

1. Type: improvement

Title: Newly retrieved security Tokens are sent as part of each heartbeat to each node from RM which is not desirable in large cluster

Description: Currently as part of heartbeat response RM sets all application's tokens though all applications might not be active on the node. On top of it NodeHeartbeatResponsePBImp converts tokens for each app into SystemCredentialsForAppsProto. Hence for each node and each heartbeat too many SystemCredentialsForAppsProto objects were getting created.

We hit a OOM while testing for 2000 concurrent apps on 500 nodes cluster with 8GB RAM configured for RM.

2. <https://issues.apache.org/jira/browse/YARN1067?jql=project%20%3D%20YARN%20AND%20text%20~%20heartbeat>

Type: improvement

Description: The heartbeat interval can be modified dynamically - more often when there are pending requests, and toned down when the heartbeat is solving no purpose other than a ping. There's a couple of jiras which are trying to change the scheduling loop - at which point this becomes useful.

Response: I think it'll be useful to have a minimum - i.e. wait for at least this minimum time before sending another heartbeat, irrespective of whether a resource request is pending or not. Gives the RM time to actually allocate some containers, for the AM to attempt an allocation of these containers, and is possibly better for the consistency of tables maintained by the AM and RM. Also the heartbeat interval could be scaled back - higher than the minimum if there's no allocations.

Could some of the sleeps be replaced with wait/notify ?

3. <https://issues.apache.org/jira/browse/YARN-3482?jql=project%20%3D%20YARN%20AND%20text%20~%20heartbeat>

Type: improvement

Description: NM are usually collocated with other processes like HDFS, Impala or HBase. To manage this scenario correctly, YARN should be aware of the actual available resources. The proposal is to have an interface to dynamically change the available resources and report this to the RM in every heartbeat.

Response: 1. The NM would have an interface (maybe a configuration file) to change how many resources are available. The NM would send this information in the NodeStatus to the RM in every heartbeat as is done at registration time. This information would be exposed through the Web UI as is now. This will have some implications when the available resources go lower than the allocated capacity.

Response 2: Hi Sunil G, yes, I'm talking about Total CPU and Total Memory.

Combining this with YARN-3481, we can estimate the load in the node that is not caused by the containers (external processes). Right now, the server could be overloaded by HBase for example and we would be sending more load there. As Karthik Kambatla mentions, this would be a very conservative scenario where the external processes have absolute priority. This might be a desired behavior for some users but the proposal is to also add an interface to dynamically change the amount of available resources according to the behavior of the external processes. Both approaches target the same problem and are complementary/orthogonal. I understand this other approach of sending node utilization might be a little out of the scope of this JIRA but I could open a new one with this functionality.

4. <https://issues.apache.org/jira/browse/YARN-3630?jql=project%20%3D%20YARN%20AND%20text%20~%20heartbeat>

Type: Improvement

Title: YARN should suggest a heartbeat interval for applications

Description: It seems currently applications - for example Spark - are not adaptive to RM regarding heartbeat intervals. RM should be able to suggest a desired heartbeat interval to applications.

Response1: Making it something that can be set in yarn-site for apps to pick up would be the simple way. Otherwise it would introduce extra fields in protobuf messages on AM registration, AMs to handle the absence of the field on older versions, tests for all of this, etc etc. A documented YARN property is something that management tools can trivially add, apps can simply read.

Response 2: I was thinking in a more adaptive solution that takes current load into consideration. Anyway, having a global configuration parameter for desired heartbeat would simplify things for application. Any thoughts on implementing something like this?

Response 3: I think an adaptive heartbeat interval is needed, especially the cluster's scale is large, in which case the heartbeat will overload RM. In fact I was also considering this problem. We need a policy for RM to determine the interval, and set the interval in the AllocateResponse. For the policy, I think the queue length of scheduler events could be a nice index of RM's load, since the scheduler is the bottleneck of the cluster's scalability. The nodeHeartbeat can also be considered, and the corresponding protobuf message filed has existed in NodeHeartbeatResponse.

Response 4: OK, adaptive does make sense: the RM can instruct AMs to back off as it experiences load. Telling them to speed up again will take more time (since they are backed off), but that probably matters less.

5. <https://issues.apache.org/jira/browse/YARN-3922?jql=project%20%3D%20YARN%20AND%20text%20~%20heartbeat>

Type: improvement

Title: Introduce adaptive heartbeat between RM and NM

Description: Currently, the communication between RM and NM are based on pull-based heartbeat protocol. Along with the NM heartbeat, it updates the status of containers (i.e. FINISHED container). This also updates the RM's view of available resource and triggers scheduling. How frequently the NM sends the heartbeat will impact the task throughput and latency of YARN scheduler. Although the heartbeat interval can be configured in yarn-site.xml, it will increase the load of RM and bring unnecessary overhead if the interval is configured too short.

We propose the adaptive heartbeat between RM and NM to achieve a balance between updating NM's info promptly and minimizing the overhead of extra heartbeats. With adaptive heartbeat, NM still honors the current heartbeat interval and sends the heartbeat regularly. However, a heartbeat will be triggered as soon as any container status is changed. Also a minimum interval can be configured to prevent NM from sending heartbeat too frequently.

6. <https://issues.apache.org/jira/browse/YARN-4963?jql=project%20%3D%20YARN%20AND%20text%20~%20heartbeat>

Type: improvement

Description: Currently the capacity scheduler will allow exactly 1 OFF_SWITCH assignment per heartbeat. With more and more non MapReduce workloads coming along, the degree of locality is declining, causing scheduling to be significantly slower. It's still important to limit the number of OFF_SWITCH assignments to avoid densely packing OFF_SWITCH containers onto nodes.

Proposal is to add a simple config that makes the number of OFF_SWITCH assignments configurable. Will upload candidate patch shortly.

7. <https://issues.apache.org/jira/browse/YARN-4728?jql=project%20%3D%20YARN%20AND%20resolution%20%3D%20Unresolved%20AND%20status%20%3D%20Open>

[text%20~%20%22heartbeat%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC](https://issues.apache.org/jira/browse/YARN-270?jql=project%20%3D%20YARN%20AND%20resolution%20%3D%20Unresolved%20AND%20ext%20~%20%22heartbeat%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC)

C

Type: bug

Title: MapReduce job doesn't make any progress for a very very long time after one Node become unusable.

Description: I have some nodes running hadoop 2.6.0.

The cluster's configuration remain default largely.

I run some job on the cluster(especially some job processing a lot of data) every day.

Sometimes, I found my job remain the same progression for a very very long time. So I have to kill the job manually and re-submit it to the cluster. It works well before(re-submit the job and it run to the end), but something go wrong today.

After I re-submit the same task for 3 times, its running go deadlock(the progression doesn't change for a long time, and each time has a different progress value.e.g.33.01%,45.8%,73.21%).

I begin to check the web UI for the hadoop, then I find there are 98 map suspend while all the running reduce task have consumed all the available memory. I stop the yarn and add configuration below into yarn-site.xml and then restart the yarn.

```
<property>yarn.app.mapreduce.am.job.reduce.rampup.limit</property>
```

```
<value>0.1</value>
```

```
<property>yarn.app.mapreduce.am.job.reduce.preemption.limit</property>
```

```
<value>1.0</value>
```

(wanting the yarn to preempt the reduce task's resource to run suspending map task)

After restart the yarn,I submit the job with the property mapreduce.job.reduce.slowstart.completedmaps=1.

but the same result happen again!!(my job remain the same progress value for a very very long time)

I check the web UI for the hadoop again, and find that the suspended map task is newed with the previous note:"TaskAttempt killed because it ran on unusable node node02:21349".

Then I check the resourcemanager's log and find some useful messages below:

*****Deactivating Node node02:21349 as it is now LOST.

*****node02:21349 Node Transitioned from RUNNING to LOST.

I think this may happen because my network across the cluster is not good which cause the RM don't receive the NM's heartbeat in time.

But I wonder that why the yarn framework can't preempt the running reduce task's resource to run the suspend map task?(this cause the job remain the same progress value for a very very long time)

8. <https://issues.apache.org/jira/browse/YARN-270?jql=project%20%3D%20YARN%20AND%20resolution%20%3D%20Unresolved%20AND%20ext%20~%20%22heartbeat%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

C

Type: bug

Title: RM scheduler event handler thread gets behind

Description: We had a couple of incidents on a 2800 node cluster where the RM scheduler event handler thread got behind processing events and basically become unusable. It was still processing apps, but taking a long time (1 hr 45 minutes) to accept new apps. this actually happened twice within 5 days. We are using the capacity scheduler and at the time had between 400 and 500 applications running. There were another 250 apps that were in the SUBMITTED state in the RM but the scheduler hadn't processed those to put in pending state yet. We had about 15 queues none of them hierarchical. We also had plenty of space lefts on the cluster.

Response: I was able to reproduce this on a smaller cluster by simulating 2800 nodes - had 720 node manager and made the heartbeat internal 250 ms (instead of 1s). At about 400 applications the scheduler queue starts to grow. I am still in the process of investigating what exactly is taking the time.

Note that for now we believe we have worked around it by increasing the nodemanager heartbeat interval from 1 second to 3 seconds.

9. <https://issues.apache.org/jira/browse/YARN-6813?jql=project%20%3D%20YARN%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20%22heartbeat%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: Bug

Title: TestAMRMProxy#testE2ETokenRenewal fails sporadically due to race conditions

Description: The testE2ETokenRenewal test lowers the AM and nodemanager heartbeat intervals to only 1.5 seconds. This leaves very little headroom over the default heartbeat intervals of 1 second. If the AM hits a hiccup and runs a bit slower than expected the unit test can fail because the RM expires the AM.

10. <https://issues.apache.org/jira/browse/YARN-5188?jql=project%20%3D%20YARN%20AND%20text%20~%20%22performance%22>

Type: bug

Description: My Hadoop Cluster has recently encountered a performance problem. Details as Follows.

There are two point which can cause this performance issue.

1: application sort before assign container at FSLeafQueue. TreeSet is not the best, Why not keep orderly ? and then we can use binary search to help keep orderly when a application's resource usage has changed.

2: queue sort and assignContainerPreCheck will lead to compute all leafqueue resource usage ,Why can we store the leafqueue usage at memory and update it when assign container op release container happen?

The efficiency of assign container in the Resourcemanager may fall when the number of running and pending application grows. And the fact is the cluster has too many PendingMB or PendingVcore , and the Cluster current utilization rate may below 20%. I checked the resourcemanager logs, I found that every assign container may cost 5 ~ 10 ms, but just 0 ~ 1 ms at usual time. I use TestFairScheduler to reproduce the scene: Just one queue: root.default 10240 apps. assign container avg time: 6753.9 us (6.7539 ms) apps sort time (FSLeafQueue : Collections.sort(runnableApps, comparator);): 4657.01 us (4.657 ms) compute LeafQueue Resource usage : 905.171 us (0.905171 ms) When just root.default, one assign container op contains : (one apps sort op) + 2 * (compute leafqueue usage op) According to the above situation, I think the assign container op has a performance problem.

11. <https://issues.apache.org/jira/browse/YARN-7402?jql=project%20%3D%20YARN%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20%22heartbeat%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: new feature

Title: Federation V2: Global Optimizations

Description: YARN Federation today requires manual configuration of queues within each sub-cluster, and each RM operates "in isolation". This has few issues:

Preemption is computed locally (and might far exceed the global need)

Jobs within a queue are forced to consume their resources "evenly" based on queue mapping

This umbrella JIRA tracks a new feature that leverages the FederationStateStore as a synchronization mechanism among RMs, and allows for allocation and preemption decisions to be based on a (close to up-to-date) global view of the cluster allocation and demand. The JIRA also tracks algorithms to automatically

generate policies for Router and AMRMProxy to shape the traffic to each sub-cluster, and general "maintenance" of the FederationStateStore.

Response: This started with conversations with Bill Ramsey, Roni Burd, Subru Krishnan, Arun Suresh, Konstantinos Karanasos and Chris Douglas. The goal is to extend YARN ability to enforce global invariant across a federated cluster, while retaining the scalability of federation. For this purpose the sharing of information among sub-cluster is on heartbeats and limited to very summarized

view of the world (queue-level aggregates only).

12. <https://issues.apache.org/jira/browse/YARN-2556?jql=project%20%3D%20YARN%20AND%20text%20~%20%22performance%22>

Type: Sub-task

Description: We need to be able to understand the capacity model for the timeline server to give users the tools they need to deploy a timeline server with the correct capacity. I propose we create a mapreduce job that can measure timeline server write and read performance. Transactions per second, I/O for both read and write would be a good start. This could be done as an example or test job that could be tied into gridmix.

- a. Discussion: This jira is to give users realistic performance numbers running the timeline server for their setup specific to their own hardware. (HBase, leveldb, etc) FYI. LevelDB publishes their own performance statics.
- b. it sounds an interesting work. Is it possible to see the throughput difference between TimelineDataManager and the web front interface? I suspect the web front interface is going to be bottleneck to throttle the end-to-end performance. With this analysis, we can have clearer picture about the reasonable to timeline server instances required to get rid of web font interface bottleneck.
- c. Thanks Chen He for the substantial early work! I have moved the test job into mapreduce jobclient tests to avoid circular dependency. I have tested the patch, and it has successfully shown the write time, write counters and write per second. I will continue to work on it to add more metric of measurement such as transaction rates, IO rates and memory usage.
- d. Cleaned up my patch, welcome to review. I have used this application to test the timeline server throughput on local mode by launching 4 mappers and each will put an entity larger than 100 kbs and iterate for 1000 times. Here is my measure result, on my local machine, the timeline server can provide about 10Mbs io rate for write. There is some deviation from the write throughput for leveldb. People are welcome to try this tool and comment about it.
- e. Hi guys,

I've done the following enhancements to the previous patches that were posted:

- 1) Earlier, the payload was getting set as the entityId. Since the entityId is used as a key, by LevelDB it was crashing under moderate loads, because each key size was ~2MB. Hence I've changed it to send the payload as a part of OtherInfo. This is handled well.
- 2) Instead of posting a string of repeated 'a's as a payload, I choose from a set of characters. This ensures that the LevelDB does not get away easily with compression ('cos algos can easily compress a string if it comprises a single repeated character)

Here are some of the performance numbers that I've got:

I run 20 concurrent jobs, with the argument -m 300 -s 10 -t 20

On a 36 node cluster, this results in ~830 concurrent containers (e.g maps), each firing 10KB of payload, 20 times.

Level DB seems to hold up fine. Would you have other ways that I could stress/load the system even more?

13. <https://issues.apache.org/jira/browse/YARN-2928?jql=project%20%3D%20YARN%20AND%20text%20~%20security>

Type: new feature

Description: We are introducing an early preview (alpha 1) of a major revision of YARN Timeline Service: v.2. YARN Timeline Service v.2 addresses two major challenges: improving scalability and reliability of Timeline Service, and enhancing usability by introducing flows and aggregation. YARN Timeline Service v.2 alpha 1 is provided so that users and developers can test it and provide feedback and suggestions for making it a ready replacement for Timeline Service v.1.x. It should be used only in a test capacity. Most importantly, security is not enabled. Do not set up or use Timeline Service v.2 until security is implemented if security is a critical requirement. More details are available in the [YARN Timeline Service v.2](./hadoop-yarn/hadoop-yarn-site/TimelineServiceV2.html) documentation.

Discussion: Thanks a bunch for filing this Sangjin Lee! I see a design doc is in order. I'll get folks who have been working on YARN-1530 to help this transition with as much code and API reuse as possible, with the flexibility of going beyond in addressing things like scalability and newer requirements.

- a. Posting the first version of the design. There are some parts that still need to be fleshed out. We'll iterate on this. Please let us know your feedback/comments/suggestions. Thanks!
- b. For public disclosure, a bunch of YARN community members synced offline about this design discussion - tx to Joep Rottinghuis, Karthik Kambatla,, Li Lu, Mayank Bansal, Maysam Yabandeh, Mohammad Kamrul Islam, Ram Venkatesh, Robert Kanter, Sangjin Lee, Vinod Kumar Vavilapalli, Vrushali Channapattan, Zhijie Shen in no order. Overall I'd like to push other efforts like YARN-2141, YARN-1012 to fit into the current architecture being proposed in this JIRA. This is so that we don't duplicate stats collection between efforts. One suggestion to the proposal - for the first cut, instead of spawning per AM container (Section 4.1) to represent an Application Level Aggregator (call it ALA), we can have a per-node agent which serves multiple AMs running on the same node. Nothing else changes - NMs sending data still have to discover the ALA, only the ALAs can send data to the underlying storage etc. It's just that the ALA is not a special container to begin with. The advantages are that we can postpone the hard part of scheduling, fault-tolerance of a special ALA container till after we wire everything else. Even long term, for small apps in a cluster, ALA running inside/side-by-side of NM with rate-limits reduces the 'heaviness' of the system. This per-node agent is very useful outside of this context too. An additional shortcut for now is to also potentially embed the ALA inside NM using say Aux Services. Obviously the biggest problem with a single ALA per node or embedded ALA per node is resource-management - which we can defer for now given it still runs system code and till we have everything else figured out. On the process side, I propose we do work on a branch with a goal to borrow whatever code is possible from current Timeline service. Regarding timelines (pun intended) I'd like to think that we have a first alpha release of this as part of say 2.8.

14. <https://issues.apache.org/jira/browse/YARN-6523?jql=project%20%3D%20YARN%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20%22heartbeat%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: Newly retrieved security Tokens are sent as part of each heartbeat to each node from RM which is not desirable in large cluster.

Description: Currently as part of heartbeat response RM sets all application's tokens though all applications might not be active on the node. On top of it NodeHeartbeatResponsePBImp converts

tokens for each app into SystemCredentialsForAppsProto. Hence for each node and each heartbeat too many SystemCredentialsForAppsProto objects were getting created.

We hit a OOM while testing for 2000 concurrent apps on 500 nodes cluster with 8GB RAM configured for RM.

Response: Approach depends on why we are sending credentials for all apps which i am not completely clear. IMO it should be sufficient to send the tokens for the apps (containers) active on the node. Possible solutions : Send only app credentials related to the node on each heartbeat. Send only app credentials related to the node on each heartbeat and also delta modifications for the node since the last heartbeat. Cache SystemCredentialsForAppsProto objects itself and reuse them rather than recreating for each node's heartbeat.(if require to send all the apps token to the node).

Response: I don't know the full story behind the SystemCredentialsForApps thing. Looks like something that was put in for Slider and other long-running services where the initial tokens can expire. It would be good to get input from Vinod Kumar Vavilapalli and Jian He since they were more involved in this.

I agree it seems silly for every node in the cluster to get all apps HDFS credentials on every heartbeat. I suspect this was the simplest thing to implement, but it's far from efficient. Going to the other extreme of just sending the app credentials only once for just the apps that could be active on the node is a lot more complicated. It's true that RMNodeImpl is tracking what applications are on the node, but this is reactive tracking to what the node is already doing. There are some scenarios where the updated tokens need to be on the node before the container launch request arrives at the node and therefore the app becomes active in the node's RMNodeImpl. For example, a Slider app runs for months. The initial tokens at app submit time have long expired, so the RM has had to re-fetch the tokens. Then suddenly the Slider app wants to launch a container on a node it's never touched before. The node's RMNodeImpl doesn't know the app is active until a container starts running on it, but the container can't localize without the updated tokens that the node has never received yet. So we'd need to send the credentials when the scheduler allocates an app's container on the node for the first time and then also when any of the app's credentials are updated (e.g.: when a token is replaced with a refreshed version). And then there's handling lost heartbeats, node reconnect, etc. In short, efficient delta is a lot more complicated.

Rather than going straight to the complicated, fully optimal implementation we could do something in-between. For example, we could have a sequence number associated with the system credentials. Nodes would send the last sequence number that they have received, and if it matches the current sequence number then the RM does not send them in the heartbeat response. If the sequence numbers don't match then the RM sends the current sequence number along with the system credentials. It's still sending all the credentials instead of optimal deltas, but at least they're only being sent when the node needs the updated version. And yes, we should precompute the SystemCredentialsForAppsProto once when the credentials change and re-send the same object to any node that needs the updated credentials rather than recreate the same object over and over and over. That should drastically cut down on the number of objects related to system credentials in heartbeats and how often we're sending them.

15. <https://issues.apache.org/jira/browse/YARN-5013?jql=project%20%3D%20YARN%20AND%20issuetype%20%3D%20Improvement%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20%22performance%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: Improvement

Title: Allow applications to provide input on amount of locality delay to use

Description: Continuing a discussion that started on YARN-4963

It would be useful if applications could provide some input to the scheduler as to how much locality delay they'd like and/or whether they'd prefer the application to be spread wide across the cluster (as opposed to being scheduled quickly and densely).

Response: a. Thanks for the clarification Tan, Wangda & Nathan Roberts, yes point 2 addresses the same issue and my mistake i missed to read this. And also agree to the focus of this jira to be specific to the system level OFF-SWITCH configuration

b. so I think when we do the application-level support the default would need to be either unlimited or some high value, otherwise we force all applications to set this limit to something other than 1 to get decent OFF_SWITCH scheduling behavior.

c. Once we have system level OFF-SWITCH configuration do we require app level default also ? IIUC by default we try to make use of system level OFF-SWITCH configuration unless explicitly overridden by the app (implementation can be further discussed in that jira)

Sure, my application scheduled very quickly but my locality was terrible so I caused a lot of unnecessary cross-switch traffic. So I think we'll need some system-minimums that will prevent this type of abuse.

This point is debatable, even though i agree your point for controlling cross-switch traffic, but still the app is performing under its capacity limits so would it be good to limit it control it.

If application A meets its OFF-SWITCH-per-node limit, do we offer the node to other applications in the same queue?

any limitations if we offer the node to other applications in the same queue ? it should be fine right ?

16. <https://issues.apache.org/jira/browse/YARN-4088?jql=project%20%3D%20YARN%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20%22heartbeat%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: improvement

Title: RM should be able to process heartbeats from NM concurrently

Description: Today, the RM sequentially processes one heartbeat after another.

Imagine a 3000 server cluster with each server heart-beating every 3s. This gives the RM 1ms on average to process each NM heartbeat. That is tough.

It is true that there are several underlying datastructures that will be touched during heartbeat processing. So, it is non-trivial to parallelize the NM heartbeat. Yet, it is quite doable...

Parallelizing the NM heartbeat would substantially improve the scalability of the RM, allowing it to either

- a) run larger clusters or
- b) support faster heartbeats or dynamic scaling of heartbeats
- c) take more asks from each application or

c) use cleverer/ more expensive algorithms such as node labels or better packing or ...

Indeed the RM's scalability limit has been cited as the motivating reason for a variety of efforts which will become less needed if this can be solved. Ditto for slow heartbeats. See Sparrow and Mercury papers for example.

Can we take a shot at this?

If not, could we discuss why.

17. <https://issues.apache.org/jira/browse/YARN-7019?jql=project%20%3D%20YARN%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20%22heartbeat%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: new feature

Title: Ability for application to notify YARN about container reuse

Description: During preemption calculations YARN can try to reduce the amount of work lost by considering how long a container has been running. However when an application framework like Tez reuses a container across multiple tasks it changes the work lost calculation since the container has essentially checkpointed between task assignments. It would be nice if applications could inform

YARN when a container has been reused/checkpointed and therefore is a better candidate for preemption wrt. lost work than other, younger containers.

18.<https://issues.apache.org/jira/browse/YARN-3477?jql=project%20%3D%20YARN%20AND%20issuetype%20%3D%20Bug%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20performance%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: bug

Title: TimelineClientImpl swallows exceptions

Description: If timeline client fails more than the retry count, the original exception is not thrown. Instead some runtime exception is raised saying "retries run out"

the failing exception should be rethrown, ideally via NetUtils.wrapException to include URL of the failing endpoint

Otherwise, the raised RTE should (a) state that URL and (b) set the original fault as the inner cause.

Description: If timeline client fails more than the retry count, the original exception is not thrown. Instead some runtime exception is raised saying "retries run out"

the failing exception should be rethrown, ideally via NetUtils.wrapException to include URL of the failing endpoint.

Otherwise, the raised RTE should (a) state that URL and (b) set the original fault as the inner cause.

Response: a. TimelineClientImpl also catches InterruptedExceptions and either converts to IOE & so making it potentially treated as a retry during a sleep(), it will catch and discard. Issue #2 means it is impossible to reliably interrupt a thread which is in the attempt-and-retry process of trying to talk to a non-responsive ATS instance. While this does not impact normal operations, it does make it hard to shut down threads talking to ATS.

b. rethrows last received exception on a retry count failure

caught InterruptedExceptions are converted to InterruptedIOException. This allows recipients to selectively look for that exception.

no longer swallows InterruptedExceptions during sleep

There's no tests here, because there's no easy way to implement the failure paths. Close review is encouraged.

There's one more thing we may want to do when handling the interrupts: re-enable the thread's interrupted flag. See <http://www.ibm.com/developerworks/library/j-jtp05236/> for the specifics here. I don't see any harm in doing this, and as it helps preserve the interrupted state, can only be a good thing

19.<https://issues.apache.org/jira/browse/YARN-4376?jql=project%20%3D%20YARN%20AND%20issuetype%20%3D%20Bug%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20performance%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: bug

Title: Memory Timeline Store return incorrect results on fromId paging

Description: The MemoryTimelineStore cannot page correctly when using fromId. This is due switching between data structures that apparently have different natural sorting. In addition, the approach of creating a new data structure every time from scratch is costly.

Response: Posting a patch that addresses the issues above. It's not easy to reproduce this error since the iteration order is implementation dependent. I went with adding the TreeSet as secondary view into the entities. As far as extra memory requirements needed, documentation states 40 bytes * capacity. For 1,000,000 entities the extra memory requirements will be 8MB. The insert time is increased for 1,000,000 entries from 3.5 seconds to 11 seconds. Looking into whether this is significant on amortization. Will test with a huge entity set to validate the performance before and after.

20.<https://issues.apache.org/jira/browse/YARN-6242?jql=project%20%3D%20YARN%20AND%20issuetype%20%3D%20Bug%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20performance%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: bug

Title: Miscellaneous Scheduler Performance Improvements.

Description: There're some performance issues of scheduler. YARN-3091 is majorly targeted to solve locking issues of scheduler, Let's use this JIRA to track non-locking issues.

Response: a. I remember there're some perf issues in FS as well, better to move them under the same JIRA so we can handle common issues together?

b. YARN-6361 is a FS performance issue but not related to CS, I think. Should it be added to the list?

c. I add two fair scheduler performance improvement JIRAs here. But I just realize there is one FairScheduler performance improvement umbrella YARN-5479. We may combine these two later.

21.<https://issues.apache.org/jira/browse/YARN-4945?jql=project%20%3D%20YARN%20AND%20issuetype%20%3D%20Bug%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20performance%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: bug

Title: Capacity Scheduler Preemption Within a queue

Description: This is umbrella ticket to track efforts of preemption within a queue to support features like.

Response: Some rough ideas about design:

In general, after YARN-4822, we can implement and active new intra-queue preemption candidate selector according to queue's policy.

There're a couple of things that needs to think more:

Compute ideal resource allocation of applications: Currently we only support calculating queue's ideal resource allocation. We should calculate apps' ideal allocation as well.

Configuration of intra-queue preemption: we should be able to turn on/off intra/inter queue preemption separately.

When intra-queue preemption can happen: in some cases, we need intra-queue preemption happen when queue is under its guaranteed resource, and we also need to make sure no excessive preemption (like crossfire between apps) happens.

Priorities of intra-queue preemption and inter-queue preemption. Intra-queue preemption should happen after inter-queue preemption, IAW, in an under-satisfied queue, an app should prefer to get resources from an over-satisfied queue instead of from other apps in the same queue.

b. Above is one of the case that needs intra-queue preemption kick in.

In my mind, intra-queue preemption could happen when the queue is not able to get new resources (1), and any of apps in the queue is under its ideal allocation. (2)

(1) The queue is not able to get new resources:

Not only queue has 100% resource usage and cluster is full. It is possible that because of queue's max capacity setting, queue cannot get more resource when cluster has sufficient idle resource .

And also, when some queue doesn't allow preemption, queue cannot get more resource when the queue below its guaranteed capacity.

(2) Any of apps under its ideal allocation:

Not only for user-limit example, we may need to consider a general solution for different queue policies. For example: for Fifo+priority policy, highest application can take all capacities; for fair policy, app's ideal allocation is computed fair share.

The only difference between different intra-queue preemption goal (children tasks of this umbrella JIRA) is, we need to compute applications' ideal allocations in different way. Remain part should be same.

Thoughts?

c. For queue X, this should happen when all of the following occur:

some set of resources (memory, vcores, labelled, locality, etc) are all used, either by other queues or apps in queue X any user in queue X is over its minimum user limit percent

another user in queue X is under its minimum user limit percent and asking for resources

Having said that, the question of whether a queue can grow its usage by allocating available resources is complicated by the same issues that plague cross-queue preemption such as labelled resources, locality, fragmented memory, and so forth.

22.<https://issues.apache.org/jira/browse/YARN-3633>

<https://issues.apache.org/jira/browse/YARN-3633?jql=project%20%3D%20YARN%20AND%20issuetype%20%3D%20Bug%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20%22security%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: bug

Title: With Fair Scheduler, cluster can logjam when there are too many active queues

Description: It's possible to logjam a cluster by submitting many applications at once in different queues.

For example, let's say there is a cluster with 20GB of total memory. Let's say 4 users submit applications at the same time. The fair share of each queue is 5GB. Let's say that maxAMShare is 0.5. So, each queue has at most 2.5GB memory for AMs. If all the users requested AMs of size 3GB - the cluster logjams. Nothing gets scheduled even when 20GB of resources are available.

Response: a. So, in essence the problem is that when there are too many queues, the fair share of each queue gets low and thus the maxAMShare, which is calculated from the fairShare of each queue, gets too low to run any container.

I propose the following solution: Instead of setting.

b. So, in the scenario described in the JIRA, we would still run AMs in some queues but we won't overrun the cluster with AMs because it will hit the cluster-wide limit. If this proposal sounds reasonable, I can start working on this. However, I am not sure how this would interact with preemption.

23.<https://issues.apache.org/jira/browse/YARN-4754>

<https://issues.apache.org/jira/browse/YARN-4754?jql=project%20%3D%20YARN%20AND%20issuetype%20%3D%20Bug%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20%22security%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: bug

Title: Too many connection opened to TimelineServer while publishing entities.

Description: a. It is observed that there are too many connections are kept opened to TimelineServer while publishing entities via SystemMetricsPublisher. This cause sometimes resource shortage for other process or RM itself. As a result of above sometimes RM itself wont get resources to publish which causes entity publish fails.

b. The relevant code in TimelineWriter#putEntities. close will close the underlying input stream.

24.<https://issues.apache.org/jira/browse/YARN-6523>

<https://issues.apache.org/jira/browse/YARN-6523?jql=project%20%3D%20YARN%20AND%20issuetype%20%3D%20Improvement%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20%20maintainability%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: improvement

Title: Newly retrieved security Tokens are sent as part of each heartbeat to each node from RM which is not desirable in large cluster.

Description: Currently as part of heartbeat response RM sets all application's tokens though all applications might not be active on the node. On top of it NodeHeartbeatResponsePBImp converts

tokens for each app into SystemCredentialsForAppsProto. Hence for each node and each heartbeat too many SystemCredentialsForAppsProto objects were getting created.

We hit a OOM while testing for 2000 concurrent apps on 500 nodes cluster with 8GB RAM configured for RM.

Response: Approach depends on why we are sending credentials for all apps which i am not completely clear. IMO it should be sufficient to send the tokens for the apps (containers) active on the node.

Possible solutions : Send only app credentials related to the node on each heartbeat

Send only app credentials related to the node on each heartbeat and also delta modifications for the node since the last heartbeat. Cache SystemCredentialsForAppsProto objects itself and reuse them rather than recreating for each node's heartbeat.(if require to send all the apps token to the node). I am not sure why all the apps tokens are sent to NM rather than sending only of applications which are running on that node. In 2nd and 3rd approaches has to deal with renewal of credentials. It never be known that does credentials are renewed. But in 1st approach, performance need to be compromised for node heartbeat response time.

How about keeping app credentials in RMNodeImpl i.e proposal is let RMnodeImpl maintains copy of credentials and these are sent in heartbeat response. By this way, RMnodeImpl maintains app credential for running applications on node. In case of credential renewal, an event triggered to RMnodeImpl to change its credentials. But, there would be corner cases, updated credentials will misses for couple of heartbeats.

- c. Yes. Its ideal to keep a copy of apps tokens on each RMNodeImpl itself. I think RMNodeImpl could pull renewed tokens from DelegationTokenRenewer at regular intervals if there is a concern over increased number of events to be fired to RMNodeImpl regarding token renewal. I still feel an event publishing model will be more concrete.

25.<https://issues.apache.org/jira/browse/YARN-7018?jql=project%20%3D%20YARN%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20%22heartbeat%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: New feature

Title: Interface for adding extra behaviour to node heartbeats

Description: This JIRA tracks an interface for plugging in new behaviour to node heartbeat processing. Adding a formal interface for additional node heartbeat processing would allow admins to configure new functionality that is scheduler-independent without needing to replace the entire scheduler. For example, both YARN-5202 and YARN-5215 had approaches where node heartbeat processing was extended to implement new functionality that was essentially scheduler-independent and could be implemented as a plugin with this interface.

26.<https://issues.apache.org/jira/browse/YARN-7005?jql=project%20%3D%20YARN%20AND%20issuetype%20%3D%20Improvement%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20maintainability%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: improvement

Title: Skip unnecessary sorting and iterating process for child queues without pending resource to optimize schedule performance.

Description: Nowadays even if there is only one pending app in a queue, the scheduling process will go through all queues anyway and costs most of time on sorting and iterating child queues in ParentQueue#assignContainersToChildQueues.

IIUIC, queues that have no pending resource can be skipped for sorting and iterating process to reduce time cost, obviously for a cluster with many queues. Please feel free to correct me if I ignore something else.

Response: Thanks for working on this fix.

Looked at the patch, getAllPending could be an expensive operation. I think we could maintain a per-partition active queue set (which has pendingResource(partition) > 0). The active queue set will be updated when queue's pending resource get updated. CSQueue#inc/decPendingResource.

The other quicker solution is to change getAllPending to getPending(partition) in your patch. We may need to do some benchmark to see how much performance it improves.

Thoughts?

b. Thanks Wangda Tan for your suggestion.

Attaching v2 patch with performance test cases in TestCapacitySchedulerPerf which prepare large scale queues (100/500/1000/5000) and make one allocation in random queue for 1000 times. In my local test, this change can increase the performance of 33% for 100 queues, 72% for 500 queues, 130% for 1000 queues and 300% for 5000 queues.

27.<https://issues.apache.org/jira/browse/YARN-7004?jql=project%20%3D%20YARN%20AND%20issuetype%20%3D%20Improvement%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20maintainability%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: improvement

Title: Add configs cache to optimize refreshQueues performance for large scale of queues.

Description: We have requirements for large scale queues in our production environment to serve for many projects. So we did some tests for more than 5000 queues and found that refreshQueues process took more than 1 minute. The refreshQueues process costs most of time on iterating over all configurations to get accessible-node-labels and ordering-policy configs for every queue.

Loading queue configs from cache should be beneficial to reduce time costs (optimized from 1 minutes to 3 seconds for 5000 queues in our test) when initializing/reinitializing queues. So I propose to load queue configs into cache in CapacityScheduler#initializeQueues and CapacityScheduler#reinitializeQueues. If cache has not be loaded on other scenes, such as in test cases, it still can get queue configs by iterating over all configurations.

Response:

Response: as Wangda mentioned there is support for storing capacity scheduler configuration in non-file based storage, and using an API to make incremental configuration changes to specific key-value pairs. Currently there's support for leveldb and zookeeper. The leveldb implementation should solve this problem, e.g. if you only want to change one key/value pair then the configuration mutation operation only needs to persist this single change, and the mutation is also applied in-memory. For the zookeeper based approach though, it reads/deserializes the entire configuration, applies the change, and serializes/stores it. But this may still speed it up, depending on where the bottleneck is for the original file-based approach. We haven't tried it on such a large queue hierarchy though.

Anyway, depending on which backing store is suitable for your environment, I'd recommend seeing if this feature can fix the refreshQueues issue. There's some documentation on enabling this in the markdown files in YARN-7241.

28.<https://issues.apache.org/jira/browse/YARN-5479?jql=project%20%3D%20YARN%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20%22heartbeat%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

Type: Improvement

Title: FairScheduler: Scheduling performance improvement.

Description: Currently ResourceManager uses a single thread to handle async events for scheduling. As number of nodes grows, more events need to be processed in time in FairScheduler. Also, increased number of applications & queues slows down processing of each single event.

There are two cases that slow processing of nodeUpdate events is problematic:

- A. global throughput is lower than number of nodes through heartbeat rounds. This keeps resource from being allocated since the inefficiency.
- B. global throughput meets the need, but for some of these rounds, events of some nodes cannot get processed before next heartbeat. This brings inefficiency handling burst requests (i.e. newly submitted MapReduce application cannot get its all task launched soon given enough resource).

Pretty sure some people will encounter the problem eventually after a single cluster is scaled to several K of nodes (even with assignmultiple enabled).

This issue proposes to perform several optimization towards performance in FairScheduler nodeUpdate method. To be specific:

- A. trading off fairness with efficiency, queue & app sorting can be skipped (or should this be called 'delayed sorting'?). we can either start another dedicated thread to do the sorting & updating, or actually perform sorting after current result have been used several times (say sort once in every 100 calls.)
- B. performing calculation on Resource instances is expensive, since at least 2 objects (ResourceImpl and its proto builder) is created each time (using 'immutable' apis). the overhead can be eliminated with a light-weighted implementation of Resource, which do not instantiate a builder until necessary, because most instances are used as intermediate result in scheduler instead of being exchanged via IPC. Also, createResource is using reflection, which can be replaced by a plain new (for scheduler usage only). furthermore, perhaps we could 'intern' resource to avoid allocation.
- C. other minor changes: such as move updateRootMetrics call to update, making root queue metrics eventual consistent (which may satisfies most of the needs). or introduce counters to getResourceUsage and make changing of resource incrementally instead of recalculate each time.

With A and B, I was looking at 4 times improvement in a cluster with 2K nodes.

Suggestions? Opinions?

1. <https://issues.apache.org/jira/browse/YARN-1680?jql=project%20%3D%20YARN%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20%22heartbeat%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>
Type: sub-task
Title: availableResources sent to applicationMaster in heartbeat should exclude blacklistedNodes free memory.
Description: There are 4 NodeManagers with 8GB each.Total cluster capacity is 32GB.Cluster slow start is set to 1.
Job is running reducer task occupied 29GB of cluster.One NodeManager(NM-4) is become unstable(3 Map got killed), MRAppMaster blacklisted unstable NodeManager(NM-4). All reducer task are running in cluster now.
MRAppMaster does not preempt the reducers because for Reducer preemption calculation, headRoom is considering blacklisted nodes memory. This makes jobs to hang forever(ResourceManager does not assing any new containers on blacklisted nodes but returns availableResouce considers cluster free memory).
1. <https://issues.apache.org/jira/browse/YARN-3923?jql=project%20%3D%20YARN%20AND%20resolution%20%3D%20Unresolved%20AND%20text%20~%20%22blacklist%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC>

[text%20~%20%22heartbeat%22%20ORDER%20BY%20priority%20DESC%2C%20updated%20DESC](#)

Type: new feature

Title: Introduce adaptive heartbeat between RM and AM

Description: Currently, the communication between RM and AM are based on pull-based heartbeat protocol. Along with AM heartbeat, AM sends the container requests to RM and retrieves the new allocated containers. Also, it will update RM's view of resource requests of applications. How frequently AM sends the heartbeat will impact the task throughput and latency of YARN scheduler. Although the heartbeat interval can be configured in yarn-site.xml (mapred-site.xml for MR AppMaster), if it is configured too short, it will increase the load of RM and bring unnecessary overhead.

We propose the adaptive heartbeat between RM and AM to achieve a balance between updating AM's info promptly and minimizing the overhead of extra heartbeats. With adaptive heartbeat, AM still honors the current heartbeat interval and sends the heartbeat regularly. However, a heartbeat is triggered as soon as a container request is made. To prevent AM sending heartbeat too frequently, a minimum interval can be used to throttle the frequency of heartbeat

2. <https://stackoverflow.com/questions/11959951/how-to-implement-a-tcp-ip-heartbeat-on-2500-sockets>

Title: How to implement a TCP/IP heartbeat on 2500+ sockets?

I currently have an asynchronous TCP/IP socket C# WinForms application that is the "Server" application. The application holds persistent sockets to the clients. I would like to implement a heartbeat packet to detect Half-Open connections.

Initially I thought about just creating a loop and sending the heartbeat to my entire collection of sockets every xx number of seconds. However, I think this would be bad for performance.

I think I should somehow stagger the heartbeat and send to a few hundred sockets at once. Does anyone have any experience/techniques/implementations for effectively accomplishing this?

Answer: I do this (for an order-of-magnitude more sockets) simply by tracking how long ago I last spoke to (or heard from) a particular socket.on an interval, I ping those over a given age. Assuming sockets connect / disconnect / communicate uniformly, this gives me a fairly uniform distribution. Besides, you can always cap the ping to a finite number of sockets per iteration: because you're tracking the last-talked info, the ones you don't get to will still be eligible next time.

3. <https://stackoverflow.com/questions/2183416/customize-weblogics-heartbeat-message>

Title: Customize WebLogic's heartbeat message

Question: I'm currently developing a system to ensure high performance, availability and scalability; fail-over and crash recovery on a WebLogic integration scenario.

Does anybody know if it is possible to customize WebLogic's native heartbeat messages, to add some additional information such as current CPU usage and/or network load?

The purpose is to allow load-balancing algorithms that use that "custom" information, to avoid overloading a struggling server with more requests.

Answer: To my knowledge, this is not possible. First, heartbeats are used by a server instance to advertise its availability - and only its availability - (by monitoring heartbeat messages, server instances in a cluster determine when a server instance has failed). Second, WebLogic's load balancing algorithms are not pluggable and don't use heartbeats (at least not directly).

So, you can use:

- Round-robin load balancing for HTTP requests when using a proxy plugin.

- Round-robin, weight-based (for not homogeneous clusters), or random load balancing for EJBs and RMI Objects.

If you want to use a (more advanced) load-based balancing strategy for HTTP requests, you'll have to use another solution - most likely an hardware load balancer - supporting this algorithm.

Note that a load-based strategy is not something I've seen frequently, even for huge websites. Most of time, a simple round-robin algorithm provides a very satisfying distribution of requests and consequently a balanced utilization of resources.

4. <https://stackoverflow.com/questions/181225/distributed-event-handling-mechanism-for-java>

Title: Distributed event handling mechanism for Java

Question: I'm looking for a reasonably fast event handling mechanism in Java to generate and handle events across different JVMs running on different hosts.

For event handling across multiple threads in a single JVM, I found some good candidates like Jetlang. But in my search for a distributed equivalent , I couldn't find anything that was lightweight enough to offer good performance.

Does anyone know of any implementations that fit the bill?

Edit: Putting numbers to indicate performance is a bit difficult. But for example, if you implement a heartbeating mechanism using events and the heartbeat interval is 5 seconds, the heartbeat receiver should receive a sent heartbeat within say a second or two.

Generally, a lightweight implementation gives good performance. A event handling mechanism involving a web server or any kind of centralized hub requiring powerful hardware (definitely not lightweight) to give good performance is not what I'm looking for.

Answer1: Depending on your use case, [Terracotta](#) may be an excellent choice.

Answer2: AMQP(Advanced Message Queuing Protocol) -- more details :http://en.wikipedia.org/wiki/Advanced_Message_Queueing_Protocol is probably what you're looking for. It is used by financial service companies for their high performance requirements -- apache has an implementation going -- <http://cwiki.apache.org/qpid/>
OpenAMQ - <http://www.openamq.org/> is an older REFERENCE IMPLEMENTATION .

5. <https://stackoverflow.com/questions/5297178/what-technologies-should-i-use-to-build-a-heartbeat-system>

Title: What technologies should I use to build a heartbeat system?

Question: I have to build a heartbeat system (i.e. some(about 10) nodes on a network send regular "heartbeats" every few seconds to a central node). These nodes are ubuntu machines. So what would you suggest for the following choices :

- TCP/UDP?
- Language/software to send the messages?
- Server architecture - multiple threads or multiple processes etc.?

The aim of the heartbeats is to quickly find any nodes that go down, or if nodes can't communicate with the central server. Performance on the client nodes is an issue, so I don't want to use java (because that would require installing a jvm).

PS: We may later need to also pass some text with the "heartbeat" messages, so we want to develop the system keeping that in mind.

Answer: A really simple one-directional "ping" application should suffice. I'd use a single UDP socket at the server, listing for incoming messages on port *foo* and send "i'm alive" messages from the clients with a single UDP socket at each client with `sendTo` in an infinite loop with a `sleep`. No fancy threads/processes needed. You can distinguish the clients at the server either by their `recvFrom` address or by including a client id in the packet payload. You can then keep track of the last time each client sent a ping. You might need more than one thread on the server to make use of blocking receives while checking for timeouts. Or use `select` and a small timeout/pause to poll the socket.

Beej has an excellent guide how to do all of this in

C: <http://beej.us/guide/bgnet/output/html/multipage/index.html>

6. <https://stackoverflow.com/questions/12383713/mysql-master-master-replication-or-drdb-heartbeat>

Title: mysql Master-Master Replication or drdb heartbeat

Question:

I'm db replication newbie.

I'm planning to add replication and failover features to our database system.

I have read tons of docs talking about scale-out or scale-in db systems and I'm a bit confused.

Currently I have only one data base stored in one server, And I'm planning to duplicate it in other new server.

I think that there are two solutions.

First one it's to create a master-master replication and deal with the load balancer to manage the failover.

And the second one is to create an DRBD with heartbeat, with active-passive database, creating a slave pointing to heartbeat virtual IP.

I think that first solution will be easier than the second, but I want to know your opinion.

Thanks!

Answer: yes, go with the master-master replication and using load balancing is the best option but it always depends on which type of applications you're using over.

while if you want to make a log of the users at that time creating virtual IP is the nice option.

Hope this information will help you on further development.

7. <https://stackoverflow.com/questions/39711895/overwriting-existing-values-in-unique-index-field-in-mongodb-aggregating-heartbeats>

Title: Overwriting existing values in unique index field in MongoDB (Aggregating heartbeat events)

Question: Other possible solutions I could think of are:

- Processing heartbeats individually with their own handler using `upsert`. (Possible but adds some unnecessary(?) complexity to processing pipeline. Also batch mode highly is preferred.)
- Keeping heartbeats in memory and storing them to DB after some timeout. (Problem is that heartbeat timers should be able to pause. Also I would like to keep server stateless.)
- Turning whole thing upside down using websockets. (Possible but adds some unnecessary(?) complexity since sometimes tracking is related to parts of the page and there can be multiple concurrent heartbeat timers on one page.)

- Store all events as they are and clean up unnecessary events later with some batch processing job. (Not exactly sure but might cause some performance issues in MongoDB). Also though using capped collection here but doesn't actually solve the problem.

So as a recap the most important question is how to effectively and elegantly deal with aggregation of this sort of heartbeat data?

8. <https://stackoverflow.com/questions/45668721/gatling-websocket-check-with-count-not-working>

Title: gatling websocket check with count not working

Question: I'm running a performance test on a websocket. The websocket is returning a heartbeat message every 3 seconds and several data messages. I want to collect the messages returned by the websocket within a specific time interval (10 seconds) and count the data messages ignoring the heartbeat messages.

9. <https://stackoverflow.com/questions/17116767/internet-availability-notification-net-vs-native-c>

Title: internet availability notification .net vs native (c++)

Question: My .net application (client-server) that needs to know immediately when the server (ping an url) is back online, and the only way I see it is to do ping it every 10/50/100 ms.

The client application is running on Kiosks with average-to-low performance PCs, in order to optimize this and I am thinking of writing a separate native application that would be in charge of ping-ing the server heartbeat address.

My question is would implementing it in C++ make any performance difference than just creating simple .net application ?

Answer: No, it wouldn't make any difference as the most "expensive" part is waiting for response. You can check it very simple using this code:

10. <https://stackoverflow.com/questions/29949024/java-socket-sockssocketimpl-memory-clog>

Title: Java Socket/SocksSocketImpl memory clog

Question: In our test lab setup we have two hosts, both acting as server/client as they are sending heartbeats to each other.

I was running automated performance tests, and after 5 days RAM consumption increase was steady but consistent, on a first application. Since the tests **did not** target heartbeat application, this was not expected. After collecting the heap dump of the problematic host and loading it into MemoryAnalyzer and I found lots of "Unreachable" SocksSocketImpl objects. **The number is huge, more than 12K of objects.** Now, the application does create and use sockets but I am pretty confident, after reviewing the code, that there is no some sort of creation loop there. However, when application quits, socket is not properly closed, but again, the heartbeat application did not restart during those 5 days.

I've read about this in SO question: [Memory leak with SocksSocketImpl finalize method](#)

Answer1: In socket data transferring , you can prepend the size of data to the transfer data ,(eg:- 10 byte reserved for the length of data) , if you doing like that on the client side the you can get the size of data to receive ,wait (loop)and collect the full data . I thought i may solve your problem.

Answer2: Ok, after days of investigating I finally got to the bottom of it.

My application creates a ServerSocket which listens for incoming connections. However, external application's logic was wrong so it used to connect to my app very repeatedly/frequently, causing a massive `Socket` object allocation. In time, connection would be closed and `Socket` would be marked for collection.

The second part of puzzle is that GC was never triggered. If I had 12K Socket, only 10-20 of those would be "GC root reachable" while others would be "Unreachable". If I would force GC, all of those would be cleaned up. Since there was only 20-30M consumed of max 500M (set by -Xmx), I assume that was the reason why GC was never triggered.

I know this answer is not particularly useful, but I am putting it here anyway. Could be helpful to someone..

11. <https://stackoverflow.com/questions/6662022/messaging-system-design-one-queue-per-one-message-type-vs-one-queue-for-all-messages>

Title: Messaging system design - one queue per one message type vs. one queue for all messages
Question: I want to implement a messaging system with following actors:

- 1) Web interface 2) Daemon 3) Database

The web interface sends requests to the daemon, which are placed in a queue (ActiveMQ).

The daemon reads the messages, processes them and writes some data into the database.

Both web interface and the daemon access the database.

If required, additional daemons may be connected to the queue (to improve performance).

Answer1: If ordering of your messages is unimportant, or is handled appropriately by your app then of course having each message in a separate queue will allow for more robust scaling options. But at the expense of having to maintain 5 queues instead of 2. I'm not sure how much is that harder, but suspect not much once you get used to it.

Answer2: if there is difference in volume of message of particular message type.. for e.g. if your message of type1 is expected to be 100 messages per minute where as type2 is expected to be 2 message per minute then, it would make sense to have separate queue due to following reasons:-

1. You can configure different concurrent message listeners based on load. for e.g in above case , you may want to configure 10 message listeners for type1 and only 1 message listener for type2.
2. It can happen if message of type2(though smaller in number) sits at very end of queue and need to wait for all type1 messages to be processed for their turn.

12. <https://stackoverflow.com/questions/43642162/how-to-close-idle-connections-in-spring-jms-cachingconnectionfactory>

Title: How to close idle connections in Spring JMS CachingConnectionFactory?

Question: I used the Spring JMS cachingconnectionfactory to improve the performance of the my application based on Spring Integration and IBM MQ. I put sessioncachesize as 10 as we have the max of 10 concurrent threads working (ThreadPoolTaskExecutor) on consume/sending messages.

When I looked at the number of connections opened in MQ explorer (open output count for queue), it shows 10 and it stays on for days and never getting closed.

1. Is there a way to programatically to detect connections which are potentially stale - say idle for half a day - I checked the resetConnection() but not sure how to get the last used time for the session.
2. Does Spring provides any connection time out parameter for cacheconnection factory? or How to release these idle connections?

Also, the heartbeat/keepalive mechanism will not work for us as we want to physical close the cached connections based on last used time.

Answer: If the timeout is a property of the Session object returned by IBM, you could subclass the connection factory, override createSession(); call super.createSession(...) then set the property before returning it. You might also have to override getSession(...) and keep calling it until you get a session that is not closed. I don't see any logic to check the session state in the standard factory. (getSession() calls createSession() when the cache is empty).

13. <https://stackoverflow.com/questions/7877461/architecture-guidance-for-a-rabbitmq-net-implementation>

Title: Architecture guidance for a Rabbitmq .net implementation

Question: I'm looking for some implementation guidance. What are the pro and cons of using the wcf bindings or using the plain vanilla .net rabbitmq api. Are the moment we are not constrained to use either. I new to rabbitmq, but done a bundle of wcf.

We have a product which collects info from publishers on each device. The product is behind the firewall (at the moment). The publisher will need 3-4 channels.

- Request/Response to publish the metric to publish/subscribe on server with ack from server.
- Update channel, to update publisher rulebase for metric discovery from server.
- Heartbeat channel to check server is up and respond to server heartbeat.
- Possible dead letter channel.

Publisher will be cross platform. Thinking of hosting on Mono, on Linux, BSD, Solaris, Android, MacOs, iOS, and possibly Aix/HP-UX. Don't know how effective wcf endpoints would be in these instances.

Server will have multiple workers, each receive same message from own? queue, ack it and process it against their own rulebase. I would like the workers to be event driven. Server needs to be high performance, 10k to 100k+ messages per minute. No messages can be lost from publisher to server.

I'm swinging towards using the plain api as it offers more flexibility as regarding stuff like threading/serialization/session management/security/compression but the product may be moved to Azure and offered as SaaS or PaaS, and having wcf endpoint would make sense to talk to publishers on both on/off windows, but that would be in the longer term.

Answer1: This question is a bit broad too answer. Recommend that it be deleted or significantly truncated (I assume the need is no longer pertinent).

14. <https://stackoverflow.com/questions/10702517/in-a-tcp-connection-java-packets/10702705#10702705>

Title: In a tcp connection... Java (Packets)

Question: When I have a TCP connection that uses packets.. (Server / Client Application) Should I keep sending a packet back and forth (Between the server and client) just to see if the connection is alive or is that unnecessary? like a KeepAlive packet..

another question is does it make a huge difference (performance wise) if I send an int (DataOutputStream) through a stream instead of sending a Packet object (ObjectOutputStream) which has like an average of 5 fields at least 3 methods and some getters and setters? would it make such a big difference performance wise?

Answer: Yeap. This is called heartbeat. This help receiver of heartbeat to detect if there is problem in connection. Regarding the second part, if you try to send the object than it need to be deserialize and serialize. This will surely have the impact on performance. If you want to know the performance from network lag perspective than it should not be much difference.

15. <https://stackoverflow.com/questions/18907591/socket-io-server-performance-and-bandwidth-usage/18907653#18907653>

Title: Socket.IO server performance and bandwidth usage

Question: I'm about to host a small socket server on a local computer and I'd like to know what kind of bandwidth it's going to use. On most days it will have no more than 50 clients connected at once, but once or twice a week it could have as many as 5,000+ clients at once. However, the only messages sent will be an occasional single message to all connected clients at once with no extra data or anything.

Will the server cause a significant drop in performance on the computer it's hosted on or slow down my internet speeds at all?

Answer: The amount of bandwidth will depend heavily on the amount of data you're going to send from the server, and how much data the client will send. The bandwidth usage will also depend on which Socket.IO transport you're using, and the heartbeat interval of your application.

The performance impact of the application also varies on the type of application you're running and the performance capability of your machine and/or network. However, 5000+ clients will have a considerable impact on performance, regardless of your computer's capabilities unless you are scaling the application across multiple cores.

I've taken some measurements using a proxy. Here are the results:

Emitting from a client: socket.emit(event, args)

- If event and args are not supplied, 12 bytes are sent to the server.
- If args is omitted but event is supplied, the total size is 22 bytes and the length of event.
- If args and event are supplied, the same rules are followed, but the results may vary depending on the data type of args.

Emitting from the server: same format as from client

- If event and args are not supplied, 8 bytes are sent to the client.
- If args is omitted but event is supplied, the total size is 17 bytes and the length of event.
- If args and event are supplied, the same rules are followed, but the results may vary depending on the data type of args.

Server to client heartbeat: every 25 seconds per client

- 5 bytes from server
 - 9 bytes client response
- Handshaking:** once per client
- 216 bytes from server
 - 431 bytes response from client
 - 129 bytes follow up from server

Therefore with a load of 5000+ clients, expect at least 3.7MB for handshaking, 3KB/s for heartbeats, and at least 107KB bandwidth for a socket.emit(). These are not exact figures, as clients can lose data, drop connections, need to reconnect, etc.

Conclusively, your network will probably hold up, but the main concern should be the amount of concurrent connections your network will have to handle. Many concurrent connections can also be CPU intensive, so you should think about clustering across cores. Also keep in mind the amount of heartbeats the Socket.IO server will have to handle. With 50 concurrent users, that's an average of 2 heartbeats per second. At 5000+ concurrent users, that's 200+ heartbeats per second, which I'd imagine is more CPU intensive than network intensive (2.8KB/s).

16. <https://stackoverflow.com/questions/982841/can-wpf-render-a-line-path-with-300-000-points-on-it-in-a-performance-sensitive>

Title: Can WPF render a line path with 300,000 points on it in a performance-sensitive environment?

Question: A simple XY line graph: The X axis will represent the complete range of possible rating percentages, from 0% on one end to 100% on the other. Specifically, the X value will represent our rating cut-off, or the minimum rating a transaction can have before it is no longer acceptable. The Y axis will show values from 0 to the total number of transactions that have come through. The Y value will represent the total number of transactions that have a rating greater than the current X value (or greater than or equal to the current X value, I haven't decided yet). No transactions will have come through when this graph is first drawn, so the graph will begin at "y=0x".

Let's say the first transaction comes through, with a rating of 40%. The rating of the transaction indicates that this transaction is acceptable if our rating cut-off is less than 40%. (... or less than or equal to 40%. Again, I haven't decided yet).

First, the Y axis will rescale to show the range of 0-1 (since 1 is the total number of transactions). Then the line will be modified to indicate that 0 transactions are acceptable from $x=40$ or more, and that 1 transaction is acceptable from $x=40$ or less. This is easy to accomplish in WPF by simply adding two points to the line path - one at (40,0) and the other at (40,1) - and then moving the line's left endpoint to (0,1). The line's right endpoint will remain at (100,0). This process can then be repeated for the second transaction, and so on.

The problem is that we will be dealing with six-digit quantities of transactions, and I want to make sure I am using WPF's hardware accelerated vector drawing capabilities to their fullest extent to ensure the graph doesn't lag or freeze the rest of the program as it tries to render 300,000 points onto a single line path. Or is WPF supposed to be able to handle numbers like that in a heartbeat? I need to find a way to implement this graph without slowing the application to a halt. I have faith that WPF's vector drawing platform will provide a solution, but I don't know enough about how to exploit WPF to be certain that I am getting the most out of WPF's high-performance rendering capabilities.

Answer: I just stumbled upon this post and am building a line graph control myself that needs to be very performant as we update the points on our lines in a real-time manner.

If performance and number of Visual(s) are what you are after ... **I doubt you will find a more performant approach than programming directly against WPF's Visual layer** (links: [1](#), [2](#)). My initial results from using this approach have been very positive.

This will be even more performant than overriding OnRender as it will encourage you to take advantage of WPF's retained mode drawing subsystem (where all the drawing instructions are cached).

That is, if all you have to update is a point on the line, then updating the point will force the line Visual to update but won't force the rest of the graph (axes, gridlines, ...) to update ... as the drawing instructions for these are retained and will be reused (since they aren't updating).

Chapter 14 in [*Pro WPF in C# 2008*](#) by Matthew MacDonald has a great section (titled 'Visuals') on programming against WPF's Visual layer. Chapter 2 of [*WPF Control Development Unleashed*](#) also has section on page 13 where he discusses how a DrawingVisual approach would be perfect for a charting component. Finally, [Charles Petzold](#) wrote a MSDN Magazine [article](#) where the best overall solution to a scatter plot was a DrawingVisual approach.

(Now, I know that your question mentioned the axes will also be updating ... and so my answer is really for the general case ... but I still think that this approach will be the most performant ... as only the things that need updating ... will update.)

Answer2: If you want it to be fast, the best way is to derive from Control and implement OnRender - normally this isn't necessary, but for your application it might be.

Also, let's take a step back - the screen you're rendering to certainly isn't 300k pixels across; before you go to render, reduce the buffer by averaging n nodes into one until you've got something closer to the resolution of the actual device, *then* draw it on-screen.

17. <https://stackoverflow.com/questions/26264295/how-to-prevent-amazon-elb-sits-in-front-of-rabbitmq-close-connection-with-celery/26264296#26264296>

Title: How to prevent Amazon ELB sits in front of RabbitMQ close connection with celery?

1. Question: ELB will auto close connection for 60 secs idling, with TCP connection switch to CLOSE_WAIT state
2. however, celery doesn't get noticed and keep publish task message
3. message will be kept in send buffer
4. when buffer is full, celery publishing call will be blocked.

Possible damages:

- Message in send buffer will be lost
- The blocking publishing call will be very harmful to single thread ioloop frameworks. e.g. Tornado
- Answer: BROKER_TRANSPORT_OPTIONS = {'confirm_publish': True} to make celery wait for ack for each published message, if ack not receive, it will re-build connection and send again. Only apply to py-amqp ([ref](#)), performance downgrades.
- [Celery-RabbitMQ Heartbeat](#) to keep connection active and avoiding ELB's auto close connection. Add additional network overhead, heartbeat might not deliver to both end in bad network environment and cause this solution not working.

18. <https://stackoverflow.com/questions/10034553/check-client-connections-on-server-architecture-design/10034626#10034626>

Title: Check client connections on server architecture design?

Question: 0

I have a server and about 150 client machines. All clients register to the server and server make method calls(callbacks) on registered clients.

At this system Server pings all connected clients(ping is a callback method) periodically(connection liveness check). But if I do all clients ping operation in a thread. It is working too slow because of waiting times of method call at unavailable clients. And if a connection is broken it waits for timeout occur. So the waiting time is too long. I have a new idea for connection liveness check.

That I will create a thread for each connected client. And each thread will just control own client. So All system connection check will be done by these threads.

Is it useful ?

Is there any other professional offer for this project ?

Answer: When checking your clients, server is acting as client to them, so it is actually two-way fair-right architecture. If you want a central node to be aware of client state, make clients 'say hello' to server by polling it with heartbeat message on certain interval. Once server does not receive next expected heartbeat, the client is considered dead. Starting more threads will not bring an advantage, but can rather result in poorer performance. Consider using worker thread or some kind of actor pattern to handle heartbeats.

19. <https://stackoverflow.com/questions/18153667/spin-up-a-report-collection-node-js-app-for-my-executable/18939070#18939070>

Title: Spin up a report collection node.js app for my executable

Question: I have a java project that runs for a long time since it has a lot of things to churn through (controlling other subprocesses and all).

I would like to display the progress of this executable on a webpage that I can access for the period of execution of the Java executable.

How do I spin up a Node.js server from my java executable so that if the java executable exits, the server knows to also exit and save the report information so far somewhere. Also, am I doing something that others have done before?

Answer: You could set up a heartbeat (a signal from your java application), and have the node app look for that (as part of the data it processes from the java application, or as a separate message). When there is no data, you still need to send the heartbeat. But as long as it is a small message, it will hopefully not impact your performance significantly.

Then set the node server up to shutdown (or restart), and write out your exiting data, if the heartbeat is absent for a fixed amount of time.

20. <https://stackoverflow.com/questions/29623602/architecture-for-hosting-wcf-services-for-handling-large-no-of-concurrent-requests>

Title: Architecture for hosting WCF services for handling large no of concurrent request

Question: I have windows service developed in .Net Framework 4.5. This process (windows service) is hosting 3 different soap based WCF services. Each WCF service is running on different port but inside the same process (windows service). Many of the clients are consuming these 3 soap based WCF services for different purpose. This communication happens through https protocol in LAN environment. Clients communicate periodically (say for instance after every 15 or 30 seconds) to these WCF services. We call it as heartbeat mechanism. For each call to any method in the service, some amount of processing takes place on service side. This mechanism works fine for few hundred clients i.e. about 200 to 300 clients. But as no of client's increases, many clients starts experience delay. I understand that this architecture is not enough capable to handle large no of request. But to improve the performance of the system, I have thought of following ways

1. Isolation of the services for scalability and stability. One of the way is to host each WCF service into separate windows service. So there will be 3 different windows services each of it will have instance of WCF service. Deployment point of view this looks painful to me.
2. Instead of self-hosting, host it in IIS. I think then IIS will manage the resources of service in optimized manner.

So question is

1. Whether isolation of services into different windows services on the same machine will really improve the performance or not? I do not want these services to be deployed on more than one machine for load balancing. Doing it so will increase the cost to the customer (due to hardware, windows server licensing cost etc.). Due to this customer will loose the features such as high availability but that is fine if he/she is not willing to spend more.
2. Whether IIS hosting will perform better than hosting in windows services?
3. Will this mechanism i.e. isolation of service will improve the stability of the system

Answer: IS hosting is the preferred method of hosting soap based wcf services, rule of thumb is to adhere to the following:

1. Ensure your service is decorated with: [ServiceBehavior(ConcurrencyMode = ConcurrencyMode.Multiple, InstanceContextMode = InstanceContextMode.PerCall)]. Or which ever instancing mode suits your scenario.
2. Ensure that your client closes calls and disposes accordingly all the time you make the call.
3. you might want to consider using the async calls to your service. *emphasized text*

21. <https://stackoverflow.com/questions/38753391/azure-application-insights-custom-alerts>

Title: Azure Application Insights - Custom alerts

Question: We run an hybrid application that runs on different Azure Roles (2 Web Roles + 2 Worker Roles). Last weekend something went wrong and the service went into "Unresponsive" state and stayed into that state for two days (!) without being rebooted.

We decided than to integrate Azure Application Insights because we cannot stand a 2 days down without even know.

What I'd like to have is kinda of a heartbeat of my application. One of our worker roles has different services running concurrently. I'd like to monitor if this services are running and what are their performance (on a metric defined by me, let say "number of messages processed in a minute").

I would like to receive an alert if this metric, let say, goes down (or up) a threshold. I tried with a small demo application but I couldn't do that.

What I did, with Azure Application Insights API on my C# demo app: 1. inside an infinite loop with a 10 seconds wait after each loop, tracked a StartOperation 2. inside this StartOperation, tracked a TrackMetric passing a random value from 0 to 10 3. checked if everything was working on Azure (and it was) 4. defined an alert saying that an email has to be sent if that metric was less or equal to 1 in five minutes

Nothing arrived, but everything was correctly running. Than I stopped my service, I saw events dropping in Azure, but no alert raised. Is that normal?

How do you check a case like mine?

Answer1: You might be able to use Application Insights Web Tests functionality to check if the endpoint is available from the different geo regions and alert when it's not.

If all endpoints are authenticated you may expose simple "/ping" endpoint and run web tests against this.

However, it won't work for Worker Roles out of the box unless you register it to accept "/ping" over web protocols (doable for Worker roles, e.g. one can implement a WCF service that way).

Answer2: The problem is that Application Insights custom alerts are currently triggered only upon data arrival.

A strategy we've been using when faced with the same problem is having a separate service send out periodically the same metric but with a "zero meaning" value. In our specific case we use an availability metric in which "1" means healthy, whereas "0" means nothing, it is just used to elicit an alert in case there was no "1" sent for the defined duration.

You can use any wide set of possible mechanisms to send out the "0" metric, as long as it is independent of the service you actually want to monitor. You need to make sure they can't fail at the same time.

Answer2: Don't think that App Insights will let you send an alert on lack of metrics, which is what happens when your instance becomes unresponsive.

If you have the budget for external tools, look into [CloudMonix](#). It'll do exactly what you need with using default configuration (no need for agents, custom code, etc). Disclaimer: I'm affiliated with the product

22. <https://stackoverflow.com/questions/54528976/high-cpu-usage-and-limit-exceeds-issue>

Title: High CPU Usage and Limit exceeds issue

Question: I have a WordPress site hosted with SiteGorund on their [GoGeek](#) plan. Its CPU usage limit exceeds every time and site closes for hours every time.

We are using [The7](#) theme so PHP code is almost optimized. We also created child theme and tried to use as less plugin as we could.

We also optimized site so its page speed is 90 plus. Why the CPU usage limit exceeds is the point we require help with.

We have contacted SiteGround, but they are saying *you require to optimze your PHP code*, but its alredy optimized. Still every time CPU usage limit exceeds, which is headache for us.

Following is the list of the plugins we are using:

1. Accelerated Mobile Pages
2. Async JavaScript
3. Autoptimize
4. Duplicate Page And Post 5 Elfsight YouTube Gallery CC
5. Gravity Forms
6. Heartbeat Control
7. OneSignal Push Notifications
8. Really Simple SSL
9. Redirection
10. SG Optimizer
11. Swift Performance Lite
12. Templatera
13. The7 Elements
14. The7 LayerSlider WP
15. The7 Slider Revolution
16. The7 Ultimate Addons for WPBakery Page Builder
17. The7 WPBakery Page Builder
18. Unlimited Addons for WPBakery Page Builder
19. VC Particles Background
20. WP Disable
21. WP User Avatar
22. Yoast SEO

We also tried fixes for everything like leverage browser caching, Gzip compression etc. Now page speed looks great, but the only issue is high CPU usage.

Answer: These plugins seems to be redundant: 1. Async JavaScript, 2. Autoptimize, 3. SG Optimizer,4. Swift Performance Lite. If you are on SG's GoGeek plan, then SG Optimizer or Swift Performance Lite is enough for cache.

23. <https://stackoverflow.com/questions/26624448/issues-with-websocket-check-didnt-succeed-by-the-time-a-new-one-was-set-up>

Title: Issues with websocket: Check didn't succeed by the time a new one was set up

Question: I am running performance tests using gatling. Gatling is scaling very well for API calls but i find consistent exceptions on websockets. I am not sure if it is a server-side or client-side issue. Ia ms ending websocket heartbeats and waiting for replies from the server using `check()`.

The problem arises at the check stage. I run my tests for an hour or so but a few "users" drop off giving **Check didn't succeed by the time a new one was set up** error.

Answer: Already answered on Gatling mailing list: Gatling doesn't currently queue messages, just in case you might be setting a check later and would expect to match them. Maybe we'll chance that.

Anyways, you must set your check on the sendText action, so you don't lose messages that might arrive between the sendText and the next exec.

24. <https://stackoverflow.com/questions/28546370/what-are-my-other-options-to-reduce-resource-usage-on-shared-hosting>

Title: What are my (other) options to reduce resource usage on shared hosting?

Question: I got a message from our shared hosting company (InMotion) informing me our resource usage is too high. We have a WordPress-powered website. To give you an idea of our website, based on Google Analytics, we get 8,343 unique sessions per month. According to our webhost, we used 8660.71 MB of bandwidth in January.

One day, InMotion told me there was a spike in CPU usage, and included an excerpt of my access logs which they say indicated "some heavy WordPress Admin activity". They said "We are not exactly sure what this admin user was attempting to accomplish, however this activity does seem to have inflated your account's CPU usage." They included the ID of the item that was uploaded and caused the spike. It was the only file I uploaded that day. It was a 7 kB PNG file; I uploaded it once, deleted it and uploaded it a second time.

I do not understand the complexities of resource usage, so to me, it seems strange that uploading a 7kB twice can bring about spikes and be considered heavy activities.

When I asked more about the Resource Usage graph, they replied this : "The numbers are percentages. 100% means you're right at the top of what we consider normal CPU usage on a shared platform. Anything above that is VPS territory. If you zoom in on the graph, you'll see that for the most part you're right at 100%, but you occasionally have spikes over. Going through the logs, your CPU usage is mostly from the Wordpress Dashboard, so disabling the heartbeat feature should reduce your usage the most."

They also told me there was unusual activity to the wp-admin/admin-ajax.php.

At our hosting company's request, I did the following:

- Disabled WordPress' heartbeat / autosave features
- Installed a caching plugin (WP Fastest Cache)
- Installed P3 Plugin Performance Plugin to see which plugins were using most resources
- I deactivated 2 plugins that were highest in resource usage : Scroll Back To Top and Simple Page Tester. But even with these changes, there are still "spikes" in our resource usage and we are receiving warnings. Our host is recommending we either upgrade to VPS hosting or use a CDN service like CloudFlare or MAXCDN.

So my questions are as follow :

- How can I tell what is really causing excessive resource usage?
- Are there other ways to reduce resource usage caused by WordPress?
- Are CloudFlare or MAXCDN good for this type of situation?

Thank you for taking the time to read. Any help or tips will be appreciated!

Answer: Your usage is not at all surprising. If you get 8,343 unique sessions per month and you used 8660.71 MB, then each visitor is taking an average of about 1MB.

Just loading your home page is about 0.525MB, so if people browse your site (plus with admin traffic) it's easy to see how you might use that much.

Yes, a CDN like CloudFlare or MAXCDN would be really good for your situation. Your page is loading a lot of CSS, Javascript and images that could all be moved to a CDN. This would significantly reduce your host bandwidth usage and probably lower your page load time as an additional benefit.

25. <https://stackoverflow.com/questions/31335756/bad-performance-when-inserting-nodes-in-neo4j-with-java-api>

Title: Bad performance when inserting nodes in Neo4j with java api

Question: I am trying to insert about 2 million nodes into Neo4j and having trouble with performance.

I am using neo4j enterprise 2.2.0 with a server extension written in java. My computer has an ssd, 32gb ram, Intel Core i7 cpu and is running Windows 8. I run a standalone version of the server and start it by running Neo4j.bat in the bin-folder.

It takes about 25 seconds to insert 10 000 nodes with no relationships right now (I will need to add relations later, but one problem at the time).

I think this is a matter of configuration so I played around with settings a bit, but no change in performance. What I find weird is that even if I set the initmemory and maxmemory settings to 15000 in neo4j-wrapper.conf the java process only allocate 3gb maximum.

I attached my code and configurations below, does anyone have a clue what I am doing wrong? What performance should I expect when inserting a large graph?

26. <https://stackoverflow.com/questions/42962495/external-code-using-select-with-large-numbers-of-file-descriptors>

Title: External code using select() with large numbers of file descriptors

Question: I have a server program written in C++ that runs on Linux and implements a push-based messaging service using TCP. Because of the push approach, there might be a lot of simultaneous connections (I'm planning on about 1 million) that have to be kept open for longer amounts of time. Most of the time these connections are idle with the occasional heartbeat, and transfer usually happens in bursts on many of them at the same time.

To make things work, I'm using epoll for multiplexing the large amounts of sockets, and by modifying the RLIMIT_NOFILE, it does actually work quite well for large amounts of sockets.

My problem is that I'm also using other types of connections in the same program, most notably FastCGI (using libfcgi from the FastCGI SDK) for accepting HTTP requests, which use select() for their internal file descriptors. This leads to problems when those file descriptors become larger than 1024 (FD_SETSIZE), which is bound to happen if the epoll part of the program uses up most of the fd numbers below 1024.

I'm wondering what the best way to handle this would be.

Do I just have to modify all external code that uses select() and use poll() instead?

Is there maybe a way to force my epoll-based code (specifically the accept() call) to use only file descriptors above 1024, so that the ones below are reserved for select()-based code?

I understand that it might be possible somehow to increase the value of FD_SETSIZE, but I assume that would hurt performance a lot because of the way select() works, and it strikes me as a hack rather than a real solution.

Answer: I would suggest moving these things into their own process so that they get their own file descriptors. What I would suggest is that you have a protocol that multiplexes a large number of TCP connections over a single TCP connection. Your server would talk to the multiplexers rather than the individual clients. A multiplexer could run on the same machine or different machines, it could handle tens of thousands of client connections and would make only a single connection to the server.

One big advantage of this is that your server machine doesn't have to deal with the large number of TCP connection states. It won't have to deal with Internet junk like dropped packets, retransmissions, duplicate packets, rogue SYNs, slow links, and so on. It won't have to have send buffer for each client but will only have to talk to the fast, clean multiplexers who can do the buffering for clients.

If this is too much work or for some reason impossible, you can use dup2 to renumber the file descriptors into higher-numbered descriptors. I strongly suggest using multiplexers though -- the number of connections you're trying to handle is just too large to do from a single process.

27. <https://stackoverflow.com/questions/46579543/recommendation-to-improve-wp-admin-panel-performance/46830975#46830975>

Title: Recommendation to improve wp-admin panel performance

Question: Recommendation to improve wp-admin panel performance : Please provide the suggestions and way to identify the bottlenecks in wordpress admin panel issue. It is a multisite and it has 3rd party plugins enabled . How to identify plugin conflict and which plugin is causing perf/ memory issues. All these php-fpm, nginx are running in DOcker container

Issues observed: During login During Post create new page loading

Answer: Here is step by step guide to identify performance issues.

1. If server isn't in production or if it doesn't matter very much, try to switch to any default WordPress theme (TwentySeventeen for example) and look if anything changes.
2. You can deactivate all plugins and look if it helps. If yes - try to turn on plugins one by one and this will help you to identify which plugin causes the performance issues.
3. Try to install a free plugin called Debug Bar (you can do it from Plugins-Add New), it will show you slow things on your website

Answer2: Since this issue is caused by the interaction of both your code (plugins) and your production environment, you need some tool that takes all of that into account when attempting to measure the cause.

I really like New Relic for this. It is a paid product, but with the free trial you might be able to diagnose your issue. They have a WordPress integration that will show you specifically how many seconds/ms each action hook and plugin is taking.

Answer2: Can you pls give us a list of PlugIns installed!?

I could tell you for some that they are a waste of memory from my experience...

Are you using i.e. a visual composer plug in, the one named like that is the most worst backend plug in regarding its needs of ressources and in premium themes it comes most often combined with master slider revolution, which has also crazy memory needs...

Do you have in general many plug ins, so let's say more then 10 to 20? Do you need all of them? Which are the ones that load when you edit a page in the backend?

If you really need all of them think about renting a better server... ;-)

Answer3: Thanks for all your inputs. I have identified the problem and resolve it . The problem is with the Network file system and the php script takes more time to read it because the uploaded assets total size is in GB's and the wordpress framework built in Filter will do recursive call to calculate the size. I have used Debug bar slow action and filter plugin to identify which action / filter is taking more time.

Solution: And in admin panel of multisite, there is a setting if you enable then it will skip calculating the size of the disk - Now site is very fast. But will lose the functionality of restricting users from uploading ex. i define 2 gb for each site, then that functionality to restrict users from the disk quota of 2 GB will be disabled. Is there a way to tune that stuff ? Kindly provide your valuable suggestions.

28. <https://stackoverflow.com/questions/33637025/hazelcast-operationtimeoutexception/33670321#33670321>

Title: Hazelcast OperationTimeoutException

Question: It appears the 120,000ms is configurable, but I don't think increasing this is the answer. When this does happen, all calls fail for the same reason regardless a get or set operation etc.

Can anyone provide a recommendation for what parameters should be adjusted to alleviate the issue? Perhaps it is actually a thread contention issue and increasing event threads or the likes may help. The hazelcast instance has no custom parameters at this time. Thread counts are all default. The server is not in excessive garbage collection during the time either.

Answer: Most probable cause of this exception a network problem among cluster members. An unresponsive node (because of memory or GC problems etc) can also cause such issue. First thing is can be to ensure quality/performance of your network env. If you are using AWS, you can prefer instance with better network performance.

If you want to get rid of problematic nodes quickly; you can set a lower value for following system property: "hazelcast.max.no.heartbeat.seconds" : Maximum timeout for heartbeat in seconds for a node to assume it is dead. Default is 500 seconds.

29. <https://stackoverflow.com/questions/17929783/best-way-to-implement-a-collection-that-support-aging/17930141#17930141>

Title: Best way to implement a collection that support aging

Question: I am looking for ideas on the best approach to handle the following problem set using Java. In this case best would emphasize performance.

Assume we have a number of bank branches. Each branch has a vault with a sensor that sends a message (in this case using UDP) back to a server whenever the state of the door is changed.

On the server there is a collection of some sort that stores each message sent from the sensors. The code inserts an event ("door open branch 1") when it gets the message. When the sensor then sends a follow up message ("door closed branch 1") the message is removed from the collection. Each message is stored in the collection along with a timestamp.

What we want is to have a method called when a message has been in the collection for more than a specified elapsed time, say 2 minutes. In this use case "the vault door has been open more than 2 minutes, call cops".

Most obvious solution is a thread that sleeps for 2 minutes, wakes up and runs through the collection checking the timestamp. Seems simple but not sure if it is the more efficient way to handle the problem. It will also require a concurrent collection, which is not a problem.

In the real world the collection would need to handle around 50K messages or less.

Any other ideas on how to handle this problem? Are there any classes out there that can help in this case

Answer: I use a data structure like this in my code, which I call an EvictionList. Every X seconds, it would delete elements from the List that hadn't been touched in a certain time. I used it as a heartbeat monitor. I had

about 100 elements in it and the performance was never an issue. Here's some pseudo-code for it, as the real code isn't accessible this second:

30. <https://stackoverflow.com/questions/43222332/is-socket-io-ideal-for-chat-module/43222760#43222760>

Title: Is Socket.io Ideal for chat module

Question: I am working on an Angularjs and Node.js based application. This is an organization based application. In this app, I have to implement chat functionality. So as we all know Socket.io is the best solution for instant messaging app and its reliability. But apart from this, I have few doubts regarding Socket.io. As of my understanding when we use socket programming (Socket.io in my case), for each and every connection it reserves a port. What if the size of an organization is too big? Will it work? At the server side, I am using Express js. Will Socket.io creates extra load on the server?

Should I go with Socket.io or HTTP?

Answer: HTTP polling for any sort of interactive timing is enormously inefficient. You will have tens of thousands of clients repeatedly asking your server, "do you have anything new for me?" and the server regularly responding "no, nothing yet".

webSockets (which socket.io uses as the transport) were invented precisely because they are more efficient for two way, interactive communication than HTTP polling.

Modern servers can be configured to handle hundreds of thousands of simultaneous webSocket connections. How many a single server of yours can actually handle in the real life working of your application depends upon dozens of factors, none of which you've disclosed in your question. But, selecting webSocket/socket.io is not a bad architectural choice for two-way chat - that's the kind of application it was invented for because it's generally better than HTTP polling at that sort of thing.

31. <https://stackoverflow.com/questions/1463689/how-do-i-code-a-watchdog-timer-to-restart-a-windows-service/1463978#1463978>

Title: Is Socket.io Ideal for chat module

Question: I'm very interested in the answer to another question regarding watchdog timers for Windows services (see [here](#)). That answer stated:

I have also used an internal watchdog system running in another thread. That thread looks at the main thread for activity like log output or a toggling event. If the activity is not seen then the service is considered hung and I shutdown the service.

In this case you can configure windows to auto-restart a stopped service and that might clear the problem (as long as it's not an internal logic bug).

Also services I work with have text logs that are written to a log. In addition for services that are about to "sleep for a bit", I log the time for the next wake up. I use MTAIL to watch a log for output."

Could anyone give some sample code how to use an internal watchdog running in another thread, since I currently have a task to develop a windows service which will be able to self restart in case it failed, hung up, etc.

Answer: I'm not a big fan of running a watchdog as a thread in the process you're watching. That means if the whole process hangs for some reason, the watchdog won't work.

Watchdogs are an idea lifted from the hardware world and they had it right. Use an external circuit as simple as possible (so it can be provably correct). Typical watchdogs simply ran a timer and, if the process hadn't done something before the timer expired (like access a memory location the watchdog was watching), the whole thing was reset. When the watchdog was "kicked", it would restart the timer.

The act of the process kicking the watchdog protected that process from summary termination.

My advice would be to write a *very* simple stand-alone program which just monitored an event (such as file update time being modified). If that event didn't occur within the required time, kill the process being watched (and let Windows restart it).

Then have your watched program periodically rewrite that file.

Answer2: Other approaches you might want to consider besides regularly modifying the lastwritetime of a file would be to create a proper performance counter or even a WMI object. We do the later in our build infrastructure, the 'trick' is to find a meaningful work unit in the service being monitored and pulse your 'heartbeat' each time a unit is finished.

The advantage of WMI or Perf Counters over a the file approach is that you then become visible to a whole bunch of professional MIS / management tools. This can add a lot of value.

32. <https://stackoverflow.com/questions/42322486/celery-beat-schedule-to-run-on-load-then-on-interval>

Title: Celery beat schedule, schedule to run on load then on interval

Question: This is problematic for a longer interval, such as an hour, that can do work that is immediately valuable but is not needed "fresh" at shorter intervals.

This [question](#) addresses this issue but neither of the answers are satisfactory:

1. Adding startup lag for the task to be en-queued is both undesirable performance-wise and bad for maintainability since the initial run and schedule are now separated.
2. Re-implementing the schedule within the task is bad for maintainability.

This seems to me something that should be obvious, so I am quite surprised that that SO question is all I can find on the matter. I am unable to figure this out from the docs and the celery github issues so I wonder if I am missing something obvious.

Edit:

There seems to be more to the story here, because after trying a different task with an hour interval, it ran immediately as the project celery is started.

If I stop and clear the queue with celery purge -A proj -f then start celery again, the task does not run within the heartbeat interval. This would makes sense because the worker handles the messages but beat has its own schedule record celerybeat-schedule which would be unaffected by the purge.

If I delete celerybeat-schedule and restart beat the task still does not run. Starting celery beat with a non-default schedule db location also does not cause the task to run. The next time the task runs is one hour from the time I started the new beat (14:59) *not* one hour from the first start time of the task (13:47).

There seems to be some state that is not documented well or is unknown that is the basis of this issue. My question can also be stated as: **how do you force beat to clear its record of last runs?**

I am also concerned that while running the worker and beat, running celery -A proj inspect scheduled gives - empty - but presumably the task had to be scheduled at some point because it gets run.

33. <https://stackoverflow.com/questions/31958572/sockets-stop-sending-messages-but-not-timing-out/31976407#31976407>

Title: Problem:

I'm making an app that has instant messaging. For the most part, the messages are sent and received without any issues. But after some period of time, somewhere between 10 and 40 minutes, the messages no longer reach the server if the client's socket hasn't been used in a while. For example, if I chat with someone, leave the app open, take a nap, and come back to chat again, then the messages won't send. I am 99% sure it is not a problem on the server side because I print out everything it receives (and it's not receiving anything) and it works fine if I log in with another phone.

What I've tried:

At first I thought it was a timeout issue on the client side because on the server side I kept getting an error saying, "Connection reset by peer", somewhere in that interval of 10-40 minutes. I (almost) resolved this by using Java.net.socket's `connect()` method with a timeout value of 0 which gives an infinite timeout:

Answer: Logging at the point you do is futile. Nothing has happened yet.

If the connection is dead, sooner or later a send will cause an `IOException: connection reset`. But not the first time, due to socket buffering.

And when you do get this exception, don't just return false. Close the connection.

HOWEVER the problem here is the `PrintWriter`. It swallows exceptions. See the Javadoc. Either call `checkError()`, which returns a boolean indicating whether there has been an exception, or, better still, don't use `PrintWriter` at all: use `BufferedWriter.write()` and `.newLine()`, and `.flush()`, all of which can throw `IOExceptions`. This is better because you can see what the exception actually was. You'll have to move all that into the try block of course, ahead of the presently misleading log message.

And don't use a new `PrintWriter` or `BufferedWriter` per message. Use the same one for the life of the socket.

Answer2: I believe the problem didn't necessarily lie with the client device or with the server, but rather with what's between those 2 things, my NAT router. The router is most likely dropping mappings in its table due to inactivity.

My solution is to use a heartbeat function (along with modifying my use of `PrintWriter` as EJP suggested), sending from the client to the server every 45 seconds. I'll most likely randomize the time somewhat just to handle the case in which a ton of people log in at the same time and affect the server's performance.

34. <https://stackoverflow.com/questions/29080139/communication-between-parent-and-nodes/29095035#29095035>

Title: We have a parent that holds information about many nodes. Each node is separate VM instance, that performs different tasks. parent is like a dashboard for all the nodes.

The parent needs to:

- send some occasional configuration changes to some node
- monitor the heartbeat i.e. the health of the node
- get some statistic data from the node

I would like that node is unaware of the outside world as much as possible. Each node works as a web server, they can have big traffic sometimes.

How to communicate in the best way between the parent and the node?

I was thinking into using files for communication, so parent can set a file with a command on a nodefile-system, and then to have a dir watcher that reads for such files.

Or to have some event-bus/message-queue in the background, but they are using sockets, so a node may become un-responsive for parents message in case of high-traffic. Or maybe I worry too much?

EDIT

Is there any event/message-bus that offers direct communication between channels, to save the time for broadcasting? In my example, the communication between is always between a parent and single child, there is no need to broadcast. So we could have some messaging like email ;)

EDIT #2 - about communication and traffic

There is one parent (or a cluster that represents one instance of a parent). Number of childs is not determined, it may be any; the goal is to have as much as possible, as long the system works fine. The communication is:

1. Commands (parent -> child) Low-frequent commands, usually initiated by admin (e.g. "restart", "upload", "reload config"). It goes directly to specific child.
2. Runtime stats (each child -> parent) Each child notifies the parent about its health (heartbeat) and some minor stats. This does not have to be a real-time communication, as long as the message is transferred under e.g. 10 seconds.

3. Runtime logs (each child -> parent) Important logs about the traffic and usage. This may be high-volume data as it is important to measure each node, if the computation gets over certain limit we need to be aware of that etc. Again, not real-time, but we need a promptly alert on high computation.

There is no much need of general broadcasting (since childs are not aware of other childs), this is more direct messaging.

Answer: Perhaps the simplest solution would be to send an http POST to the node to change configuration (especially if it already is a web-server). A heartbeat could just be HEAD request. A statistics gathering request might be a get.

You could use servlet security mechanisms to ensure that the configuration was only changed by the parent.

If you have performance issues, a solution like RMI or ZeroMQ, might be good, but it introduces extra complexity.

A good http client library like this one <https://code.google.com/p/google-http-java-client/> would get you a long way.

35. <https://stackoverflow.com/questions/4906575/net-library-for-active-passive-fail-over-clustering>

Title: .NET library for active/passive fail-over clustering

Question: I want to develop an application that connects to some input sources and processes the messages it reads (think BizTalk in principle, but not as heavy). For performance and reliability I would like to enable horizontal scaling of the service, obviously by utilising a shared storage (such as DB) to act as a message queuing mechanism.

However, threads that access resources such as email or disk folder cannot be scaled horizontally. Only one instance must be running at one time reading from that input source. (Further message processing business logic can of course reside on multiple nodes).

This is a perfect candidate for Active/Passive clustering. One node is considered "Active" and actively connects to the "single-instance" resources (such as email inbox), while others are "Passive". If the "Active" node dies, then the other "Passive" nodes elect a new "Active" node among themselves.

Now the question: is there a .NET library out there somewhere which helps one implement the usual failover clustering logic? (i.e. implementing the necessary heartbeat sending/detection, and "active" node election process). As I don't want to reinvent the wheel.

What I can see from the research done already:

- BizTalk Server supports this functionality natively, but I am not using BizTalk as it's too heavy and expensive (but I want to emulate this functionality of it)
- Windows Server supports Failover Clustering (in certain high-end versions like Windows Server 2008 Enterprise or Datacenter), but again this is an expensive solution (as each node would need the expensive license)
- There is a lot of information on how failover algorithm should work, but I cannot see an open source implementation anywhere ... (only in commercial products sold at a premium)

I understand that it might be considered advanced and desirable functionality, and hence why commercial solutions for it are expensive. This is fine - if there is no open-source implementation or library out there, I will develop one on my own. I just don't want to spend the effort if it already exists.

UPDATE 12/02/2011: Found SAForum (http://www.saforum.org/link/linkshow.asp?link_id=214720), which is a website that publishes open specification for developing service availability concepts. There is also OpenSAF (<http://www.opensaf.org>Welcome-to-OpenSAF%284%A2~151213~14944.htm>), and open-source C++ implementation of specifications on SAForum. Looks comprehensive, but is very heavy. It will take me a lot of time to wade through the specifications and documentation. It also covers a lot more than just fail-over, offering

specification for full scalable distributed system (notifications, distributed events, locks, cluster management, etc.) ... Still no sign of a .NET implementation anywhere

Answer: Surely developing this sort of advanced functionality on your own would be more expensive than buying it commercially. Unless your time is being donated to the project, and you have no deadline, I'd rule out writing this yourself.

To get high availability and horizontal scaling you need to write a *lot* of code. Testing that it works to the level that would be required in a high availability production environment will also take considerable effort. And even if you did all that, would you trust your own code over Microsoft's, which has accumulated run hours in the gazillions, and has been through the multiple versions that all software needs to go through to become mature and stable.

I know you were really asking about open source libraries, but the same argument applies - would you trust it, is it well tested, is it field proven, and who's butt can you kick when it falls dead?

Update: Well this was a few years ago and I guess I've softened my stance towards the viability of using open source for this sort of mission critical infrastructure, although I still believe having commercial support is essential, and I'd still avoid writing it yourself.

I would put in a plug here for [Rabbit MQ](#) as a high availability, highly scalable message bus, for the benefit of others reading this. Commercial support is available, and its based on open standards (AMQP). Client libraries are available for just about any major platform.

36. <https://stackoverflow.com/questions/5623420/most-suitable-language-for-computationally-and-memory-expensive-algorithms/5623491#5623491>

Title: most suitable language for computationally and memory expensive algorithms

Question: Let's say you have to implement a tool to efficiently solve an NP-hard problem, with unavoidable possible explosion of memory usage (the output size in some cases exponential to the input size) and you are particularly concerned about the performances of this tool at running time. The source code has also to be readable and understandable once the underlying theory is known, and this requirement is as important as the efficiency of the tool itself.

I personally think that 3 languages could be suitable for these three requirements: c++, scala, java. They all provide the right abstraction on data types that makes it possible to compare different structures or apply the same algorithms (which is also important) to different data types.

C++ has the advantage of being statically compiled and optimized, and with function inlining (if the data structures and algorithms are designed carefully) and other optimisation techniques it's possible to achieve a performance close to that of pure C while maintaining a fairly good readability. If you also put a lot of care in data representation you can optimise the cache performance, which can gain orders of magnitude in speed when the cache miss rate is low.

Java is instead JIT compiled, which allows to apply optimisations during runtime, and in this category of algorithms that could have different behaviours between different runs, that may be a plus. I fear instead that such an approach could suffer from garbage collector, however in the case of this algorithm it's common to continuously allocate memory and java heap performance is notoriously better than C/C++ and if you implement your own memory manager inside the language you could even achieve good efficiency. This approach instead is not able to inline method invocation (which induces a huge performance penalty) and doesn't give you control over the cache performance. Among the pros there's a better and cleaner syntax than C++.

My concerns about scala are more or less the same as Java, plus the fact that I can't control how the language is optimised unless I have a deep knowledge on the compiler and the standard library. But well: I get a very clean syntax :)

What's your take on the subject? Have you had to deal with this already? Would you implement an algorithm with such properties and requirements in any of these languages or would you suggest something else? How would you compare them?

Answer: Usually I'd say "C++" in a heartbeat. The secret being that C++ simply produces less (memory) garbage that needs managing.

On the other hand, your observation that

however in the case of this algorithm it's common to continuously allocate memory
is a hint that Java / Scala may actually be more suited. But then you could use a small object heap in C++ as well. Boost has one that uses the standard allocator interface, if memory serves.
Another advantage of C++ is obviously the use of abstraction without penalty through templates – i.e. that you can easily create generic algorithmic components that can interact without incurring a runtime overhead due to abstraction. In fact, you noted that

it's possible to achieve a performance close to that of pure C while maintaining a fairly good readability – this is looking at things the wrong way: [Templates allow C++ to achieve performance *superior* to that of C while still maintaining high abstraction.](#)

37. <https://stackoverflow.com/questions/27654893/how-managed-servers-listen-to-each-other-in-server-cluster/27658207#27658207>

Title: how managed servers listen to each other in server cluster

Question: when configuring oracle fusion middleware, in the screen for 'managed cluster servers' user has to enter managed server name and listening port. how it's working on a cluster, is the server listening on the port of the given ip address, if it's so it's confusing to think how one server is listening to a external machine. for example serverA listens on ServerB port 20 and whenever serverB sends data through port 20, serverA has to pick them up! in that case ServerA has a listener on external machines port, is it possible?

Answer: Managed Servers host business applications, application components, Web services, and their associated resources. To optimize performance, Managed Servers maintain a read-only copy of the domain's configuration document. When a Managed Server starts, it connects to the domain's Administration Server to synchronize its configuration document with the document that the Administration Server maintains.

For production environments that require increased application performance, throughput, or high availability, you can configure two or more Managed Servers to operate as a cluster. A cluster is a collection of multiple WebLogic Server instances running simultaneously and working together to provide increased scalability and reliability. In a cluster, most resources and services are deployed identically to each Managed Server (as opposed to a single Managed Server), enabling failover and load balancing. A single domain can contain multiple Oracle WebLogic Server clusters, as well as multiple Managed Servers that are not configured as clusters. The key difference between clustered and nonclustered Managed Servers is support for failover and load balancing. These features are available only in a cluster of Managed Servers.

38. <https://stackoverflow.com/questions/9374994/what-is-the-lightest-solution-to-creating-a-multiprocess-architecture-with-state>

Title: What is the lightest solution to creating a multiprocess architecture with state shared across all processes
Question: **I have multi-layered application architecture that has 4 parts:**

- A networking server/client layer
- An intermediate data layer to handle interactions between processes
- A monitoring layer

- A client layer made up of n number of instances

Client/Server layer:

The client/server layer handles asynchronous network communications with another computer implemented using a custom Layer 2 protocol. Due to design constraints built into the communications, it needs to remain independent and able to poll/push data to the data layer asynchronously.

Intermediate Layer:

The intermediate layer is currently implemented using a database. One table holds all of the possible labels that can be called on (about 120,000). A second table holds an intermediate cache of the first table containing only the values in use, this requires constant updates and gets flushed when a new collection of items is requested. The third table is where collection updates are sent and only contains data when a request is pending.

The Monitor Layer:

The monitor layer is a multi-threaded monolithic application. It spawns n number of client instances based on how many monitors are attached. It manages global state between all client instances because one or more of them may share similar/identical state. It creates a unique listing of values needed, manages sending update requests when the clients need a different set of labels, and manages recurring updates.

Obviously, this isn't ideal. If one instance goes down it can take the rest down with it. What I'd like to do is remove the intermediate layer, replace it with the monitor layer, and make everything spawn as subprocesses of the monitor process so they can be respawned at will if something goes awry (ex. comms heartbeat stops, client crashes, etc).

The database just seems too heavy and not specialized enough to handle the IPC (Inter Process Communications). The program was written under extreme time constraints so utilizing a database was the 'easy solution' with the expectation that it would change in the future. I'm a big fan of the robustness of [Google Chrome's multi-process architecture](#) but I know little about how they tie all the processes together (pipes, tcp, ?).

So:

1. Could I expect a significant performance improvement from using IPC over a database for the intermediate layer?
2. What form of IPC would be ideal on a Windows system?
3. Is there a cross platform (read Linux) alternative solution available that could be used in its place if development were moved to Mono?
4. Where can I find resources/examples to help get a start?

Note: I understand that the architecture of this system seems unnecessarily complex but it exists as a front-end for a much larger system. This application is also mission critical so stability trumps efficiency.

Update:

I forgot to mention in the initial question. The database data/index is loaded directly from a ramdisk on boot. The database itself has been indexed for optimal performance. Tables or values that require frequent writes are not indexed but the rest of the data is.

I'm looking for an alternative to measure against because optimization of the db has been taken to its limit and I think there's still a lot of room for improvement.

I will upload a some diagrams of the architecture as soon as I get some time to draw them up.

1. Answer: Yes. The database most likely involves the harddrive, and the harddrive is the slowest part of any computer so switching away from using the harddrive will probably have performance benefits.
2. I would go with [zeromq / zmq](#). Its a message oriented framework that supports several communication patterns. For instance PUB/SUB or REQ/REP etc. More examples [here](#)
3. zmq is cross platform and its amazingly fast.
4. [Some C# examples on github](#)

39. <https://stackoverflow.com/questions/13229311/intel-tbb-tasks-for-serving-network-connections-good-model/13230713#13230713>

Title: Intel TBB tasks for serving network connections - good model?

Question: I'm developing a backend for a networking product, that serves a dozen of clients ($N = 10-100$). Each connection requires 2 periodic tasks, the heartbeat, and downloading of telemetry via SSH, each at H Hz. There are also extra events of different kind coming from the frontend. By nature of every of the tasks, there is a solid

part of waiting in select call on each connection's socket, which allows OS to switch between threads often to serve other clients while waiting for response.

In my initial implementation, I create 3 threads per connection (heartbeat, telemetry, extra), each waiting on a single condition variable, which is poked every time there is something to do in a workqueue. The workqueue is filled with the above-mentioned periodic events using a timer and commands from the frontend.

I have a few questions here.

1. Would it be a good idea to switch a worker thread pool approach to Intel TBB tasks? If so, to which value of threads do I need to initialize `tbb::task_scheduler_init`?
2. In the current approach with 300 threads waiting on a conditional variable, which is signaled $N * H * 3$ times per second, it is likely to become a bottleneck for scalability (especially on the side which calls `signal`). Are there any better approaches for waking up just one worker per task?
3. How is waking of a worker thread implemented in TBB?

Answer: Its difficult to say if switching to TBB would be a good approach or not. What are your performance requirements, and what are the performance numbers for the current implementation? If the current solution is good enough, than its probably not worth-while to switch.

If you want to compare the both (current impl vs TBB) to know which gives better performance, then you could do what is called a "Tracer bullet" (from the book [The Pragmatic Programmer](#)) for each implementation and compare the results. In simpler terms, do a reduced prototype of each and compare the results.

As mentioned in [this answer](#), its typically not a good idea to try to do performance improvements without having concrete evidence that what you're going to change will improve.

Besides all of that, you could consider making a thread pool with the number of threads being some function of the number of CPU cores (maybe a factor of 1 or 1.5 threads per core) The threads would take off tasks from a common work-queue. There would be 3 types of tasks: heartbeat, telemetry, extra. This should reduce the negative impacts caused by context switching when using large numbers of threads.

40. <https://stackoverflow.com/questions/19586134/boost-asio-write-operation-on-client-is-blocked-when-server-down/19596464#19596464>

Title: boost asio write operation on client is blocked when server down

Question: I want implement a synchronous tcp client using boost::asio.

scenario:

- client: synchronize tcp client, send data to server in a loop
- server: receive data from client

And connection can be rebuild when socket is unavailable. client will connect to server, then send "hello world" to server. But when i shutdown server with "ctrl+c", the problem raise:

Write operation still work without any error throwed, and `ec.message() = "success"`. After several write operation, the thread is blocked forever at write.

Maybe the write function put the data into the buffer, then return immediately, and write is blocked when the buffer is full?

In general, how to check socket is writable or not, or throw an error when server down, so that the program can try to rebuild the connection when server comes up again.

Answer: There's nothing wrong with your client code, it is behaving correctly as a TCP socket implements reliable in-order delivery of the byte stream. Your client does not realize the server is unresponsive because that's not such a simple task, there are many entities between your client and server applications.

You may wish to enable [TCP keep alive](#). Though be careful as it too is not a silver bullet, it merely indicates the TCP stack on both ends is alive and well; which says nothing about the application availability. The various timeout are also somewhat tricky to configure for all environments.

The most flexible option is to implement a heartbeat protocol in your client and server, which can be fully tailored to your application's performance requirements.

41. <https://stackoverflow.com/questions/7075472/scalable-algorithm-to-detect-stale-data/7085529#7085529>

Title: Scalable algorithm to detect stale data

Question: Here is the problem:

"Agents" installed on many different servers send "heartbeat" signals up to a central server every 5 seconds. How can I find the ones that have missed their heartbeat for more than 10 seconds actively and raise an alert?

The problem is simple if you don't think about scalability. In the simplest form, you can record the timestamp of the latest heartbeat received from each agent in a database table and run a regular query to find the ones older than the threshold.

This solution is however not scalable to millions of agents.

I am looking for algorithms or technologies that make this possible

1. Answer: Use a map: AgentId --> LastHeartbeatTime
2. Use 11 sets (assuming a resolution of 1 second is enough), each holds Ids of Agents reported in a 1-second window.

Every time an agent reports a heartbeat: 1. Find it in the map 2. Delete it from the relevant set 3. Update it in the map 4. Add it to the relevant set

Define a thread: Once per second, the oldest set expires. It should be empty. If it doesn't - it contains Ids of agents which did not report. Once a set expires, you can reuse it (cyclic array of sets).

I believe it can be implemented without locks (maybe you'll need 12 sets).

42. <https://stackoverflow.com/questions/316120/need-tips-on-how-to-prioritize-and-schedule-a-bunch-of-work-items/316212#316212>

Title: Need tips on how to prioritize and schedule a bunch of work items

Question: It took me some time, but I've finally managed to write down all the tasks that need to go into Version 1.0 of the software product I'm working on.

The list is almost 1000 items long.

We are a 3-person team, and we've somehow managed to get this far using MindMeister, Google Docs, @todos in the code etc. Now, I have everything neatly grouped by feature, but how do I prioritize all this and turn it into a schedule?

Any advice would be greatly appreciated - I'm not looking for software recommendations, however - I'm seeking advice on how to take this enormous bag of tasks - ranging from bug-fixes to application modules - and find out in what order I should do them.

Answer: Prioritize ruthlessly. 1000 action items is a lot, and the odds are that as you go you'll modify some, toss others, and add new ones. Your list will not survive the things you learn by actually building the software, and if you don't do the most important stuff first, you'll end up with a mess.

For every item or feature, you have to answer the question: Can the product be at all usable or useful without this? If yes, it can wait; everything else goes to the head of the queue.

After that, I like to group milestones by focus: I'll do a features milestone (or multiple ones if there are natural small clusters of features), a UI milestone where I'll focus on AJAX/rich client interactivity, a performance milestone where I profile and do database & server tuning, etc. Or break them up some other way - but definitely break them up. Work in smaller bites with specific focus for each iteration, and make sure each iteration is solid before moving on.

Answer2: My recommended approach will be based on Agile methodology best practices...

So, you have what in Agile terms is called a "backlog" defined- that's great - and an important first step.

A good Agile pace that is commonly used is a 2-3 week iteration length...and at the end you have a set of releasable features. This will establish the "heartbeat" of your development process. Next, you'll decide how to organize and group the features into Stories and Tasks.

You'll want to grow the underlying architecture and let it naturally emerge based on the ordering of the Stories and Tasks that you select from your backlog.

It's important to mitigate risks early - so you'll want to select early those items that are either performance or implementation unknowns that might pose the largest risk - and could result in the largest rework impact. For example - establishing the messaging infrastructure - might be an early architectural feature that might be included if you select a Story that required a persistent message to be delivered to complete a unit of work.

Can you group the set of features into functional categories that might naturally evolve to describe the 1.0 release as a System of Systems? For example, the Administrative functions, the User Profile Management, Reporting, external integration layers, Database Access Objects, etc.

What are the simplest Story / Use Cases that you can write - that will map to some of the ~1,000 features / requirements you've defined? Select a set of Stories (or individual Tasks from a Story - if the Story itself is too large to implement in a single iteration). It will take some additional effort - but recomposing your requirements into a set of Stories/Tasks is important.

You'll find that you will refactor during subsequent iterations - but that your steady 2-week heartbeat iteration schedule will keep delivering real functionality.

At various points you may want to schedule an architecture iteration just to focus on some cleaning-up / refactoring - and that's ok too

43. <https://stackoverflow.com/questions/620877/what-algorithms-are-there-for-failover-in-a-distributed-system/624591#624591>

Title: What algorithms are there for failover in a distributed system?

Question: I'm planning on making a distributed database system using a [shared-nothing architecture](#) and [multiversion concurrency control](#). Redundancy will be achieved through [asynchronous replication](#) (it's allowed to lose some recent changes in case of a failure, as long as the data in the system remains consistent). For each database entry, one node has the master copy (only that node has write access to it), in addition to which one or more nodes have secondary copies of the entry for scalability and redundancy purposes (the secondary copies are read-only). When the master copy of an entry is updated, it is timestamped and sent asynchronously to nodes with secondary copies so that finally they will get the latest version of the entry. The node that has the master copy can change at any time - if another node needs to write that entry, it will request the current owner of the master copy to give that node the ownership of that entry's master copy, and after receiving ownership that node can write the entry (all transactions and writes are local).

Lately I've been thinking about what to do when a node in the cluster goes down, that what strategy to use for failover. Here are some questions. I hope that you would know available alternatives to at least some of them.

- What algorithms there are for doing failover in a distributed system?
- What algorithms there are for consensus in a distributed system?
- How should the nodes in the cluster determine that a node is down?
- How should the nodes determine that what database entries had their master copy on the failed node at the time of failure, so that other nodes may recover those entries?
- How to decide that which node(s) has the latest secondary copy of some entry?
- How to decide that which node's secondary copy should be promoted to be the new master copy?
- How to handle it, if the node which was thought to be down, suddenly comes back as if nothing happened?
- How to avoid split-brain scenarios, where the network is temporarily split into two, and both sides think that the other side has died?

Answer: You are asking an absolutely massive question, and a lot of what you want to know is still in active research.

Some thoughts:

- Distributed systems are difficult, because there are no foolproof systems to deal with failures; in an asynchronous system, there is no way to be sure that a node is down or whether there is network delay. This may sound trivial, but it really isn't.
- Achieving consensus can be done by the [Paxos family of algorithms](#), versions of which are used in Google's bigtable, and in other places.

You'll want to delve into a distributed systems textbook (or several). I like [Tannenbaum's Distributed Systems: Principles and Paradigms](#)

Answer2: Tackling just a small part of your question: there's no way in the scenario you describe to decide (in the abstract) which node(s) have the latest secondary copy. At best, some node can poll and determine (after a bit of communication) who among the nodes that they know of / can see, and that know of / can see them, and that *can't see* the old master has the most current copy. But:

- They can't find out the status of nodes they can't reach
- They can't find out the status of nodes that can't reach them
- They can't be sure that what they think they know about the status of a node that can see the old master when they can't is current--the master could have updated the shared neighbor after the neighbor reported status.

On the broader issues, you may want to look at how something like memcached and the like handle the issues, and especially read through the lists to see what problems they've encountered when theory met practice.

44. <https://stackoverflow.com/questions/44435097/rabbitmq-binary-memory-consumption/45724005#45724005>

Title: RabbitMQ Binary memory consumption

Question: According to the images below (Rabbit 3.6.6-1) I am wondering where is all the memory being used for "Binaries" when it doesn't show the same memory usage on the "Binary references" / breakdown

Can anyone enlighten? I suspect something needs to be "Cleaned up"... but what?

This big consumption of "Binaries" can also be seen on machines with 4 queues and no messages...

EDIT 17/07/2017: We have found that this is mainly due to the fact that we open and close multiple connections to rabbitmq, which somehow does not seem to free up the memory in a clean way.

Answer: The safest option, from the perspective of avoiding dangling resources, are TCP keepalives, since you don't have to rely on your client applications behaving. However, they are less versatile and if misconfigured on a high-throughput but "bursty" system, may lead to worse performance, since false-positives will cause reconnects.

Application protocol hearbeats are the more fine-grained option if you need to avoid this problem while also keeping your system's performance, but they require more coordination, in the sense that clients have to opt in and chose their own sensible timeouts. Since you can never be 100% sure your clients won't die without gracefully closing connections, enabling TCP keepalives as a fallback (even with higher timeouts) might also be a good idea.

45. <https://stackoverflow.com/questions/42002389/the-logging-out-event-when-a-user-closes-the-browser/42002642#42002642>

Title: The “Logging out” event when a user closes the browser

Question: I have a table called Eventlog, this table contains already data about user connection: when the user calls this action for example :

```
public ActionResult Login(string username, string password) { }
```

- I test whether the user already exists on database or not
- If yes, I use Session["user"] = username or FormsAuthentication.SetAuthCookie(username, true); to set the user session
- And then I put a record on the Eventlog table : **user X was connected at Y o'clock**

This works fine, but I want also the information about the user logging out. I can do similar thing to the LogOff Action, I guess it is gonna work fine as well, but the majority of people don't use the logoff button, they only close the browser, how is it possible to implement the user logoff event for this situation when the user closes the browser: **user X has been disconnected at Y o'clock**. The Session_End() does not serve the need in this situation.

Answer: You have to accept the limitations of web technology. Once you have sent your response to the user agent, the server has no way to know what is happening with the request. The user might close the user agent gracefully. The UA might crash. The user might lose internet connection. His computer can crash. All of this can happen before the client even *receives* the response. This is the environment you are dealing with. Embrace it instead of fighting it.

If tracking logoff is important to you, there are several techniques you might use:

1. Rely on the session timeout. If you choose a timeout short enough it might be enough to meet your security requirements. I would consider this the preferred way, because it is simple and proven.
2. Use scripting to send a heartbeat from the UA to the server. You can use "ping" requests, long calls etc. However, be aware of the performance impact this comes with, the number of requests to the server and the complexity of the implementation.
3. Use an existing framework such as SignalR to establish a client-to-server connection and have the client check in to the server. This is basically the second option with less manual work for you.

All of this wouldn't let you intercept user logoff or loss of connection, but if the client stops responding you know that the connection is interrupted (in one of many possible ways). So you shouldn't register this as "user logged off", but rather as "user disconnected".

Answer2: It's not possible on the server side to know when a user closes the browser. However, you can use JavaScript to trigger on the window.close and send an AJAX call to the server, therefore recording when a user leaves. This is unreliable, however, since the user has control over browser settings, and could disable JS. It's probably the best you can do.

46. <https://stackoverflow.com/questions/45019888/cancelling-current-task-and-reuse-the-same-thread-while-creating-another-task-in>

Title: cancelling current task and reuse the same thread while creating another task in java

Question: Please take time to read below. Your help will be highly appreciated

I have a scenario where I need to monitor some realtime activity. Say for example a method is getting called in realtime within milli seconds. I have to monitor as if when the method was first called and when the method was called last.

So, after that method is hit last I need to wait for sometime say 10 seconds and see if it doesn't called again within that time. If its not called then I need to run some code.

I want to use **ExecuterService** and use **newCachedThreadPool()**. But I am confused on how to implement this. If you are not sure what I am talking about, take some example of say when there is some network breakdown and u where receiving heartbeats and suddenly u stopped receiving it then you show some error message on screen for e.g. Connection not available. In my case its some third party application which is sending some message and its just one way communication. Like, my application sent some request and other application keep on sending responses. So, I need to monitor that response and somehow need to know when I received the last response.

My approach - I thought of executing a task each time that method is called which will wait for 10 seconds and within 10 seconds, if that method got called again, it will somehow cancel the current task and will create another task (or reuse if possible) which will again run for 10 seconds. This will keep on happening until the last message received (when the method got called last) and after that once 10 sec delay is over, the task will be executed and some code will run to show error message on the UI.

I have used Timer earlier, which solved this problem but created a performance issue as new Timer which a new TimerTask is instantiated every time a new message is received hence creating a hell lot of objects which garbage collector could not reclaim that fast, thus resulting in outOfMemory Error and making Server non responsive. Obviously it was a bad code that's why I am here for help.

Please help me in giving some approach to solve this problem.

Answer: This is quite easy if you approach it with the most basic of tools--sometimes with simple problems the enhanced tools like thread pools just distract from a trivial solution.

Let's say you have a simple thread (Runnable). That thread checks a time stamp to see if that time stamp is 10 seconds old. If it is you notify your listener, if not you delay a few millis and check again.

Now all your method has to do is update the (volatile) time stamp to "now" every time it runs. There may be some other business rules to implement here but it should be a good foundation.

The only issue now is how you notify your listeners. If this happens rarely you can probably call them on the same thread you are checking the time with--but I think you ruled that out. If it happens more often but you don't want/need it to "nest" your notifications, you can have a second thread hanging around with no purpose except to notify the client when triggered by your watcher thread.

If you need to "nest" notifications (notify the listener before the original notification has returned) then you need a thread pool for your notifications to go out on.

Finally I suppose if you want to catch EVERY time your timer isn't called for 10 seconds but you don't want to nest, your timing thread could push "events" onto a threadsafe queue and your "Notification" thread could pull them off and send the events one at a time.

That should cover all the possibilities.

47. <https://stackoverflow.com/questions/47730584/is-using-the-boost-endian-arithmetic-types-considered-good-practice/47730796#47730796>

Title: Is using the Boost Endian Arithmetic types considered good practice?

Question: I'm fairly new at a company as embedded software engineer and I have to deal with networking quite a lot. I have to program in C++ all the time and using the code of my colleagues I noticed they use structs to build up packets to send over a network using TCP/UDP. For this, because the machines we are using are little-endian, everything has to be converted to big-endian. So the moment the data has to be sent they use the known functions as htons, ntohs, etc.

So I was looking up on how to make my code portable so the programmer does not have to care about the endianness of his machine and I stumbled upon the Endian Arithmetic types of the Boost library with which you, the programmer, can decide how your integer types are stored in memory. They seem very nice in the context I would use them but they are mentioned barely anywhere. Stackoverflow only has posts on how the endianness problem can not be handled in a proper way but these Arithmetic types seem like a nice portable solution to me. Why is it these types are barely mentioned anywhere and are never a proposed solution? Is there something wrong with them or are they just too new?

Answer: It depends on where. Of course, using them throughout your whole codebase is a design trade-off.

The endian types are not a zero-cost abstraction. Using them for anything else than passive storage can hurt performance. (Imagine doing number crunching on non-native endian numbers. The processor could be spending more time dancing around with high-order/low-order bytes and words as needed than on the actual calculations).

If your application is typical, you will have POD transmission buffers that do not contain many "live" data elements, and the sheer benefit of automatic endianness conversions under the hood could well be worth any overhead.

I know about Boost Endian types and would prefer them over repeatedly writing ntohs and friends in a heartbeat.

In reality, though I've written generic serialization helpers (where the use of ntohs/hton is isolated to a handful primitive functions), or used existing libraries (such as protobuf). So the irony is that, me too, I haven't use Boost Endian extensively for any production code.

Perhaps this pattern goes for many developers, explaining not a lot of examples around Boost Endian?

48. <https://stackoverflow.com/questions/4481645/gridgain-application-that-is-slower-than-a-multithreaded-application-on-one-mach/4484590#4484590>

Title: GridGain application that is slower than a multithreaded application on one machine

Question: My code can chose between a multi-threaded execution on one machine or use several GridGain nodes using the code above. When I run the gridgain version it starts out like it is going to be faster, but then a few things always happen:

- One of the nodes (on a different machine) misses a heartbeat, causing the node on my main computer to give up on that node and to start executing the job a second time.
- The node that missed a heartbeat continues doing the same job. Now I have two nodes doing the same thing.
- Eventually, all jobs are being executed on my main machine, but since some of the jobs started later, it takes way longer for everything to finish.
- Sometimes an exception gets thrown by GridGain because a node timed out and the whole task gets failed.
- I get annoyed.

I tried setting it up to have many jobs so if one failed then it wouldn't be as big of a deal, but when I do this I end up with many jobs being executed on each node. That puts a much bigger burden on each machine making it more likely for a node to miss a heartbeat, causing everything to go downhill faster. If I have one job per CPU then if one job fails, a different node has to start over from the beginning. Either way I can't win.

What I think would work best is if I could do two things:

- Increase the timeout for heartbeats
- Throttle each node so that it only does one job at a time.

If I could do this, I could divide up my task into many jobs. Each node would do one job at a time and no machine would become overburdened to cause it to miss a heartbeat. If a job failed then little work would be lost and recovery would be quick.

Can anyone tell me how to do this? What should I be doing here?

Answer: For the first one, the activeJobsThreshold value tells the node how many jobs it can run at the same time. This is a better way of doing throttling than changing the number of threads in the executor service. Also, it does some load balancing and idle nodes can 'steal' work from other nodes to get everything done faster.

There are better ways to do this also. Gridgain can do size the jobs based on the measured performance of each node, apparently, which would improve overall performance, especially if you have fast and slow computers in the grid.

For the future I am going to study the configuration file and compare that to the javadocs to learn all about all the different options, to get this to run even faster.

49. <https://stackoverflow.com/questions/22526004/function-of-tick-or-ticker/22539957#22539957>

Title: Function of Tick or Ticker

Question: What is the use of tick function in easeljs. When to use it? What exactly does it do to a stage? What is the exact format? I see different ways in which it has been called in different tutorials.

What is difference between tick and ticker?

Answer: The tick function on the Stage (and other display objects) advances all the child animations. Things like MovieClip and Sprite have frame-based animation, which are advanced the next frame whenever they are ticked. You can turn off updateOnTick on the stage to prevent this.

The Ticker is a utility class that manages an actual heartbeat. It is a totally optional utility, but it creates an interval (using timeouts or requestAnimationFrame), and then dispatches events at a ~constant rate (the rate will be dependant on the performance on the device).

You can set the stage as a listener to the Ticker (instead of a custom handler function), and it will automatically call update() (and hence tick()) on the stage. This is the easiest usage. You can also manually call stage.update() in your own function to tick and redraw the stage. Note that using the stage as a listener guarantees that the stage will constantly update - so if you want to control it, then listen to the Ticker yourself, and manually call stage.update().

50. <https://stackoverflow.com/questions/23619899/mysql-sub-entity/23635854#23635854>

Title: MySQL Sub Entity

Question: I am working on a project where I want the category "Items" to have sub entities in MySQL.

In my situation the main entity is called "Items", however I need to divide them in to smaller portions such as:

- Consumables
- Drugs

- Gear/tools
- Armor
- Ranged weapons
- Melee weapons.

Those sub entities also need some sub entities as well. For example ranged weapons need the sub entities:

- Flame weapons
- Primitive weapons
- Launchers
- Grenades
- Exotic weapons

I have tried to search it but can't seem to find any solution for it. How do I design these entities?

Also when I do a simple SELECT * FROM item; will it then show ALL the items that are in all the sub categories?

Or will it only show those which have been inserted directly in the item entity?

Answer: Under this table, you could query items WHERE parent_id = x (other words, ranged weapons). You may need to nest your queries a bit, depending on how many levels you have. But the logic is usually fairly straightforward.

If I had only a few levels, like you're describing (a few meaning not 10 or 20 or 100), then no question I'd do a tree structure like the second example. If you do have multiple levels, you'll need to think about the actual queries you'll be running against it and maybe look into various normal forms (http://en.wikipedia.org/wiki/Database_normalization) to represent your data.

Again, though, with only a few levels, I'd tree structure this thing in a heartbeat. It'll be easier to maintain and, as long as you don't end up having to climb several levels up the tree, you shouldn't have any problems with performance (assuming good indices, good queries, etc)

51. <https://stackoverflow.com/questions/623321/how-to-design-log-level-names-to-reflect-frequency-of-use/648128#648128>

Title: How to design log level names. To reflect frequency of use?

Question: I'm going to build a great system. Thinking about log level naming make me wonder.

1. Can I choose names, so the admin and the developers know which to use. Without using documentation? It would be good if the log level also reflect **how frequent** they will show up in logs.
For example:

- INIT/SHUTDOWN - (appear once)
- FUNC_CALL - (appear frequent, for example in loops)
- TRACE - (several times in functions)

Now, a sysadmin would never turn on TRACE logging in production. He can safely turn on INIT/SHUTDOWN. And FUNC_CALL if there are low traffic in the system.

What is wrong with this design?

What names would you use to reflect the frequency?

(I know about WARN, INFO and ERROR.)

Answer: I'd go with more self-describing names, like:

- EVERYTHING_IS_BROKEN_IMMEDIATE_ATTENTION_REQUIRED
- RARE_IMPORTANT_EVENT (which includes init/shutdown)
- DETAILED_EXECUTION_TRACE
- TONS_OF_DEBUGGING_INFORMATION

Maybe not exactly these ones but you get the idea — make sure it is absolutely impossible to be confused about what each log level means. (I also used the “trace” term in a more conservative sense — a list of function calls **is** actually a trace, so FUNC_CALL and TRACE sound as synonyms to me)

Also be sure not to make log levels that noone should disable. I personally have always found the default ERROR/WARNING/INFO levels silly because they are very misleading (is a request for a non-existing item an error?)

Also would be good if noone can (accidentally) disable
EVERYTHING_IS_BROKEN_IMMEDIATE_ATTENTION_REQUIRED and RARE_IMPORTANT_EVENT
levels.

Don't be afraid to use long names, IDEs will auto-complete them anyway. Better to have longer names than messed up logs.

Answer2: The problem with log is to be sure they will actually *not* be displayed too much, for this is the surest way to bring a system to a full stop.

(log files full, process much slower because of some complicated log messages to build, log conditions repeated over and over, ...)

Then, it looks like FUNC_CALL and TRACE are good names for pre-production steps, when you want see, for test reasons, what exactly is executed.

But in production should remain only functional-related logs (generally WARNING and SEVERE logs about functional features), and even those can be dangerous (especially a WARNING in a loop for several thousand instances).

So actually, whatever name you choose, you must include in the document which helps to put your application into production which exact log levels you want to keep active, and for which packages. And it will take several tries before getting it right.

Answer: In existing logging frameworks such as log4j, the severity level and the location in the program are two orthogonal notions.

Log4j defines the following levels: TRACE, DEBUG, INFO, WARN, ERROR and FATAL, but one can also filter the output according to the class in which the log is done.

52. <https://stackoverflow.com/questions/11821753/if-power-failure-occurs-during-an-online-examination-how-do-we-update-the-time/11822062#11822062>

Title: If power failure occurs during an online examination, how do we update the time left when the user logs in to the portal again?

Question: I am working on a project Online examination ***just to gain knowledge***. There can be a case of power failure and when a candidate logs in again, then the time wasted during power failure must be given. But in my javascript code, the exam ends after exact 2 hours corresponding to server time(AJAX is used here). After time ends, the student is redirected to home page. I have thought of a solution but I dont find a start to implement it.

As the session is maintained, so I can maintain the time he used from 2 hours and can be stored in database. when he relogin then that particular row which corresponds to him can be checked and the time can be updated. But I am not able to implement it. Please tell me if there is another solution to it or the direction in which I am thinking is right or wrong.

The exam clock resumes from the start of 2 hours. It doesn't resume from the time which was ticking when the power failure was there. Its the same thing whether a power failure occurs or a candidate logs back again in this case atleast. And I am not asking for any code for this problem. I just want a hint or a direction in which I can think of. I just want to know what can be the concept behind it.

Answer: activeoldest votes

4

Formalizing the problem a bit:

- A user logins in and begins their exam at t_0 . Their exam concludes at t_{120} .
- At some point (x minutes into exam) before the end of the exam (t_x) there is a power failure and those being tested must resume the exam.
- At some point after t_x , t_y the system comes back online.
- At some point after or equal to t_y , the user logs in again, call it t_z . As you've indicated, this is equal to t_y .
- They're entitled to $120 - x$ more minutes to complete the exam. The point at which the exam concludes is now $t_z + (120 - x)$.

Possible Solution:

Originally thought of a very session-oriented approach, but this might be the way to go:

- Implement a system wide clock (think "heartbeat") with a period p . For every interval p that the system is up, increment a global counter.
- Record t_0 as this global counter for each examination.
- In another row, update the elapsed time an examination. This is the current value of t_0 . In your code you'll likely have functionality to save their work in progress, update the elapsed time there. Also update the elapsed time on each page/section load. Note that if some work is lost between the last elapsed time update/in progress save, they'll receive that time 'back' since their last elapsed update was never stored.
- The interval p will be a policy decision. In theory someone could gain an extra p to complete their exam depending on the timing of the failure. If p is 1 second, it's not a big deal. If it's 5 minutes, it's a bigger deal. Of course there will be performance tradeoffs for different values of p . Also since we're not dealing with real-time systems here, there can be some skew with p .
- Use transactions for everything. When the system resumes (and before the global clock starts ticking again), any transactions interrupted will need to be rolled back.

53. <https://stackoverflow.com/questions/54297995/multicast-and-clustering/54298724#54298724>

Title: Multicast and Clustering

Question: They saw "Multicast" in this picture and said that it was "Big No" for clustering for performance reasons. My impression was absolutely opposite - the Multicast protocol is more simple to configure, and more economical and effective, than the Unicast.

Any big reasons, why cluster designers should be afraid of the Multicast?

Answer: The main potential "gotcha" with multicast is that a lot of network switches don't implement [IGMPv3](#)(or [MLDv2](#) for IPv6), and instead they just broadcast every multicast packet to every device on the LAN, and rely on each device's IP stack to filter out any irrelevant incoming multicast packets locally. That technically works (and keeps the switch's implementation simple) but it does mean that any slow(ish) devices on the LAN might suffer from performance problems if they have to devote a lot of their network bandwidth and/or CPU time to examining and throwing away lots of multicast packets they never asked for. On the other hand multicast (or broadcast) is practically a requirement to do things like automatic discovery of devices on the LAN, since you can't use unicast communication to communicate with another device unless you already know that device's IP address.

My suggestion, then, would be to use multicast for discovery, heartbeats, and other low-bandwidth traffic, but if you're planning to do something high-bandwidth (e.g. video streaming or bulk data transfer), either plan to be able to fallback to unicast, or make sure your switches implement IGMPv3/MLDv2 and don't just spam multicast packets everywhere.

One last note: WiFi is *really* bad at multicast -- due to the unfortunate way that multicast-over-WiFi was implemented, even a modest amount of multicast traffic can bring a WiFi router to its knees. So if you're planning to use multicast, you'll probably want to either keep any WiFi routers off of the LAN entirely, or at least make sure you can set them up to filter out multicast packets rather than trying to forward them to their WiFi clients.

54. <https://stackoverflow.com/questions/29359003/how-can-i-break-only-on-unhandled-exceptions-in-continuetwith/29403946#29403946>

Title: How can I break only on unhandled Exceptions in ContinueWith?

Question: When I write Task-based code, some of my ContinueWith clauses intentionally throw Exceptions (which I catch and handle appropriately), and some of them accidentally throw Exceptions (because of bugs). How can I avoid breaking on the first kind while still breaking on the second kind?

In the code below, I expect the debugger to break on the Unintentional Exception, and NOT on the Intentional Exception (because it is handled later). If I disable "Just My Code" according to [this question](#), then the Intentional Exception doesn't break the debugger (correct), but the Unintentional Exception doesn't break the debugger either (incorrect). If I enable "Just My Code", then the Unintentional Exception does break the debugger (correct), but so does the Intentional Exception (incorrect).

Is there any setting to make Exceptions in ContinueWith clauses work like a normal developer would presumably expect them to?

Answer: I'm pretty sure you can't do what you want here, not exactly.

Note: your code example is a bit misleading. There's no reason the text This line should never print should in fact never print. You don't wait on the tasks in any way, so the output happens before the tasks even get far enough to throw exceptions.

Here's a code example that illustrates what you're asking about, but which IMHO is a bit more robust and which is a better starting point to demonstrate the different behaviors involved

55. <https://stackoverflow.com/questions/1846522/maintaining-network-integrity-in-peer-to-peer-network/1901848#1901848>

Title: 3

I am looking for information on techniques, algorithms, etc. on how to maintain network integrity in a dynamic peer-to-peer network. Both practical implementations, academic papers and anything else in that category are welcome.

Imagine a network that is solely peer-to-peer based where each node is only connect to x other nodes. Without having a grand list of all nodes, each node is responsible for maintaining a connection with the network. Nodes go down and come up dynamically, meaning each node needs to ask it's neighbors (and their neighbors?) for new nodes to connect to, in order to maintain the x number of connections.

Network segmentation (two halves of the network are only connected by one node from each network - if either of those go down, the network splits into two) and how to avoid this and efficient routing (distance metrics, etc.) are my main interests, but anything relating to networks with similar descriptions would be interesting.

I am currently looking at the Chord DHT protocol as it has some similarity to what I'm asking.

AnFor ubiquitous computing various ad-hoc P2P networks have been developed and they'd probably fit your needs. It's been used for example in the army to deploy small capsules each talking to neighbors up to usually some command center. If you don't have a center, it may be related to distributed computing, anyway here are some links:

- [Wireless ad hoc network](#)
- [List of ad-hoc routing protocols](#) <-- This may be your best starting source info
- <http://eprints.kfupm.edu.sa/49089/1/49089.pdf>

Answer: Just to avoid reinventing the wheel, take a look at the various routing protocols. [OSPF](#) might be a good starting point, given your scenario. Of course there are many, many variables that might make it not the best choice for you. Such as:

- you can keep a shortest path to X nodes; if a node goes down, attached nodes are informed and can do a new SP search to find a suitable one; you need to consider overhead for ping and keep-alive messages
- do you need to intradate connections (i.e. searches in the p2p network) or just maintain a large set of nodes interconnected (a la botnet)? If so, a mixed approach (a small, distributed hash table for small subsets of the network + OSPF/BGP for borders) might help;
- so on and so forth

56. <https://stackoverflow.com/questions/22945406/is-standard-java-immune-to-memcpy-security-flaws-like-the-recent-open-ssl-heartbleed>

Title: Is standard Java immune to memcpy security flaws like the recent open ssl heartbeat flaw?

Question: Recently, the library openssl has been revealed to have a serious flaw that enables attackers to read up to 64KB of memory.

<http://blog.existentialize.com/diagnosis-of-the-openssl-heartbleed-bug.html>

The cause seems to be due to the use of memcpy and not cross checking the size of the input provided by the attacker.

If we assume standard libraries (not calling out to C), is Java immune to these types of security flaws?

To be more specific about type of security flaw, I'm not referring to trusting user input, but specifically bounded memory access.

Answer: Java is safer, because it doesn't use pointer arithmetic, does bounds checking, and doesn't (normally) allow one to access arbitrary chunks of memory (see [sun.misc.Unsafe](#)!).

However, similar problems could arise, in principle, if one reads and writes bytes from an array, ByteBuffer, etc according to offsets provided by an untrusted client. The problem is much reduced, because one can only attack data within the bounds of that array (or similar container) rather than data in arbitrary adjacent objects.

Even with Unsafe, one would typically be, uh, Safe, because one tends to use it for allocating and accessing a very specific set of performance-critical objects, rather than the entire application (including encryption keys, passwords, etc).

The fundamental problem is trusting user input, and that can happen in any language, and a whole variety of contexts, e.g. SQL injection.

57. <https://stackoverflow.com/questions/4371016/make-browser-tab-flash-a-notification>

Title: Make browser tab flash a notification

Question: For security reasons, my website automatically signs users out after 5 minutes of inactivity. I achieve this through jquery timeouts which are reset any time the user does what I consider an "activity". To ensure security, the timeout of the cookie is also set to 5 minutes, and my jquery performs a heartbeat back to the server to ensure the cookie doesn't expire.

Currently, at about 4 minutes of inactivity, a jquery ui dialog pops up, warning the user of their impending timeout. The user can choose to stay signed in, sign out now, or do nothing and they are forced to sign out at the end of the 5 minutes.

My problem is that I want to make the tab flash/blink with a different background color to warn the user that something is going on while they weren't paying attention. I'm just not sure how to go about doing this.

Answer: You can change the title of the page (this should also change the text in the tab).

```
document.title = 'New title';
```

Additionally you could do this in a setInterval back and forth between the page title, and the information you are attempting to show the user. I have seen this behavior on gmail with incoming chat communication.

Answer2: You can also add an **alert** window. When user is in another tab, browser has an inbuilt feature of flashing the tabs (having alert). So, changing document title along with an alert will serve your purpose. Note : before showing alert , you need to first check if tab is active.

58. <https://stackoverflow.com/questions/20060532/connection-refused-when-my-play-app-makes-http-call-to-itself>

Title: “connection refused” when my play app makes http call to itself

Question: I am implementing a heartbeat endpoint/route using play 2.2.1 built with Scala 2.10.2 (running Java 1.7.0_45). When the heartbeat endpoint is called, I want the controller to make http calls to localhost. If all of those calls are ok, then the heartbeat endpoint will return an OK http response.

When I execute the following url from curl, I get the expected 200 response: `http://localhost:9000/oauth2/token`. I am also able to telnet to `localhost 9000`.

Answer: Do I need to configure something to allow a play application to make calls to itself? Is this a network problem on my box? If so, why do curl and telnet work? If a network issue, then it must be a jvm specific networking issue?

Could it be a security problem with play calling to itself? Not sure where to go next.

59. <https://stackoverflow.com/questions/12373031/how-can-i-have-an-express-connect-route-that-doesnt-update-session>

Title: How can I have an Express/Connect route that doesn't update session

Question: I'm building a single-page javascript app that talks to Express on the back end. At various points in the app, we interact with the back end, updating the session. The session expiration is relatively short for security reasons.

In it, I'd like to warn the user that the session might be expiring, if they've been idle for a long time and have not made any transactions with the back end.

I'd like to have an Express "heartbeat" route that returns how long the session has remaining (session.maxAge), but I don't want it to refresh the session expiration.

The connect.session code automatically refreshes the session at the end of a request.

I'm looking for a way to have access to the session to fetch the maxAge, but not have it updated.

Answer: Best bet would be modifying your SessionStore manually to not modify the session expiration when coming from a specific route (req.url).

Look for the part of your sessionStore that calls Session.touch()

60. <https://stackoverflow.com/questions/12373031/how-can-i-have-an-express-connect-route-that-doesnt-update-session>

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61. <https://stackoverflow.com/questions/7877461/architecture-guidance-for-a-rabbitmq-net-implementation>

Title: Architecture guidance for a Rabbitmq .net implementation

Question: I'm looking for some implementation guidance. What are the pro and cons of using the wcf bindings or using the plain vanilla .net rabbitmq api. Are the moment we are not constrained to use either. I new to rabbitmq, but done a bundle of wcf.

We have a product which collects info from publishers on each device. The product is behind the firewall (at the moment). The publisher will need 3-4 channels.

- Request/Response to publish the metric to publish/subscribe on server with ack from server.
- Update channel, to update publisher rulebase for metric discovery from server.
- Heartbeat channel to check server is up and respond to server heartbeat.
- Possible dead letter channel.

Publisher will be cross platform. Thinking of hosting on Mono, on Linux, BSD, Solaris, Android, MacOs, iOS, and possibly Aix/HP-UX. Don't know how effective wcf endpoints would be in these instances.

Server will have multiple workers, each receive same message from own? queue, ack it and process it against their own rulebase. I would like the workers to be event driven. Server needs to be high performance, 10k to 100k+ messages per minute. No messages can be lost from publisher to server.

I'm swinging towards using the plain api as it offers more flexibility as regarding stuff like threading/serialization/session management/security/compression but the product may be moved to Azure and offered as SaaS or PaaS, and having wcf endpoint would make sense to talk to publishers on both on/off windows, but that would be in the longer term.

Answer: This question is a bit broad too answer. Recommend that it be deleted or significantly truncated (I assume the need is no longer pertinent).

62. <https://stackoverflow.com/questions/26075680/is-it-safe-to-use-etcd-across-multiple-data-centers/26078893#26078893>

Title: Is it safe to use etcd across multiple data centers?

Question: Is it safe to use etcd across multiple data centers? As it expose etcd port to public internet. Do I have to use client certificates in this case or etcd has some sort of authification?

Answer: Yes, but there are two big issues you need to tackle:

1. Security. This all depends on what type of info you are storing in etcd. Using a point to point VPN is probably preferred over exposing the entire cluster to the internet. Client certificates can also be used.
2. Tuning. etcd relies on replication between machines for two things, aliveness and consensus. Since a successful write must be committed to at majority of the cluster before it returns as successful, your write performance will degrade as the distance between the machines increases. Aliveness is measured with periodic heartbeats between the machines. By default, etcd has a fairly aggressive 50ms heartbeat timeout, which is optimized for bare metal servers running on a local network. Without tuning this timeout value, your cluster will constantly think that members have disappeared and trigger frequent master elections. This gets worse if both of your environments are on cloud providers that have variable networks *plus* disk writes that traverse the network, a double whammy.

More info on etcd tuning: <https://coreos.com/docs/cluster-management/debugging/etcd-tuning/>

63. <https://stackoverflow.com/questions/19389840/worklight-security-force-login-every-2-weeks/34004419#34004419>

Title: worklight security - force login every 2 weeks

Question: Trying to better understand security implementation options. When using IBM Worklight, to force a user to login only every 2 weeks, what approach would you recommend?

Answer: ne of the options is to set two weeks timeout. Another is to generate some kind of token with 2w validity and use it instead of user/pass when logging in.

- Answer2: First I will use **Adapter-based authentication** to authenticate the user into the application: [\[https://developer.ibm.com/mobilefirstplatform/documentation/getting-started-6-3/authentication-security/adapter-based-authentication/\[1\]\]](https://developer.ibm.com/mobilefirstplatform/documentation/getting-started-6-3/authentication-security/adapter-based-authentication/[1])
- Second, you can try to configure the **serverSessionTimeout** property in file worklight.properties to 20160 minutes(2 weeks). The serverSessionTimeout property defines client inactivity timeout, after which the session is invalidated. A session is an object stored in the server memory for each connecting device. Among other data, it stores authentication information. Active sessions are determined by the number of sessions opened versus the sessions timing out due to lack of activity. The default session timeout is 10 minutes, but it can and should be configured. Users typically set the timeout to anywhere from 5 to 10 minutes. This parameter affects the server memory consumption.
- In addition, the mobile client has a **heartbeat** property that allows the mobile client to ping the server while the app is in the foreground, so that the server session will not time out. *Note: When a mobile app has moved into the background, it no longer interacts with the server, nor sends a "heartbeat". The result is that the server session drops after the specified server session timeout.*

64. <https://stackoverflow.com/questions/495551/cloud-computing-and-my-companys-data/495566#495566>

Title: I am looking into Cloud Computing for my company. The one question that I can't seem to get out of my head is; What happens to my data and the ability to use it if the Cloud computing company goes out of business?

Answer: Obviously, you should pick a provider that you think is solid and unlikely to go out of business however the real answer is that you should have a replacement provider lined up and a plan for how you're going to switch if the main provider goes bust. The key parts of such a plan are:

- Make sure you own and control the domain names, and use a completely independent provider to run your DNS
- Set up a completely automated backup system which moves all data off your primary provider.
- Have the backup provider ready-to-run at all times with just a DNS switch
- Test your switchover process periodically

An outsourced server farm is really no different to any other outsourced function. You just need to make sure you're not locked into a single supplier.

Answer2: I would say that it depends on the company. I wouldn't assume anything about you being able to retrieve it if the company goes out of business. Even if you have a legal right to do so, it will probably take months of going through court orders and procedures to get at it after the company fails.

After the company goes bankrupt, I also wouldn't assume there would be any security protocols in place to protect it. Even if they say there will be, when a company goes under all bets are off.

A think to also remember is that even the most "well known" companies can fail in a heartbeat (Enron anyone). You never really know how well a company is doing until the financial statements (if any) are released.

Answer2: Why don't you just keep a local backup of some sort? Also, you might want to stick with well known companies like Amazon where they probably wouldn't go out of business.

EDIT: As stated in the comments, even if Amazon stopped offering their cloud computing service it's unlikely that they wouldn't give users ample time to move their data off of their servers

65. <https://stackoverflow.com/questions/42002389/the-logging-out-event-when-a-user-closes-the-browser/42002642#42002642>

Title: The “Logging out” event when a user closes the browser

Question: 3

I have a table called Eventlog, this table contains already data about user connection: when the user calls this action for example :

```
public ActionResult Login(string username, string password) { }
```

- I test whether the user already exists on database or not
- If yes, I use Session["user"] = username or FormsAuthentication.SetAuthCookie(username, true); to set the user session
- And then I put a record on the Eventlog table : **user X was connected at Y o'clock**

This works fine, but I want also the information about the user logging out. I can do similar thing to the LogOff Action, I guess it is gonna work fine as well, but the majority of people don't use the logoff button, they only close the browser, how is it possible to implement the user logoff event for this situation when the user closes the browser: **user X has been disconnected at Y o'clock**. The Session_End() does not serve the need in this situation.

Answer: You have to accept the limitations of web technology. Once you have sent your response to the user agent, the server has no way to know what is happening with the request. The user might close the user agent gracefully. The UA might crash. The user might lose internet connection. His computer can crash. All of this can happen before the client even receives the response. This is the environment you are dealing with. Embrace it instead of fighting it.

If tracking logoff is important to you, there are several techniques you might use:

1. Rely on the session timeout. If you choose a timeout short enough it might be enough to meet your security requirements. I would consider this the preferred way, because it is simple and proven.
2. Use scripting to send a heartbeat from the UA to the server. You can use "ping" requests, long calls etc. However, be aware of the performance impact this comes with, the number of requests to the server and the complexity of the implementation.
3. Use an existing framework such as SignalR to establish a client-to-server connection and have the client check in to the server. This is basically the second option with less manual work for you.

All of this wouldn't let you intercept user logoff or loss of connection, but if the client stops responding you know that the connection is interrupted (in one of many possible ways). So you shouldn't register this as "user logged off", but rather as "user disconnected".

66. <https://stackoverflow.com/questions/11008177/stop-people-having-my-website-loaded-on-multiple-tabs/11008432#11008432>

Title: Stop people having my website loaded on multiple tabs

Question: I want users to browse my site from *only* one tab in their browser. How can this be done? Would I use javascript and cookies?

For example, I have a website: **www.example.com** - and I want my clients to only be able to visit the site from one single tab in one browser. If they open another tab and load the site (or a subpage of the site) - I want an alert "*Can't open multiple instances*", and then redirect them to an error page.

One thing to note - if the user changes the address

from **www.example.com/action/door/mine.aspx** to **www.example.com** - that should work fine, because the user is in the same (original) tab.

Answer: **EDIT2:**

It's the exact thing which is mentioned at [this answer](#), You need 2 IDs:

1. One random one

2. One consistent one (this will be our SSID actually, since you limit tabs of a single browser, it's better to get generated from browser's unique parameters)

You can generate consistent one from browser's user-agent or get it from server-side. store both of them server-side.

Store the random one in `window.name` property which is tab-specific.

Send a heartbeat every 1~2 seconds to your server containing both consistent ID and random one. if server fails to receive the heartbeat, it cleans up database and de-register dead clients.

on every browser's request, check `window.name` for the value. if it were missing, check with the server-side whether if the previous tab is closed or not (cleaned from database).

If yes, generate a new pair for client if no, reject him.

Answer2: Why do you want to do this?

Could try to do some ugly hacking, but the result would be: There is **no** way you could completely suppress this behaviour.

This could not be solved by JavaScript, because there is always the possibility that the user has disabled JavaScript in his browser, or allows only a certain subset.

The user could open a new browser, use a different computer, etc. to visit multiple pages at once.

But more important:

Also, your site would be the only site that has this behaviour and for this reason this will confuse everybody which uses your site, because it doesn't work like a web site should work. Everybody who tries to open a second tab will think: "This is odd. This website sucks because it's different than websites should be. I will not come again!" ;-)

67. <https://stackoverflow.com/questions/4573211/a-completely-decoupled-oo-system/4574569#4574569>

Title: a completely decoupled OO system?

Question: To make an OO system as decoupled as possible, I'm thinking of the following approach:

- 1) we run an RMI/directory like service where objects can register and discover each other. They talk to this service through an interface
- 2) we run a messaging service to which objects can publish messages, and register subscription callbacks. Again, this happens through interfaces
- 3) when object A wants to invoke a method on object B, it discovers the target object's unique identity through #1 above, and publishes a message on the message service for object B
- 4) message services invokes B's callback to give it the message
- 5) B processes the request and sends the response for A on message service
- 6) A's callback is called and it gets the response.

I feel this system is as decoupled as practically possible, but it has the following problems:

- 1) communication is typically asynchronous
- 2) hence it's non real time
- 3) the system as a whole is less efficient.

Are there any other practical problems where this design obviously won't be applicable ? What are your thoughts on this design in general ?

Answer: *Books*
Enterprise Integration Patterns

It appears he's talking about using a Message Oriented Middleware

Here are some things to consider

Security

What will prevent another rogue service from registering as a key component in your system. You will need way to validate and verify that services are who they say they are. This can be done through a PKI system. There are scenarios that you might not need to do this, if your system is hosted entirely on your intranet. If that is the case Social Engineering and Rogue Employees will be your biggest threat.

Contract

What kind of contract will your clients have with the services? Will messages all be serialized as XML and sent as a TextMessage? If you use a pure byte message you'll have to be careful about byte order if your services are to run on multiple platforms.

Synchronization

Most developers are not able to comprehend and utilize asynchronous messages correctly. Where possible it might be in the best interest of your design to create a way to invoke "synchronous" messages. I've done this in the past by creating a sendMessageAndWait() method with a timeout and a return object. Within the method you can create a temporary topic id to receive the response, register a listener for it, then use locks to wait for a message to be returned on your temporary topic.

Unsolicited Messages

What happens if you want to allow your service(s) to send unsolicited messages to your clients? A critical event happened in Service A and it must notify your clients or possibly a Watch Dog service. Allow for your design to register for a common communication channel for services to communicate with clients without clients initiating the conversation.

Failover

What happens if a critical service processing your credit cards goes down? You'll need to implement a Failover and Watch Dog service to ensure that your key infrastructure is always up and running. You could register a list of services within your registry then your register could give out the primary service, falling back to a secondary service if your primary stops communicating. Or if your Message Oriented Middleware can handle Round Robin messaging you might be able to register all the services on the same topic. Think about creating a way to know when a service has died. Since most messages are Asynchronous it will be difficult to determine when a service has gone offline. This can be done with a Heartbeat and Watch Dog.

I've created this type of system a few times in my past for large systems that needed to communicate. If you and other developers understand the pros and cons of such a system it can be very powerful and flexible.

The biggest piece of advice I can give is to build a toolkit for your other developers so they don't have to think about how to register a service, or implement failover, or respond to messages from a client. These are the sorts of things that will kill your system and have others say it is too complicated. Making it painless for them will allow your system to work the way you need it with flexibility and decoupling while not burdening your developers with understanding enterprise design patterns.

This is not a Ivory Tower Architect/Architecture. It would be if he said, "This is how it will do done, now go do it and don't bother me about it because I know I'm right." If you really wanted to reference a Anti-Pattern it could be Kitchen Sink, maybe. Nah now that I think about it, it isn't Kitchen Sink either.

If you can find one please post it as a comment. [Anti-Patterns](#)

Answer2: Coupling is simply a balance between efficiency and re-usability. If you wish the modules of your system to be as reusable as possible then that will undoubtedly come at a cost.

Personally I think it best to define some key assumptions which may tighten coupling, but bring increased efficiency.

There are design patterns which never see the light of day just because the benefit they provide is not worth the cost in complexity.

68. <https://stackoverflow.com/questions/7523626/trusted-connection-vs-integrated-security-affects-connection-pooling>

Title: Trusted_Connection vs Integrated Security affects connection pooling

Question: was running some application performance monitoring on my ASP.NET 4.0 application (on Windows 2008 RC2, connected to a SQL Server 2005 database) and noticed that the connections did not appear to be pooling. We run the application pool under a specific user and use integrated security. With a connection string like:

```
<add name="myConnection" connectionString="Server=DBSrv;Database=DB1;Trusted_Connection=true;" providerName="System.Data.SqlClient"/>
```

On a hunch i slightly modified the connection string to use the Integrated Security syntax instead of trusted_connection. After making the change the connections began using the connection pool.

```
<add name="myConnection" connectionString="Server=DBSrv;Database=DB1;Persist Security Info=False;Integrated Security=SSPI;" providerName="System.Data.SqlClient"/>
```

I can't find any documentation anywhere that suggests that these formats would affect pooling. Has anyone come across something similiar?

Answer: The tool I was using (dynatrace), that was reporting that the connection pooling was behaving differently based on the connectionstring format appears to be the culprit. A more recent upgrade of dynatrace no longer showed a difference. Apparently this was a phantom issue.

69. <https://stackoverflow.com/questions/4684112/how-do-cdi-and-ejb-compare-interact/4705840#4705840>

Title: How do CDI and EJB compare? interact?

Question: I'm having a tough time understanding how the two interact and where the boundary between them lies. Do they overlap? Are there redundancies between them?

I know there are annotations associated with both, but I haven't been able to find a complete list for both with brief descriptions. Not sure if this would help clear up how they differ or where they overlap.

Really just confused. I (think I) understand EJB reasonably well, I guess I'm having a hard time understanding exactly what CDI brings to the table and how it supplants or enhances what EJB already offers.

Answer: CDI - it is about dependency injection. It means that you can inject interface implementation anywhere. This object can be anything, it can be not related to EJB. [Here](#) is an example of how to inject random generator using CDI. There is nothing about EJB. You are going to use CDI when you want to inject non-EJB services, different implementations or algorithms (so you don't need EJB there at all).

EJB you do understand, and probably you are confused by @EJB annotation - it allows you to inject implementation into your service or whatever. The main idea is that class, where you inject, should be managed by EJB container. Seems that CDI does understand what EJB is, so in Java EE 6 compliant server, in your servlet you can write both

70. <https://stackoverflow.com/questions/23514256/http-request-with-timeout-maximum-size-and-connection-pooling>

Title: http request with timeout, maximum size and connection pooling

Question: I'm looking for a way in Python (2.7) to do HTTP requests with 3 requirements:

- timeout (for reliability)
- content maximum size (for security)
- connection pooling (for performance)

I've checked quite every python HTTP librairies, but none of them meet my requirements. For instance:

Answer: There is of subtle difference here in how compressed data sizes are handled here; `r.raw.read(100000+1)` will only ever read 100k bytes of compressed data; the uncompressed data is tested against your max size. The `iter_content()` method will read more uncompressed data *in the rare case the compressed stream is larger than the uncompressed data.*

Neither method allows `r.json()` to work; the `response._content` attribute isn't set by these; you can do so manually of course. But since the `.raw.read()` and `.iter_content()` calls already give you access to the content in question, there is really no need.

71. <https://stackoverflow.com/questions/1402852/application-pool-identity-in-iis-and-integrated-security-to-sql-server>

Title: Application pool identity in IIS and Integrated security to SQL Server

Question: If I have an ASP.NET web app using impersonation and a SQL Server connectionstring with Integrated Security = true, does the identity of the IIS application pool of the app play any role?

Does the identity need to be set to some specific user (LocalSystem, NetworkServices or a domain user)? This is on Windows 2003.

Answer: If the SQL Server is on a different box than IIS then the identity of the IIS application pool has to be trusted for constrained delegation. See [How To: Use Protocol Transition and Constrained Delegation in ASP.NET 2.0](#). If the IIS app is running as NETWORK SERVICE or SYSTEM then the IIS machine account has to be trusted for constrained delegation. The linked resource has all the steps to set this up.
If the SQL Server is on the same machine as IIS then there isn't any requirement afaik.

72. <https://stackoverflow.com/questions/29218373/best-security-model-for-winforms-net-and-sql-server>

Title: Best Security Model for winforms .NET and SQL Server

Question: I am trying to determine the best security model for a winforms .NET application connecting to SQL Server 2008 R2. Only stored procedures are executed from .NET to access SQL Server.

We are using only Authenticated users (no SQL logins). Row level data access is restricted using `SUSER_SNAME()`.

Database roles are not restrictive enough because I only want them to be able to execute the stored procedures from the application. Application roles are out because of the connection pooling issue. Linking security to AD user groups is out because my group does not have control over that and it would be an administrative nightmare to have to coordinate.

I am currently looking into mapping security through certificates linked to user accounts, but I don't seem to be able to use those with Windows Authenticated users, only SQL logins.

Any suggestions for a solution, especially with examples or references, would be appreciated.

73. <https://stackoverflow.com/questions/24981654/why-dont-the-answers-to-security-questions-need-to-be-stored-securely>

Title: Why don't the answers to "security questions" need to be stored securely?

Question: I've done some work at a few places now where passwords are salted and hashed in the database, but the answers to the security questions are stored in plain text. Just now, I signed up for the online portal for my hydro company, and in the account management section, the security question and answer are displayed to me.

Given that security questions and answers often allow a user access to an account in a workaround way, without requiring the password, why are they allowed to be stored in plain text? Especially since people often have a limited pool of security questions to choose from, so they likely use the same answers across many sites.

Answer: The problem with security questions is that they are by design completely insecure. The reason that they are stored in plain text is that they occasionally need to be looked at by humans and used by humans to verify that an answer is correct. If a user's answer to their favorite food is "popped corn", and they answer "popcorn", that's a valid answer.

Hashing the answers to security questions would require that the user know their previous answer *exactly*, just as if it were a password, and we already know that the user forgets their password (in those cases where the user is the one trying to access the account). The point of security questions is that they are real things that can be remembered and don't have to be treated by the user as passwords.

Similarly, because these are not arbitrary answers in the way that passwords are, they are sometimes, as you noticed, displayed back to the user. This is so that they can change the answer when it is no longer correct. A password is an arbitrary response, but security question answers are not arbitrary. People's favorites and even what or who they think inspired them can change over time. A user who is asked their favorite movie might choose the one they saw last night, and completely forget a year later that they ever rated it so highly.

For that matter, hashing the answers to security questions is of limited utility (mainly to security geeks who know to answer them randomly). Their very nature is that they are public. Hashing the model of the user's latest car doesn't keep the hacker from just reading their Facebook feed.

The secure answer to security questions is not to use them. Technically, they should be treated exactly like passwords, because for all practical purposes they *are* passwords. But if we hashed the answers to security questions, required users to choose strong answers, and didn't allow them to use easily-guessable answers, then there would be no point to them.

Remember, the purpose of security questions and answers is to *bypass not knowing the password*. The more they're treated like passwords, the more useless they become for that purpose.

Answer2: There's no answer to "Why don't the answers need to be stored securely?", because they should.

A password is actually an answer to a security question too ("What is your password?"), so you should always hash answers to security questions too as it's a way to authorize a user.

74. <https://stackoverflow.com/questions/39856144/safely-wrapping-a-connection-pool>

Title: afely Wrapping a Connection Pool

Question: I am trying to implement row level security so our application can enforce more stringent access control.

One of the technologies we are looking into is Oracle's Virtual Private Database, which allows row level security by basically augmenting all queries against specific tables with a where clause predicate. Since we are in a web environment, we need to set up a special context within Oracle, inside a single request's thread. We use connection pooling with a service account.

I started to look into Eclipse Link and Hibernate. Eclipse Link seems to have events that fit perfectly into this model.

This would involve us migrating from hibernate, which is not a problem, but we would then be bound to EL for these events.

Oracle seems to imply that they implement at the data source level in [Web Logic product](#).

The context is set and cleared by the WebLogic data source code.

Question: Is it more appropriate to do this at the DataSource level with some series of events. What are the events or methods that I should pay the most attention too?

Added Question: How would I extend a connection pool to safely initialize an oracle context with some custom data? I am digging around in Apache, and it seems like extending BasicDataSource doesn't give me access to anything that would allow me to clean up the connection when Spring is done with it.

I need to set up a connection, and clean up a connection as the exit / enter the connection pool. I am hoping for an implementation that is so simple, no one can mess it up by breaking some delicate balance of products.

- Specifically we are currently using [Apache Commons DBCP Basic Data Source](#)

This would allow us to use various ways to connect to the database and still have our security enforced. But I don't see a great example or set of events to work with, and *rolling my own security life cycle* is never a good idea.

Answer: I eventually solved my problem by extending some of the Apache components.

First I extended org.apache.commons.pool.impl.GenericObjectPool and overrode both borrowObject() and returnObject(). I knew the type of the objects in the pool (java.sql.Connection) so I could safely cast and work with them.

Since for my case I was using Oracle VPD, I was able to set information in the Application context. I recommend you read about that in more depth. It is a little complicated and there are a lot of different options to hide or share data at various contexts level, and across RAC nodes. [Start](#)

In essence what I did was generate a nonce and use it to instantiate a session within oracle, and then set the access level of the user to a variable in that session, that the Oracle VPD policy would then read and use to do the row level filtering.

75. <https://stackoverflow.com/questions/35285070/npm-node-package-manager-security-and-voting>

Title: NPM (node package manager) security and voting

Question: Anyone can publish their **Node.js** package to open Node Package Manager (**npm**) pool. Is there any security checks for published packages so that I can be sure that a new package won't contain any harmful code? Also it's interesting to know if there is any voting system for node packages so that I can pick out the most voted package from a bunch of similar node packages?

Answer: The [Node Security Platform](#) is a tool designed to help developers do just that! You can test your project dependencies for known vulnerabilities in a variety of ways - from the command line, integrated with your CI system, or integrated with github.

The vulnerabilities are discovered via two sources:

1. A team of seasoned node.js security professionals actively auditing modules on npm.

2. Submissions from community members, which are verified by the aforementioned team.

It's also free to use the command line tool, as well as integration with open source github repositories.

If you are using npm enterprise, nsp is also partnered with npm to provide [sidebar integration](#). This allows you to see vulnerability information right from the npme web ui, which sounds like what you are looking for.

As far as module popularity goes, there is a website that does this to some degree at nodejsmodules.org. I use it from time to time, but beware - they've got a very expired HTTPS cert.

Disclosure: I am an employee of ^Lift Security, the company behind the Node Security Platform.

Answer: You can also use <https://nodesecurity.io/> to add security checks into your GitHub pull request flow. If you perform a search on npmjs.com before pulling a module into your system the index of all packages on npmjs.com takes into account maintenance, quality, etc."

[npm search](#) is also a good option for npm package voting.

The npms analyzer continuously analyzes the npm ecosystem, gathering as much information as possible from a variety of sources, including GitHub, [David](#) and [nsp](#). Using the collected information, a final score for each package is calculated based on four different aspects: Quality, Maintenance, Popularity, and Personalities

76. <https://stackoverflow.com/questions/22199424/there-was-an-error-while-performing-this-operation>

Title: "There was an error while performing this operation"

Question: I have a website in IIS for which I cannot open any of the settings like Authentication, Handler Mappings, Authorization Rules etc. It just shows the error message "There was an error while performing this operation", with no more details and points to web.config.

Browsing the website results in a 500.19 error.

I tried adding iis_iusers to the website folder and web.config, changing the app pool identity giving access to same on web.config/website folder security settings, verified target framework, iisreset/app pool recycles to no avail.

Answer: Similar to the marked solution here, I had the same problem and again it was a missing IIS module, but this time it was the Application Initialization Module that was required, not URLRewrite. installing via the Web Platform Installer or [IIS.net](#) fixed the problem.

Steps I took to debug this though was to section by section go through my web config removing each section and attempting to load the site and/or let IIS parse the config. When I removed the section pertaining to initialization optimisation this fixed the issue and I immediately remembered that this dependency was added a fair while ago.

Echo the sentiments though that this really needs better error messages!!!

77. <https://stackoverflow.com/questions/22199424/there-was-an-error-while-performing-this-operation>

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Answer: It turned out the website was using URL rewrite module which i was missing.

Downloaded web platform installer from MS and installed URL rewrite module.

<http://www.microsoft.com/web/downloads/platform.aspx>

Wish IIS errors were more informative than just "There was an error..."

Answer2: I am running IIS 8.5 and I deployed my first Asp.Net Core 2.0 (Razor pages) site to the IIS Server (on Windows Server 2012 R2) that was running several Asp.Net Framework/Classic websites. This worked for me:

Install the .NET Core Windows Server Hosting bundle

<https://docs.microsoft.com/en-us/aspnet/core/publishing/iis?tabs=aspnetcore2x#install-the-net-core-windows-server-hosting-bundle>

78. <https://stackoverflow.com/questions/7477784/how-should-i-setup-the-security-of-the-database-for-enterprise-library-logging-b>

Title: How should I setup the security of the database for Enterprise Library Logging block
Question: net application running on IIS6. I've setup the logging configurations however it does not log to our database.

I think this should be a permission issue because when I run the app from visual studio it logs fine.

but I've already given the app pool identity account datawriter rights to the logging database. The directory security is setup to windows authentication.

Answer: Does the account have permission to execute the InsertCategoryLog, AddCategory, and WriteLog stored procs?

79. <https://stackoverflow.com/questions/19519527/when-using-integrated-security-should-i-use-the-default-apppool>

Title: When using integrated security should I use the default apppool

Question: I just read something that said it's much better to use integrated security here on SO, so I've switched all my connection strings over.

The error I get is "Login failed for user 'IIS APPPOOL\DefaultAppPool'."

Before I go ahead and grant this user permission, I wanted to ensure that it was the correct thing to do and I wasn't inadvertently opening the floodgates of hacker hell.

Should I grant this app pool permission to access my SQL or should I create a new app pool?

I'm writing WCF services in .NET 4.5

80. <https://stackoverflow.com/questions/11916882/windows-integrated-security-user-identity-isauthenticated-returns-false>

Title: windows integrated security user.identity.isauthenticated returns false

Question: I swapped my hard disk for an ssd, and am having fun recreating my environment. I'm running win7 pro, and my web app is returning false from user.identity.isauthenticated (was working fine before I upgraded to the ssd). I added windows integrated security as a security feature under the windows components (I'm running local iis), and enabled it for the web site.

If I disable anonymous, user.identity.isauthenticated returns true with the correct credentials - BUT I am always prompted to enter my credentials. AHAH - it must be ntfs permissions. But I've added them for every account I can think of - NETWORK SERVICES, my own account, IUSR, authentication users, and several others that were already there. Makes no difference. Maybe the app pool I'm running under - but I've tried DefaultAppPool, .NET 4.0, and .NET 4.0 Classic. Again, makes no difference. Does anyone have any ideas on other things I can try? I'm not on a domain or anything like that, this is entirely local. Thanks!

Answer: The solution was in the browser, in this case under ie9 Internet Options. After verifying in the Advanced tab that Enable Windows Integrated Authentication was checked, one must go to the Security tab, under Local Intranet/Sites and uncheck "automatically detect intranet network" and check "include all local intranet sites"

81. <https://stackoverflow.com/questions/24424446/performance-impact-when-creating-audit-trail-using-trigger-in-ms-sql-server-2012>

Performance impact when creating Audit trail using trigger in MS SQL server 2012

Question: In SQL Server 2012 database we want to create audit trail for almost all major tables on Update and Delete operations. Normally we create Audit Trail using trigger on each table and store it on shadow table. So there is any **performance impact?** if huge records updated or deleted on any table. There is another way to implement Audit trail?

Answer: Typically, when I implement an audit trail for DB tables, I implement it via code, not in triggers. When implemented in code, you can provide additional context information, such as the reason the change was made, who made the change, what was the reason behind the change, etc., which is a very common business requirement. In a typical multi-layer application design, we have DAOs for each table and the business services which implement the updates are responsible for calling the separate DAOs for the core table update and the history entry insert. This approach is no good if you want a bunch of different sources directly making table updates to the DB, but it's a natural approach if you have a service-oriented architecture and your one set of services are the only way into and out of those tables.

If you implement audit trail using this approach, you of course need to make sure the audit trail record is inserted in the same transaction as the modification to the core table.

Whether this would perform better than a trigger-based approach, I couldn't say. My guess would be that if you are using bulk insert operations it may run faster, but would probably be slower in the more common scenario where you are updating/deleting one record at a time via SQL. It's another option you could explore, though.

82. <https://stackoverflow.com/questions/35280527/audit-trail-sql-server>

Title: Audit trail - SQL Server

Question: Is it advisable to use Triggers in SQL Server to implement Audit trail on very frequently updated tables which contains large data? Are there any performance impacts? If not recommended, what are the options for implementing Audit trail?

Answer: You might want to investigate Change Data Capture. It is native SQL Server functionality for audit logging.

<https://msdn.microsoft.com/en-us/library/cc645937.aspx>

CDC does add overhead, but it is well thought-out overhead. Triggers can get messy very quickly and should be avoided when possible.

83. <https://stackoverflow.com/questions/36717692/elasticsearch-nest-2-x-performance-issue-how-to-disable-audit-trail>

Title: ElasticSearch Nest 2.x - Performance issue, how to disable audit trail?

Question: I'm running search queries using Elasticsearch client NEST 2. Queries are running fine but inspecting the response I can see that a huge time is spent auditing the query while the ES operation itself is done in a snap.

Here is an example of a request/response : We can see that the audit took 304ms while the ES search took only 16.

My question is, is there anyway to disable this audit trail or tweak the configuration to effectively improve the performance ?

I had a look at the source code and found out that the audit trail operation is triggered by the ElasticsearchResponse's property DebugInformation but couldn't find how to disable it.

My configuration is pretty straight forward :

For information, when I'm running the queries against a local ES store (populated with same data) audit trail takes ~60ms which is better but still huge comparing to the ES search operation.

84. <https://stackoverflow.com/questions/15089207/possible-ways-to-generate-audit-trail-for-every-save-of-business-entities>

Title: Possible ways to generate audit trail for every save of business entities

Question: We currently have a requirement to implement audit trail generation for some of our main business entities, as usual in these cases we need to persist old and new value of every field which was changed and also some header data like time stamp, entity ID and user who did the save.

I understand there are different ways to do this, such as:

1. .NET code side, using Reflection
2. SQL Server side triggers
3. SQL Server CDC (Change Data Capture)

A .NET Reflection based method could possibly take a bit longer to be written but if properly done will be smart enough to include new properties added in the future without any code change, and it can also expand and compare all children entities (like collections of other sub-entities added to our main .NET entity).

We actually have a legacy application which uses such .NET based audit trail generation, we save the whole audit trail as XML field in a SQL database and over the years that audit table is now something like 35GB of data.

I am thinking how easy it could be a trigger based solution in terms of:

- first implementation
- every change required in future modification of the entity to audit (add/change/remove a field etc...)
- how readable is the audit data? can we simply have a query which is showing old and new values for a specific saving operation?
... and how about performances?

Does anybody have experience with both approaches and can suggest or point out some pros and cons?

Answer: In the past, for similar requirements, I have turned to domain events and messaging. It does bring in some complexity, but can be worth it. I would suggest at least considering it.

Essentially, you would make the change a first class citizen of the model by defining an event that fires when changes are made to the business objects. These events can also be a good way to capture business intent instead of just changes at the field level. For example, a business event named OrderRefunded is usually a better audit point than OrderTotal field changed from 45.00 to 0.00.

Firing these domain events with messaging using publish/subscribe allows many subscribers to handle the event. One of these subscribers could be an Audit subscriber. This takes all the performance impact (of rebuilding indexes etc) away from the domain that is processing the original request and places the burden on the Audit subscriber. this also means that you would never get a problem where a bug in your audit code takes down the processing of business transactions.

Another benefit is about how much data that needs to be saved. This approach gives you the advantage that the Audit subscriber will only have to save the amount of data that it intends to use. Rules about how much data to save or archive are also localized to the service that is handling audit. Therefore, you can be sure that you are not storing any data without a need.

Tools I've used in the past to do this include [NServiceBus](#) and [RabbitMQ](#). Each had its benefits and liabilities depending on the problem.

85. <https://stackoverflow.com/questions/37947719/hibernate-envers-performance-mysql>

Title: Hibernate Envers performance MySQL

Question: Right now I'm trying to choose the most appropriate approach in order to implement Audit Trail for my entities with AWS RDS MySQL database.

I have to log all entity changes including the initiator(user) who initiated these changes. One of the main criterion is performance.

Hibernate Envers looks like the easiest and the most complete solution and can be very quickly integrated. Right now I'm worried about the possible performance slowdown after Envers introducing. I saw a few posts where developers prefer approach for Audit Trail based on database triggers.

The main issue with triggers is how to get initiator(user) who initiated these changes.

Based on your experience, could you please suggest the approach for Java/Spring/Hibernate/MySQL(AWS) in order to implement Audit Trail for historical changes.

Also, do we have any solution for Audit Trail within AWS RDS MySQL database infrastructure ?

Answer: Understand that speculation about performance without concrete evidence to support one's theory is analogous to premature optimization of code. It's almost always a waste of time.

From a simple database point of view, as a table grows to a specific limit, yes it's performance will degrade, but typically this mainly impacts queries and less on insertion/update if the table is properly indexed and queries properly formed.

But many databases support partitioning as a means to control performance concerns, particularly on larger tables. This typically involves separating a table's data across a set of boundaries defined by a partition scheme you create. You simply define what is the most relevant data and you try and store this partition on your fastest drives/storage and the less relevant, typically older, data is stored on your slower drives/storage.

You can also elect to store database tables in differing schemas/tablespaces by specifying the envers property org.hibernate.envers.default_schema. If your database supports putting schemas in different database files on the file system, you can help increase performance by allowing your entity table reads/writes not impact the reads/writes of your audit tables.

I can't speak to MySQL's support for any of these things, but I do know that MSSQL/Oracle supports partitioning very easily and Oracle for sure allows the separation of schemas across differing database files

86. <https://stackoverflow.com/questions/4417130/implementing-efficient-audit-trail-of-record-changes-in-google-app-engine-desi>

Title: Implementing efficient audit trail of record changes in Google App Engine – Design patterns

Question: I have a quite common design problem: I need to implement a history log (audit trail) for records in Google App Engine. The history log has to be structured, i.e I cannot join all changes into some free-form text and store in string field.

I've considered the following options for the history model and, after noticing performance issues in option #1, I've chosen to implement option #3. But have still some doubts if this solution is efficient and scalable. For instance: is there a risk that performance will degrade significantly with increased number of dynamic properties in option #3?

Do you have some deeper knowledge on the pros/cons for each option or could suggest other audit trail design patterns applicable for Google App Engine DB characteristics?

1. Use classic SQL "master-detail" relation

- Pros
 - simple to understand for database developers with SQL background
 - clean: direct definition for history record and its properties
 - search performance: easy searching through history (can use indices)
 - troubleshooting: easy access by administration tools (`_ah/admin`)
- Cons
 - one-to-many relations are often not recommended to be implemented this way in GAE DB
 - read performance: excessive number of record read operations to show long audit trail e.g. in details pane of a big records list.

2. Store history in a BLOB field (pickled python structures)

- Pros
 - simple to implement and flexible
 - read performance: very efficient
- Cons
 - query performance: cannot search using indices
 - troubleshooting: cannot inspect data by admin db viewer (`_ah/admin`)
 - unclean: not so easy to understand/accept for SQL developers (they consider this ugly)

3. Store history in Expando's dynamic properties. E.g. for each field `fieldName` create `history_fieldName_n` fields (where `n=<0..N>` is a number of history record)

- Pros:
 - simple: simple to implement and understand
 - troubleshooting: can read all the history properties through admin interface
 - read performance: one read operation to get the record
- Cons:
 - search performance: cannot simply search through history records (they have different name)
 - not too clean: number of properties may be confusing at first look

4. Store history in some set of list fields in the main record. Eg. for each `fieldName` create a `fieldName_history` list field

- Pros:
 - clean: direct definition of history properties
 - simple: easy to understand for SQL developers
 - read performance: one read operation to get the record
- Cons:
 - search performance: can search using indices only for records which whenever had some value and cannot search for records having combination of values at some particular time;
 - troubleshooting: inspecting lists is difficult in admin db viewer

Answer: If I would have to choose I would go for option 1. The reads are as (if not more) performant for the other options. And all other options only have speed advantages under specific circumstances (small or very large sets of changes). It will also get you lots of flexibility (with more ease) like purging history after x days or query history across different model types. Make sure you create the history entities as a child of the changed entity in the same transaction to guarantee consistency. You could end up with one of these:

87. <https://stackoverflow.com/questions/4813069/web-services-design-question-logging-messages>

Title: Web Services Design Question - Logging messages

Question: We had a debate in the office with respect to audit logging of messages received and sent via Web Services.

I am of the opinion that the entire SOAP message should not be logged in the application audit logs unless there is a requirement that states that this is required. Only salient elements of the request need to be part of the audit log as this provides evidence that is required in the audit trail.

My reasons are: (1) Audit logs by definition are always turned on and should not be turned off. So if we take the decision of logging the entire message for audit trail they will be turned on always and can cause a huge performance impact during production runs (particularly during peak loads) (2) If the business/technical requirement does not explicitly state this as a requirement this is an un-necessary overhead. If information is required, the run-time engines tracing capability can be used to turn on/off to get the SOAP messages.

What are the generic thoughts of experts in this space.

Answer: Don't confuse auditing with logging. If there is a requirement for auditing then you need to perform auditing.

Since auditing is typically required for legal or policy reasons you need to understand what actions and activities need to be logged as well as what data needs to be logged. This is not a technical decision but needs to be determined by the business. Once you have your requirements then you can project your audit volumes and design your application to take these into account (e.g. performance, storage, etc.).

If you think you have an auditing requirement but it is not explicitly stated then ask for clarification. You don't want to find this out only after you have been sued.

If you truly have an auditing requirement then you should probably audit the entire soap request message as well as the response. This is to support non-repudiation.

As an example let's say that you have a health care application and only audit the key information: personal identifiers (e.g. SSN) and whether the patient is allergic to penicillin. But what happens when a patient dies because is allergic to penicillin was false when it shouldn't have been? The audit logs are checked and you say that you were sent a value of false for that patient but the other system says that they actually sent you a value of true and that you must have a problem with your system. In this scenario what you need to do is to show the exact message that was sent to the web service and that because it was signed by the service consumer you can prove that it came from them and also prove that the data in the message is correct. Then you would follow that information through your system via the audit logs.

Of course, it all goes back to the requirements; if the business finds that only auditing x and y satisfies whatever legislation or policies then go with that

Answer2: I know from experience that logging it all can lead to pretty huge files or a lot of data if kept on database. It's very helpful during development time, but in production it becomes a problem. I would suggest logging as you said. But be aware of a situation I came across: We were providing a webservice for 3rd-party

companies use. When there's some dispute about who's fault is the error. We needed the exact SOAP message to prove that it wasn't our fault. I don't know if this scenario applies to you.

88. <https://stackoverflow.com/questions/29276193/benchmarking-for-disk-i-o-writes-per-second-elasticsearch-and-mysql>

Title: Benchmarking for DISK I/O Writes Per Second - ElasticSearch and MySQL

Question: During working on our project we needed to decide should we use "ElasticSearch" or "MySQL" to record the audit/trail logs of the system. Searching speed is not an issue here, we needed to see the disk I/O performance for both platforms. I had no experience of disk i/o monitoring, so after a little research I decided to monitor the writes per second for both ElasticSearch and MySQL via a simple load running script.

Should I consider writes per second for disk i/o performance ? Am I going in to the right direction ? Also, I'm not sure if less no. of writes per second is better or worst ?

89. <https://stackoverflow.com/questions/5794417/maintaining-referential-integrity-good-or-bad>

Title: Maintaining Referential Integrity - Good or Bad?

Question: We are planning on introducing simple Audit Trail in our database using triggers and separate history table for each table that requires auditing.

For example consider table StudentScore, it has few foreign keys (eg. StudentID, CourseID) linking it to corresponding parent tables (Student & Course).

If any row in StudentScore is modified we'll move old row to StudentScoreHistory.

One of the points raised during design discussion was to make StudentID and CourseID in StudentHistory table a FK, to maintain referential integrity. Argument made in favour of this was as we always mostly do a soft (logical Boolean flag) delete rather than hard delete, its good to maintain referential integrity to ensure we do not have any orphan ids in audit table

This seems to be a bit odd design to me. I do agree with [@Jonathan Leffler's comment](#) that audit record should not stop the deletion of parent data. Instead, if this is required, should be handled via foreign keys in main table and not in audit table. I want to get your opinion, to make sure I'm not missing some value in extending foreign keys to audit tables.

Now my question is: Is it a good design to have these foreign keys in History tables?

Any details on key arguments (e.x. performance, best practice, design flexibility etc) would be highly appreciated.

For benefit of anyone looking for specific purpose and our environment:

Purpose:

1. Maintain critical data history
2. Allow auditing of user activity with support to recreate scenario
3. To limited extent allow roll-back of user activity

Environment:

- Transactional database
- Not every table requires auditing
- Uses soft-delete to the extent possible, specifically for static/reference data
- Few highly transactional tables do use hard deletes

Answer: When discussing auditing, I would go back to the purpose behind it. It isn't really a backup but rather a history of what has been. For example, for StudentScore, you would want to be sure not to lose the fact that the student originally had a 65% when they now have a 95%. This audit trail would allow you to walk back through the changes to see what happened and who did it. From this, you could identify what a particular user did to abuse the system. In some ways this could be a type of backup since you could roll back these changes to their previous states without rolling back entire tables.

With this in mind (if my assumptions about what you are using this for are correct), the only place you would want a FK/PK relationship is between the history table and its "live" counterpart. Your audit (history) table should not refer to any other table because it is no longer a part of that system. Instead, it is simply a record of what has happened in one table. Period. The only referential integrity you might want to consider is between the history table and the live table (thus the possible FK/PK relationship). If you allow records to be deleted from the live table, don't include the FK in the history table. Then the history table could include deleted records (which is what you want if you allow deletions).

Don't get confused with relational integrity in the main database with this history table. The history tables are all stand-alone. They only serve as a history of one table (not a set of tables).

The relating of two history tables together is possible and even more advanced relations between the live and history tables together (Students and Courses with both live and history, for example) so you can deal with even the possibility that a student was deleted (shudder) since the record would still be in the history table. The only issue here would be if you don't keep the history for a particular table, in which case you are choosing to lose that data (if you allow deletes).

Answer2: I would suggest not extending foreign keys to audit tables. My recommendation is that the data in an audit be expanded to what the Foreign Key values are.

Instead of storing CourseID as "1", it will be "HTML4". That way if the Foreign Key value is removed, the audit table is still valid. This will also hold true if the Foreign Key value is changed from "HTML4" to "HTML5" anytime in the future. If you only stored the Foreign Key, then you would be telling the auditor that the previous students did "HTML5", which is not correct.

Another great benefit is the ability to ship off the audit trails to another server for data mining without any issues.

I have used the above setup for a while now and it works for me.

Answer: If you need to re-create the scenario, then I'd say yes you need the FKs, and having them I think would be an easier way to track through to the relevant related detail records. However, this makes deletions an issue, as well as info that may change in your primary key tables. In this case I'd say you *don't* want to delete records that have FKs in other tables, but rather use a soft delete as you've already indicated.

As far as info in the PK tables changing, caveat emptor. Setting up FKs would be a simple way to get *some* traceback ability, but it won't be perfect. There are trade-offs. To get an absolutely perfect history, you basically would need to create backup copies of *all* related records, any time an audit candidate record has something happen on it. You need to figure out the level of granularity that's appropriate and go with it, because a perfect record of events could be complicated to set up, and eat up a lot of space in the process.

Also, this may or may not be an option for you, but I would strongly consider a combination of tools like [ApexSQL Audit](#) + [ApexSQL Log](#) as opposed to a homegrown auditing solution. Based on your needs, those two tools combined with archiving your transaction logs periodically would cover what you need to do. The audit tool can store data in the same db or elsewhere, and the log tool can selectively recover data. Just a thought.

Answer2:

If your system is really focused on transaction processing then my answer may not apply well to you, but in the datawarehouse/BI world, this problem is often solved by using a "star schema". In this approach, you would denormalize the important indicative information from the linked tables along with your audit records. This could include the PK values of the parent tables (i.e. the FK values on your audited table). However, you wouldn't preserve the actual referential integrity constraints themselves.

So for your example, your StudentScoreHistory table could retain its StudentID column, without the FK constraint, as well as maybe the StudentName (or whatever you think you might need from Student). This way you can go back to your audit trail to piece together what has happened and when without worrying about whether you are hard or soft deleting parent records. This has the further advantage (or disadvantage, depending on your perspective) of keeping track of the changable parent table attributes as they were when the child record was originally recorded. For example, it might be useful to know that Student 123456, who is now Mrs. Marriedlady used to be Miss Singlegirl when her biology degree was conferred.

90. <https://stackoverflow.com/questions/1743718/performance-of-storing-dbml-generated-objects-as-a-listx-in-session>

Title: Performance of storing DBML generated objects as a LIST<X> in Session

Question: I'm creating an app that will have a fair amount of users. Everytime someone views a page or performs an activity I will be writing to a log. While I'm concerned about the performance of that in itself, my bigger concern is that I'm actually wanting to store that history in-session within the ASP.NET MVC application so that when they logout, I can display an audit trail of their activity to them. To do this, I simply create an Audit object and insert it using LINQ to SQL. I then take that same object and store it in a session LIST. I do this because technically the same user could be logged in from multiple locations so just hitting the database at the end wouldn't solve it. I also know I could key the audit on the session ID, but in the big picture I don't want to overburden the database.

My question: are there any performance issues with storing DBML generated objects in the session in ASP.MVC?

Answer: This entirely depends on how big these objects are. How many KB per user are we talking about? But best guess... if it's just simple, reasonably short log data... the answer is no, you won't have a problem. You're going to run into other system bottlenecks long before you are serving enough users for this to be an issue.

91. <https://stackoverflow.com/questions/16758684/combine-inserted-and-deleted-in-a-trigger-without-using-a-join>

Title: Combine INSERTED and DELETED in a trigger without using a JOIN

Question: I have an audit trail solution, which dumps the contents of the INSERTED or DELETED table in a trigger to XML, along with the current user, timestamp, etc. For inserts and updates, it logs the former, and for deletions it logs the latter.

However, in order to determine what has changed between two logs for the same record, I need to self-join on the audit table to get the previous record. This in itself does not work too badly, but performance would be greatly enhanced if I could log both data_from and data_to in the trigger.

The obvious solution is to use an inner join between INSERTED and DELETED for updates, but the problem with this is that these tables are not and cannot be indexed, so the database needs to do a full row-by-row hash in order to produce a result. Since, in an update trigger, the order in the INSERTED and DELETED records is identical, I can't help feeling that there must be some way I can combine these two tables horizontally without using a join and without using a cursor.

What I have already tried and what I know won't work:

1. Using ROW_NUMBER in a common table expression will not work - the CTE is not indexed
2. Inserting the contents of INSERTED and DELETED into temporary tables, indexing those and then using them in a join - This is one fallback option I have at present, if I can't find a better solution.
3. Using two cursors, one for INSERTED and one for DELETED - this is out of the question for performance reasons.
4. Joining with the audit trail table in the trigger to get the previous XML - also works, but not as well as 2 above, and since I have the data I need in the DELETED table, I can't help feeling that there must be something useful I can do with it.

Answer: Have you considered using the [Change Data Capture](#) feature? It captures changes more effectively than a trigger can and it is an asynchronous background process which means there is minimal impact on the processes actually making the updates.

Answer2: The solution I eventually went for is to transfer the data in the inserted and deleted tables into indexed table variables, and then work with them from there. Performance is not as good as it would be with CDC, but is acceptable and linear, and time to market was considerably shorter. I wrote a code generator to generate the triggers, a sample of which I have included below:

92. <https://stackoverflow.com/questions/26680915/storing-binary-files-in-sql-server>

Title: Storing binary files in sql server

Question: I'm writing an mvc/sql server application that needs to associate documents (word, pdf, excel, etc) with records in the database (supporting sql server 2005). The consensus is it's best to keep the files in the file system and only save a path/reference to the file in the database. However, in my scenario, an audit trail is extremely important. We already have a framework in place to record audit information whenever a change is made in the system so it would be nice to use the database to store documents as well. If the documents were stored in their own table with a FK to the related record would performance become an issue? I'm aware of the potential problems with backups/restores but would db performance start to degrade at some point if the document tables became very large? If it makes any difference I would never expect this system to need to service anywhere near 100 concurrent requests, maybe tens of requests.

Answer: Storing the files as blob in database will increase the size of the db and will definitely affect the backups which you know and is true.

There are many things of consideration whether the db and code server are same.

Because it happens to be code server requests and gets data from db server and then from code server to client.

If the file sizes are too large I would say go for the file system and save file paths in db.

Else you can keep the files as blog in db, it will definitely be more secure, as well as safe from virus, etc.

93. <https://stackoverflow.com/questions/2783298/auditing-in-oracle/2783343#2783343>

Title: Auditing in Oracle

Question: I need some help in auditing in Oracle. We have a database with many tables and we want to be able to audit every change made to any table in any field. So the things we want to have in this audit are:

- user who modified
- time of change occurred
- old value and new value

so we started creating the trigger which was supposed to perform the audit for any table but then had issues...

As I mentioned before we have so many tables and we cannot go creating a trigger per each table. So the idea is creating a master trigger that can behaves dynamically for any table that fires the trigger. I was trying to do it but no lucky at all....it seems that Oracle restricts the trigger environment just for a table which is declared by code and not dynamically like we want to do.

Do you have any idea on how to do this or any other advice for solving this issue?

Answer: You don't need write your own triggers.

Oracle ships with flexible and fine grained audit trail services. Have a look at [this document](#) (9i) as a starting point. (Edit: Here's a link for [10g](#) and [11g](#) versions of the same document.) You can audit so much that it can be [like drinking from the firehose](#) - and that can hurt the server performance at some point, or could leave you with so much audit information that you won't be able to extract meaningful information from it quickly, and/or you could end up eating up lots of disk space. Spend some time thinking about how much audit information you *really* need, and how long you might need to keep it around. To do so might require starting with a basic configuration, and then tailoring it down after you're able to get a sample of the kind of volume of audit trail data you're actually collecting.

Answer2: If you have 10g enterprise edition you should look at Oracle's [Fine-Grained Auditing](#). It is definitely better than rolling your own.

But if you have a lesser version or for some reason FGA is not to your taste, here is how to do it. The key thing is: *build a separate audit table for each application table*.

I know this is not what you want to hear because it doesn't match the table structure you outlined above. But storing a row with OLD and NEW values for each column affected by an update is a really bad idea:

1. It doesn't scale (a single update touching ten columns spawns ten inserts)
2. What about when you insert a record?
3. It is a complete pain to assemble the state of a record at any given time

So, have an audit table for each application table, with an identical structure. That means including the CHANGED_TIMESTAMP and CHANGED_USER on the application table, but that is not a bad thing.

Finally, and you know where this is leading, have a trigger on each table which inserts a whole record with just the :NEW values into the audit table. The trigger should fire on INSERT and UPDATE. This gives the complete history, it is easy enough to diff two versions of the record. For a DELETE you will insert an audit record with just the primary key populated and all other columns empty.

Your objection will be that you have too many tables and too many columns to implement all these objects. But it is simple enough to generate the table and trigger DDL statements from the data dictionary (user_tables, user_tab_columns).

94. <https://stackoverflow.com/questions/4178767/what-types-of-api-do-you-offer-with-your-delphi-application/4186121#4186121>

Title: What types of API do you offer with your Delphi application?

Question: We have a 3-tier Delphi application written using RemObjects DataAbstract. Many of our customers are asking for an API so they can interact with it using their own applications.

The API must allow the clients to call methods with various parameters and return results ranging from simple parameters to whole datasets.

What types of API can you recommend and how difficult are they to implement?

Answer: Since you've written your application using RemObjects DataAbstract then you've got just about everything you need already waiting for you in your application.

RemObjects DataAbstract includes the RemObjects SDK which is one of the most flexible and easy ways to build an API available. The RemObjects SDK lets you expose methods to your customers in a multitude of ways from native binary RemObjects calls, to XML-RPC, to JSON, to SOAP, to a local DLL, to Windows Messages, to Named Pipes... even via SMTP/POP.

The beauty is that you'll be able to design one API and then easily expose it to your customers [via any or all of these different mechanisms](#). Just design your API methods, then ask your customer how they'd like to be able to consume it, chances are RemObjects have a message/channel combination that matches their request.

1. Answer2: Publish the API as functions in a DLL. Easy enough to code, but limited by the DLL limits (only plain functions, etc.). Not easy to call from scripts, for example
2. Publish the API as COM objects. A bit more complex to implement (especially if you never used COM before), but very flexible. Can be easily called from scripts, if needed.
3. Use a standard generic RPC mechanism like SOAP or REST. Better suited for server, not difficult to implement, requires a "listener" active to receive the calls
4. Use your own protocol to communicate. Longer to implement, can be faster than SOAP or REST, but requires also more work on the customer side.

Answer3: Besides the plain business logic API, I think it will be also a big advantage if the application offers APIs for generic tasks like:

- logging / audit trails
- monitoring (performance, statistics)
- rights administration
- basic administration (shutdown / go to maintenance mode)
- messaging (send notifications to users or applications)

95. <https://stackoverflow.com/questions/7080145/bitemporal-database-design-question>

Title: Bitemporal Database Design Question

Question: I am designing a database that needs to store transaction time and valid time, and I am struggling with how to effectively store the data and whether or not to fully time-normalize attributes. For instance I have a table Client that has the following attributes: ID, Name, ClientType (e.g. corporation), RelationshipType (e.g. client, prospect), RelationshipStatus (e.g. Active, Inactive, Closed). ClientType, RelationshipType, and RelationshipStatus are time varying fields. Performance is a concern as this information will link to large datasets from legacy systems. At the same time the database structure needs to be easily maintainable and modifiable. I am planning on splitting out audit trail and point-in-time history into separate tables, but I'm struggling with how to best do this.

Some ideas I have:

1) Three tables: Client, ClientHist, and ClientAudit. Client will contain the current state. ClientHist will contain any previously valid states, and ClientAudit will be for auditing purposes. For ease of discussion, let's forget about ClientAudit and assume the user never makes a data entry mistake. Doing it this way, I have two ways I can update the data. First, I could always require the user to provide an effective date and save a record out to ClientHist, which would result in a record being written to ClientHist each time a field is changed. Alternatively, I could only require the user to provide an effective date when one of the time varying attributes (i.e. ClientType, RelationshipType, RelationshipStatus) changes. This would result in a record being written to ClientHist only when a time varying attribute is changed.

2) I could split out the time varying attributes into one or more tables. If I go this route, do I put all three in one table or create two tables (one for RelationshipType and RelationshipStatus and one for ClientType). Creating multiple tables for time varying attributes does significantly increase the complexity of the database design. Each table will have associated audit tables as well.

Answer: A lot depends (or so I think) on how frequently the time-sensitive data will be changed. If changes are infrequent, then I'd go with (1), but if changes happen a lot and not necessarily to all the time-sensitive values at

once, then (2) might be more efficient--but I'd want to think that over very carefully first, since it would be hard to manage and maintain.

I like the idea of requiring users to enter effective dates, because this could serve to reduce just how much detail you are saving--for example, however many changes they make today, it only produces that one History row that comes into effect tomorrow (though the audit table might get pretty big). But can you actually get users to enter what is somewhat abstract data?

Answer2: you might want to try a single Client table with 4 date columns to handle the 2 temporal dimensions. Something like (client_id, ..., valid_dt_start, valid_dt_end, audit_dt_start, audit_dt_end). This design is very simple to work with and I would try and see how it scales before going with something more complicated.

96. <https://stackoverflow.com/questions/1672849/database-design-question-bit-column-for-deletions/1672869#1672869>

Title: Database design question. BIT column for deletions

Question: Part of my table design is to include a IsDeleted BIT column that is set to 1 whenever a user deletes a record. Therefore all SELECTS are inevitably accompanied by a WHERE IsDeleted = 0 condition.

I read in a previous question (I cannot for the love of God re-find that post and reference it) that this might not be the best design and an 'Audit Trail' table might be better.

How are you guys dealing with this problem?

Update I'm on SQL Server. Solutions for other DB's are welcome albeit not as useful for me but maybe for other people.

Update2 Just to encapsulate what everyone said so far. There seems to be basically 3 ways to deal with this.

1. Leave it as it is
2. Create an audit table to keep track of all the changes
3. Use of views with WHERE IsDeleted = 0

Answer: This is not a really good way to do it, as you probably noticed, it is quite error-prone. You could create a VIEW which is simply

`CREATE VIEW myview AS SELECT * FROM yourtable WHERE NOT deleted;`

Then you just use myview instead of mytable and you don't have to think about this damn column in SELECTs.

Or, you could move deleted records to a separate "archive" table, which, depending on the proportion of deleted versus active records, might make your "active" table a lot smaller, better cached in RAM, ie faster.

Answer2: We're actively using the "Deleted" column in our enterprise software. It is however a source of constant errors when forgetting to add "WHERE Deleted = 0" to an SQL query.

Not sure what is meant by "Audit Trail". You may wish to have a table to track all deleted records. Or there may be an option of moving the deleted content to paired tables (like Customer_Deleted) to remove the passive content from tables to minimize their size and optimize performance.

Answer3: Nah this is totally up to you.

Do you need to be able to see who has deleted / modified / inserted what and when? If so, you should design the tables for this and adjust your procs to write these values when they are called.

If you don't need an audit trail, don't waste time with one. Just do as you are with IsDeleted.

Personally, I flag things right now, as an audit trail wasn't specified in my spec, but that said, I don't like to actually delete things. Hence, I chose to flag it. I'm not going to waste a client's time writing something they didn't request. I won't mess about with other tables because that's another thing for me to think about. I'd just make sure my index's were up to the job.

Ask your manager or client. Plan out how long the audit trail would take so they can cost it and let them make the decision for you ;)

Answer3: Model the task, not the data. Looking back at the story our friend from marketing told us, his intent is to discontinue the product – not to delete it in any technical sense of the word. As such, we probably should provide a more explicit representation of this task in the user interface than just selecting a row in some grid and clicking the 'delete' button (and "Are you sure?" isn't it).

As we broaden our perspective to more parts of the system, we see this same pattern repeating:

Orders aren't deleted – they're cancelled. There may also be fees incurred if the order is canceled too late.

Employees aren't deleted – they're fired (or possibly retired). A compensation package often needs to be handled.

Jobs aren't deleted – they're filled (or their requisition is revoked).

In all cases, the thing we should focus on is the task the user wishes to perform, rather than on the technical action to be performed on one entity or another. In almost all cases, more than one entity needs to be considered.

Answer3: Views (or stored procs) to get at the underlying table data are the best way. However, if you have the problem with "too many cooks in the kitchen" like we do (too many people have rights to the data and may just use the table without knowing enough to use the view/proc) you should try using another table.

We have a complete mimic of the base table with a few extra columns for tracking. So Employee table has an EmployeeDeleted table with the same schema but extra columns for when it was deleted and who deleted it and sometimes even the reason for deletion. You can even get fancy and have triggers do the insertion directly instead of going through applications/procs.

Biggest Advantage: no flag to worry about during selects

Biggest Disadvantage: any schema changes to the base table also have to be made on the "deleted" table

Best for: situations where for whatever reason (usually political with us) many not-as-experienced people have rights to the data but still expect it to be accurate without having to understand flags or schemas, etc

Answer: I've used soft deletes before on a number of applications I've worked on, and overall it's worked out quite well. Yes, there is the issue of always having to remember to add AND IsActive = 1 to all of your SELECT queries, but really that's not so bad. You can create views if you don't want to have to remember to always do that.

The reason we've done this is because we had very specific business needs to be able to report on records that have been deleted. The reporting needs varied widely - sometimes they'd need to see just the active records, or just the inactive records, or sometimes a mix of both - so pushing all the deleted records into an audit table wasn't a very good option.

So, depending on your particular business needs, I think this approach is certainly a viable option.

97. <https://stackoverflow.com/questions/7671726/how-to-find-the-last-time-a-table-isqueried-in-oracle/7675943#7675943>

Title: How to find the last time a table is queried in oracle

Question: want to get the information about when a table is queried in oracle. Is there any log in oracle which shows the queries. I was looking around v\$sqlarea and v\$sqltext but, the system admin does not allow me to reach those tables.

Answer: In a default installation I know of no way to reliably get this info. You may be able to catch SQL Statements that were recently run in v\$sql* views, but v\$sql* views are transient in nature and are used to support normal operations of the database. Statements can age out so it is not a reliable way to audit.

What is a proper reliable way to get this info? Oracle Auditing. It contains the ability to record fine grained information about how your database objects are touched.

In this case you will want to investigate the AUDIT SELECT. After doing the basic config for auditing (usually done by a DBA) then SELECT auditing can be set up for specific tables like this:

AUDIT SELECT ON employees;

When a user SELECTS from employee, either directly or through a view, a record will be written to the audit trail (text file or SYS.AUD\$ depending on configuration). The trail will have username, timestamp, table_name, and some other information to help you determine what the user was doing at the time.

Here is a 9i reference for auditing that gives an overview including info on AUDIT

SELECT: http://download.oracle.com/docs/cd/B10500_01/server.920/a96524/c25audit.htm

Be aware that fine grained auditing can slow things down. Whatever you are auditing now has a new layer of activity that must be completed (writing to the audit trail). If you have a business need to know who sees what data that is understandable, but make sure to be aware of the performance implications.

98. <https://stackoverflow.com/questions/67557/how-to-audit-database-activity-without-performance-and-scalability-issues/2612535#2612535>

Title: How to Audit Database Activity without Performance and Scalability Issues?

Question: I have a need to do auditing all database activity regardless of whether it came from application or someone issuing some sql via other means. So the auditing must be done at the database level. The database in question is Oracle. I looked at doing it via Triggers and also via something called Fine Grained Auditing that Oracle provides. In both cases, we turned on auditing on specific tables and specific columns. However, we found that Performance really sucks when we use either of these methods.

Since auditing is an absolute must due to regulations placed around data privacy, I am wondering what is best way to do this without significant performance degradations. If someone has Oracle specific experience with this, it will be helpful but if not just general practices around database activity auditing will be okay as well.

Answer: with monitoring database traffic using a network traffic sniffer.

Send the raw data between the application and database off to another machine and decode and analyse it there.

I used PostgreSQL, and decoding the traffic and turning it into a stream of database operations that could be logged was relatively straightforward. I imagine it'd work on any database where the packet format is documented though.

The main point was that it put no extra load on the database itself.

Also, it was passive monitoring, it recorded all activity, but couldn't block any operations, so might not be quite what you're looking for.

There is no need to "roll your own". Just turn on auditing:

1. Set the database parameter AUDIT_TRAIL = DB.
2. Start the instance.
3. Login with SQLPlus.
4. Enter the statement

```
audit all;
```

This turns on auditing for many critical DDL operations, but DML and some other DDL statements are still not audited.

5. To enable auditing on these other activities, try statements like these:

```
audit alter table; -- DDL audit audit select table, update table, insert table, delete table; -- DML audit
```

Note: All "as sysdba" activity is ALWAYS audited to the O/S. In Windows, this means the Windows event log. In UNIX, this is usually \$ORACLE_HOME/rdbms/audit.

Check out the [Oracle 10g R2 Audit Chapter](#) of the Database SQL Reference.

The database audit trail can be viewed in the SYS.DBA_AUDIT_TRAIL view.

It should be pointed out that the internal Oracle auditing will be high-performance by definition. It is designed to be exactly that, and it is very hard to imagine anything else rivaling it for performance. Also, there is a high degree of "fine-grained" control of Oracle auditing. You can get it just as precise as you want it. Finally, the SYS.AUD\$ table along with its indexes can be moved to a separate tablespace to prevent filling up the SYSTEM tablespace.

Kind regards, Opus

Answer: If you are using oracle then there is feature called CDC(Capture data change) which is more performance efficient solution for audit kind of requirements

99. <https://stackoverflow.com/questions/15089207/possible-ways-to-generate-audit-trail-for-every-save-of-business-entities/15089371#15089371>

Title: Possible ways to generate audit trail for every save of business entities

Question: We currently have a requirement to implement audit trail generation for some of our main business entities, as usual in these cases we need to persist old and new value of every field which was changed and also some header data like time stamp, entity ID and user who did the save.

I understand there are different ways to do this, such as:

1. .NET code side, using Reflection
2. SQL Server side triggers
3. SQL Server CDC (Change Data Capture)

A .NET Reflection based method could possibly take a bit longer to be written but if properly done will be smart enough to include new properties added in the future without any code change, and it can also expand and compare all children entities (like collections of other sub-entities added to our main .NET entity).

We actually have a legacy application which uses such .NET based audit trail generation, we save the whole audit trail as XML field in a SQL database and over the years that audit table is now something like 35GB of data.

I am thinking how easy it could be a trigger based solution in terms of:

- first implementation
- every change required in future modification of the entity to audit (add/change/remove a field etc...)
- how readable is the audit data? can we simply have a query which is showing old and new values for a specific saving operation?
... and how about performances?

Does anybody have experience with both approaches and can suggest or point out some pros and cons?

Answer: In the past, for similar requirements, I have turned to domain events and messaging. It does bring in some complexity, but can be worth it. I would suggest at least considering it.

Essentially, you would make the change a first class citizen of the model by defining an event that fires when changes are made to the business objects. These events can also be a good way to capture business intent instead of just changes at the field level. For example, a business event named OrderRefunded is usually a better audit point than OrderTotal field changed from 45.00 to 0.00.

Firing these domain events with messaging using publish/subscribe allows many subscribers to handle the event. One of these subscribers could be an Audit subscriber. This takes all the performance impact (of rebuilding indexes etc) away from the domain that is processing the original request and places the burden on the Audit subscriber. this also means that you would never get a problem where a bug in your audit code takes down the processing of business transactions.

Another benefit is about how much data that needs to be saved. This approach gives you the advantage that the Audit subscriber will only have to save the amount of data that it intends to use. Rules about how much data to save or archive are also localized to the service that is handling audit. Therefore, you can be sure that you are not storing any data without a need.

Tools I've used in the past to do this include [NServiceBus](#) and [RabbitMQ](#). Each had its benefits and liabilities depending on the problem.

Answer: Requirements for audit are very specific to each every organisation. In my last project, we were required to keep an audit trail on messages sent to Real time systems.

The volume was substantial.. some days over 50GB text files and on others average 10-15GB.

The 1st solution we used was to persist it in SQL

- Performance slow
- Queries slow
- Archiving solution equally slow
- Support for querying db records only

About 2 years back

- We moved to logged directly to text file. Open and append
- Daily basis we gzip the text file to reduce space consumed.
- Fast writes
- slow reads (read the gzipped stream and query records)

Last year

- Limit file size to 4Gb and roll over to use a new file (improved gzip performance, reduced OOM)
 - gzip any files every morning
 - fast write
 - can execute parallel reads so better reads (read the gzipped stream and query records)
- What you choose is based on your needs.

100. <https://stackoverflow.com/questions/10588286/why-should-the-event-store-be-on-the-write-side>

Title: Why should the event store be on the write side?

Question: Event sourcing is pitched as a bonus for a number of things, e.g. event history / audit trail, complete and consistent view regeneration, etc. Sounds great. I am a fan. But those are read-side implementation details, and you could accomplish the same by moving the event store completely to the read side as another subscriber.. so why not?

Here's some thoughts:

1. The views/denormalizers themselves don't care about an event store. They just handle events from the domain.
2. Moving the event store to the read side still gives you event history / audit
3. You can still regenerate your views from the event store. Except now it need not be a write model leak.
Give him read model citizenship!

Here seems to be one technical argument for keeping it on the write side. This from Greg Young at <http://codebetter.com/gregyoung/2010/02/20/why-use-event-sourcing/>:

There are however some issues that exist with using something that is storing a snapshot of current state. The largest issue revolves around the fact that you have introduced two models to your data. You have an event model and a model representing current state.

The thing I find interesting about this is the term "snapshot", which more recently has become a distinguished term in event sourcing as well. Introducing an event store on the write side adds some overhead to loading aggregates. You can debate just how much overhead, but it's apparently a perceived or anticipated problem, since there is now the concept of loading aggregates from a snapshot and all events since the snapshot. So now we have... two models again. And not only that, but the snapshotting suggestions I've seen are intended to be implemented as an infrastructure leak, with a background process going over your entire data store to keep things performant.

And after a snapshot is taken, events before the snapshot become 100% useless from the write perspective, except... to rebuild the read side! That seems wrong.

Another performance related topic: file storage. Sometimes we need to attach large binary files to entities. Conceptually, sometimes these are associated with entities, but sometimes they ARE the entities. Putting these in the event store means you have to physically load that data each and every time you load the entity. That's bad enough, but imagine several or hundreds of these in a large aggregate. Every answer I have seen to this is to basically bite the bullet and pass a uri to the file. That is a cop-out, and undermines the distributed system.

Then there's maintenance. Rebuilding views requires a process involving the event store. So now every view maintenance task you ever write further binds your write model into using the event store.. forever.

Isn't the whole point of CQRS that the use cases around the read model and write model are fundamentally incompatible? So why should we put read model stuff on the write side, sacrificing flexibility and performance, and coupling them back up again. Why spend the time?

So all in all, I am confused. In all respects from where I sit, the event store makes more sense as a read model detail. You still achieve the many benefits of keeping an event store, but you don't over-abstract write side persistence, possibly reducing flexibility and performance. And you don't couple your read/write side back up by leaky abstractions and maintenance tasks.

So could someone please explain to me one or more compelling reasons to keep it on the write side? Or alternatively, why it should NOT go on the read side as a maintenance/reporting concern? Again, I'm not questioning the usefulness of the store. Just where it should go :)

Answer: think this is really an excellent question. Treating your aggregate as a sequence of events is useful in its own right on the write side, making command retries and the like easier. But I agree that it seems upsetting to work to create your events, then have to make yet another model of your object for persistence if you need this snapshotting performance improvement.

A system where your aggregates only stored snapshots, but sent events to the read-model for projection into read models would I think be called "CQRS", just not "Event Sourcing". If you kept the events around for re-projection, I guess you'd have a system that was very much both.

But then wouldn't you have *three* definitions? One for persisting your aggregates, one for communicating state changes, and any number more for answering queries?

In such a system it would be tempting to start answering queries by loading your aggregates and asking them questions directly. While this isn't forbidden by any means, it does tend to start causing those aggregates to accrete functionality they might not otherwise need, not to mention complicating threading and transactions.

Answer: One reason for having the event store on the write-side might be for resolving concurrency issues before events become "facts" and get distributed/dispatched, e.g. through optimistic locking on committing to event streams. That way, on the write side you can make sure that concurrent "commits" to the same event stream (aggregate) are resolved, one of them gets through, the other one has to resolve the conflicts in a smart way through comparing events or propagating the conflict to the client, thus rejecting the command

101. <https://stackoverflow.com/questions/1517387/whats-difference-between-a-temporal-database-and-a-historical-archive-database/1517466#1517466>

Title: What's difference between a temporal database and a historical archive database?

Question: It is said here:

<http://www.ibm.com/developerworks/web/library/wa-dbdsgn2.html>

Each table in the DB should have a history table, mirroring the entire history of the primary table. If entries in the primary table are to be updated, the old contents of the record are first copied to the history table before the update is made. In the same way, deleted records in the primary table are copied to the history table before being deleted from the primary one. The history tables always have the name of the corresponding primary one, but with _Hist appended.

In temporal db see here [temporal database modeling and normalisation](#) there isn't a separate table as far as I understand.

So when should I create another table or not ?

Answer: What Robert said theoretically - nothing to add.

Practically, temporal table vs. main+hist table, has other implications.

For heavily maintained data (e.g. updates/deletes greatly outnumber the inserts), having a historical (sometimes also referred to as "audit" - as it is the main mechanism to enforce audit trail of DB data) table allows keeping the main table reasonably small sized compared to keeping the audit info inside the main table itself. This can have significant performance implications for both selects and inserts on the main table, especially in light of index optimization discussed below.

To top that off, the indices on hist/audit table do not need to be 100% identical to main table, meaning you can omit indices not needed for querying audit data from hist database (thus speeding up inserts into audit table) and, vice versa, optimize what indices there are to specific audit queries you have (including ordering the table by timestamp via clustered index) without saddling the main table with those indices which slow the data changes (and in case of clustering on time of update, clash with main table's clustered index so you usually can't have it clustered in temporal order).

History tables provide a history of (generally non-temporal) changes made to the primary database records by users. This history is archival in nature (i.e. accessed occasionally for historical purposes). The temporal information (when the change was made) is secondary in nature.

A temporal database is designed specifically to execute time queries against. The temporal information is primary in nature, and kept online for immediate retrieval. A second table is not created, unless archiving also needs to take place.

http://en.wikipedia.org/wiki/Temporal_database

Answer3: The history table that is talked of in that developerworks article is a table that holds the history of the database (i.e. the history of our beliefs about reality).

The kind of history that you asked about in that other thread holds our (current !) belief about the history of reality.

Note the difference. The two concur only to the extent that our past beliefs about reality have indeed been correct. And that is not always 100%.

If you use the former as being the latter, then you are in a sense assuming that that degree of concurrence is indeed 100%, i.e. that all your past beliefs about reality always and by definition coincided with reality, i.e. you are assuming that it is impossible for you to have had any faulty belief about reality.

Tables that hold the history of other tables can suit purposes of auditing. Tables that hold the history of reality can suit the purpose of any user that is interested in that historical information.

102. <https://stackoverflow.com/questions/349524/sql-server-history-table-populate-through-sp-or-trigger/363508#363508>

Title: SQL Server history table - populate through SP or Trigger?

Question: In my SQL Server backend for my app, I want to create history tables for a bunch of my key tables, which will track a history of changes to the rows.

My entire application uses Stored Procedures, there is no embedded SQL. The only connection to the database to modify these tables will be through the application and the SP interface. Traditionally, shops I've worked with have performed this task using triggers.

If I have a choice between Stored Procedures and Triggers, which is better? Which is faster?

Answer: Triggers.

We wrote a GUI (internally called *Red Matrix Reloaded*) to allow easy creation/management of audit logging triggers.

Here's some DDL of the stuff used:

103. <https://stackoverflow.com/questions/2250015/find-number-of-times-the-procedure-is-called-using-another-procedure/2250171#2250171>

Title: Find number of times the procedure is called using another procedure

Question: I have two procedures A and B. Procedure A performs certain tasks. Procedure B has to monitor how many times procedure A is called in a day.

How to achieve this?

Answer: Oracle does not track this sort of thing by default but if you just want to record some simple information then switch on the built-in AUDIT functionality:

AUDIT EXECUTE PROCEDURE BY ACCESS;

You can view the accesses in the view dba_audit_trail. [Find out more](#).

If for some reason you don't want to use the audit trail - say you want to capture more information - then you will need to use your own logging mechanism. This is a good use for the AUTONOMOUS TRANSACTION pragma. Just be careful that writing the log records doesn't have an undue impact on the performance of your application.

edit

The role of procedure B in your question is entirely superfluous: either the database records how often procedure A runs or else A writes its own trace records. Unless B is a packaged query on the log (however implemented)?

104. <https://stackoverflow.com/questions/23528244/in-oracle-rac-will-an-application-be-faster-if-there-is-a-subset-of-the-code-u/23529111#23529111>

Title: In Oracle RAC, will an application be faster, if there is a subset of the code using a separate Oracle service to the same database?

Question: For example, I have an application that does lots of audit trails writing. Lots. It slows things down. If I create a separate service on my Oracle RAC just for audit CRUD, would that help speed things up in my application?

In other words, I point most of the application to the main service listening on my RAC via SCAN. I take the subset of my application, the audit trail data manipulation, and point it to a separate service listening but pointing same schema as the main listener.

Answer: services you'd define, your workloads, your goals, etc. Realistically, you'd need to test it in your environment to know for sure.

A separate service could allow you to segregate the workload of one application (the one writing the audit trail) from the workload of other applications by having different sets of nodes in the cluster running each service (under normal operation). That can help ensure that the higher priority application (presumably not writing the audit trail) has a set amount of hardware to handle its workload even if the lower priority thread is running at full throttle. Of course, since all the nodes are sharing the same disk, if the bottleneck is disk I/O, that segregation of workload may not accomplish much.

Separating the services on different sets of nodes can also impact how frequently a particular service is getting blocks from the local node's buffer cache rather than requesting them from the other node and waiting for them to be shipped over the interconnect. It's quite possible that an application that is constantly writing to log tables might end up spending quite a bit of time waiting for a small number of hot blocks (such as the right-most block in the primary key index for the log table) to get shipped back and forth between different nodes. If all the audit records are being written on just one node (or on a smaller number of nodes), that hot block will always be available in the local buffer cache. On the other hand, if writing the audit trail involves querying the database to get information about a change, separating the workload may mean that blocks that were in the local cache (because they were just changed) are now getting shipped across the interconnect, you could end up hurting performance.

Separating the services even if they're running on the same set of nodes may also be useful if you plan on managing them differently. For example, you can configure Oracle Resource Manager rules to give priority to sessions that use one service over another. That can be a more fine-grained way to allocate resources to different workloads than running the services on different nodes. But it can also add more overhead.

105. <https://stackoverflow.com/questions/10869912/is-it-good-to-create-separate-table-of-each-of-our-web-application-module-for-au/10870115#10870115>

Title: Is it good to create separate table of each of our web application module for audit purpose?

Question: Initially, I'm thinking of one table that will handle all the audit logs but in terms of flexibility, like for example in the future do you think, it will make sense to break the table and have each application to have their own audit log table?

Like for example, for reservation, I'll have one audit table that will track all the changes on the field level, and then I'll have another audit table for visa application.

Answer: The pattern you are describing seems to be along the lines of Entity Attribute Value (EAV), which is one row per field.

Assuming that all field changes to all tables in all of your modules will result in a new audit row, there are some potential issues with this approach

- the audit table will get very huge
- the number of writes will be large and frequent and could negatively impact performance - correct clustering of this audit table will be important
- in order to view / compare rows, you will need to reassemble fields back into rows in order to be meaningful to a user

You are also potentially missing out on 2 important attributes to audit, viz UserId and TimeStamp of the change

There is probably some normalisation you can do to your audit tables, e.g. Have a 'one per row' audit table and a 'one per field' audit table. e.g. IP Address, ReferenceNumber, Activity Type, UserId and TimeStamp are probably a constant for all updated fields in the same row which were changed by the single 'action' and belong at once per row.

There are also other alternatives

- One Audit table per Live table, which is generally a clone of the fields, plus a TimeStamp field and a new Primary Key (or just leave it as a heap)
- SQL Change Data Capture [SQL Server 2008 change data capture vs triggers in audit trail](#)
- If all changes occur from the same App, you can use a Document Store (e.g. store the rows as Xml, Blobs or other Metadata), keeping serialized versions of the change in a single row, and possibly just exposing a couple of indexable fields (Column Name, Date) for query purposes.
- If you choose the Document store approach, you might also choose not to store audit data in a RDBMS at all. NoSQL stores like RavenDB or MongoDB are good at storing high volumes

106. <https://stackoverflow.com/questions/1010148/table-with-a-lot-of-columns/1010237#1010237>

Title: Table with a lot of columns

Question: If my table has a huge number of columns (over 80) should I split it into several tables with a 1-to-1 relationship or just keep it as it is? Why? My main concern is performance.

PS - my table is already in 3rd normal form.

PS2 - I am using MS Sql Server 2008.

PS3 - I do not need to access all table data at once, but rather have 3 different categories of data within that table, which I access separately. It is something like: member preferences, member account, member profile

Answer1: 80 columns really isn't that many...

I wouldn't worry about it from a performance standpoint. Having a single table (if you're typically using all of the data in your standard operations) will probably outperform multiple tables with 1-1 relationships, especially if you're indexing appropriately.

I would worry about this (potentially) from a maintenance standpoint, though. The more columns of data in a single table, the less understandable the role of that table in your grand scheme becomes. Also, if you're typically only using a small subset of the data, and all 80 columns are not always required, splitting into 2+ tables might help performance

Answer2: Re the performance question - it depends. The larger a row is, the less rows can be read from disk in one read. If you have a lot of rows, and you want to be able to read the core information from the table very quickly, then it may be worth splitting it into two tables - one with small rows with only the core info that can be read quickly, and an extra table containing all the info you rarely use that you can lookup when needed.

Answer3: Taking another tack, from a maintenance & testing point of view, if as you say you have 3 distinct groups of data in the one table albeit all with the same unique id (e.g. member_id) it might make sense to split it out into separate tables.

If you need to add fields to say your profile details section of the members info table, do you really want to run the risk of having to re-test the preferences & account details elements of your app as well to ensure no knock on impacts.

Also for audit trail purposes if you want to track the last user ID/Timestamp to change a members data. If the admin app allows Preferences/Account Details/Profile Details to be updated separately then it makes sense to have them in separate tables to more easily track updates.

Not quite a SQL/Performance answer but maybe something to look at from a DB & App design pov

107. <https://stackoverflow.com/questions/29823519/audit-windows-activity-of-user-on-winformapplication>

Title: Audit windows activity of user on WinFormApplication

Question: activity done by user on application and in System to see if he had changed any security settings or anything.

Is there any way to do this by AOP or using PostSharp or any other such method which could be done with minimal changes in existing code as it is a very big application and implementing logging in every method is a time taking steps.

I am open to create a new application which could be for auditing purpose if it helps.

Please let me know any best practices I should follow to implement Auditing. We are using .Net 4.5 and SQL Server 2005.

Answer: Sounds like you want an audit of business-level operations attempted via your WinForms application.

Since, you asked about aspect-oriented approach - yes you can certainly use PostSharp's OnMethodBoundaryAspect to plug in some logging/auditing behaviour with *almost* no change to existing code.

You will also get information about the caller and values of arguments passed which you can use to make your audits meaningful. Will update shortly with example. [Further Reading](#)

108. <https://stackoverflow.com/questions/49258846/why-is-it-recommended-to-make-a-unique-sas-token-for-each-event-hub-publisher-a>

Title: Why is it recommended to make a unique SAS token for each event hub publisher, assuming permissions are the same for each publisher?

Question: tokens for event hub publishers, it is mentioned that SAS tokens should include a URI that ends with the publisher name (client identifier), and that one token should be created for each publisher. What is the advantage of making a token for each client, assuming the permissions granted are the same for each client (publishing to the event hub)? Is there logging that can differentiate between clients, or some other audit trail or benefit this provides?

109. <https://stackoverflow.com/questions/41425798/find-out-user-removed-from-which-project-in-tfs/41432018#41432018>

Title: Find out user removed from which project in TFS

Question: I have removed an user from some TFS project group. But somehow i do not remember which is the project he has been removed from .

Is there a way to track back, which project that particular user was having access?

Answer: No, there is no audit trail for security and this no way to know which group the user was removed from.

110. <https://stackoverflow.com/questions/1532138/what-are-the-implications-of-deleting-a-user-account/1532298#1532298>

Title: What are the implications of deleting a user account? [closed]

Question: Most of the websites I've used in the past (including this one) do not offer an option to delete your own account.

I think the main reason is to avoid the orphanage of the items created (or the delete on cascade of those items).

Modern sites (like this one) have a place where those items go when an account is abandoned (in the case of SO it is the user "[Community](#)").

What is, in your opinion, the rationale of not providing a "delete my account" feature?

Security? Laziness? Ignorance? Bug? Or feature?

We are designing a small web app, and we are discussing precisely this topic. We can't find too many reasons though for not allowing the user to delete the account

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Answer2: This is a pretty broad topic, but some of the ones I've experienced are:

- Accounts can be tied to comments, deleting the account screws up the comments
- Accounts can be tied to other systems (community server, authorize.net and blackbox web services) and can be hard to delete on those
- Cascade, like you mentioned
- Prevent user stupidity - accidental delete is hard to undo, and even trickier on a subscription site
- Return on investment - try explaining to your boss why you're doing a weeks worth of data integrity testing instead of setting a boolean to false
- Marketing - "We have 85,000 registered users" (see: myspace)

Answer 3: Will it be more work to maintain those abandoned accounts than you would normally have? Also, are people that visit your site likely to come back to it after long periods of time? These are questions your team might want to discuss.

Personally, unless it is going to cause a disruption or slowdown in work, I would keep the accounts. That way, users won't complain when they visit six months down the road and find they cannot log in.

Answer4: This may not apply to you. But in our system, we deal with patient data. Because of privacy, security and regulatory concerns, we do not delete users. We have extensive audit trails indicating who accessed/entered/changed which pieces of information. We provide a mechanism to disable access, but the audit trails must remain in tact, so the health care facilities can monitor and enforce their privacy policies.

Answer: I'm pretty sure I've quoted [this Udi Dahan article](#) but it's worth posting again here. The key point is to **model the task, not the data**. Do you truly want to nullify the existence of a user (he/she never existed)?

111. <https://stackoverflow.com/questions/2043548/secure-version-control/2043630#2043630>

Title: Secure version control

Question: 2

I would like to have your opinion about the subject "version control", but focusing on security.

Some common features:

- allowing to access to source code using clients *only* (no way to access the source code on the server directly)
- granting permission to access only the source code which I am allowed to modify (i.e.: a developer should be able to access the source code related to his project only). So it should be possible to create user groups and granting different levels of access.
- tracking modifications, check-ins, and check-outs and the developers who made them...
- ...and, surely, I am forgetting something.

Which are the most "paranoid" version control systems that you know? Which features do they implement?

My aim is creating an environment for developing applications managing sensible data: credit cards, passwords, and so on... A malicious developer may insert backdoor or intentionally alter some security features. So the access to the source code should be controlled strictly. I must confess that my knowledge of version control systems is poor, so, I fear, customizing SVN could be a hard task for me.

[Perforce](#) is widely used in the Finance Industry where security of code is sometimes an issue. You can setup gatekeepers and access controls to restrict visibility of code and produce audit trails for various activities for SOX compliance.

Use a well-known, industry standard system like [subversion](#). It can control access to individual projects very simply, and using the web server authz configuration can control individual access to specific files in each project.

The only non-standard issue is logging check-outs. But the web server can easily log this information for you.

Your users will thank you.

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112. <https://stackoverflow.com/questions/1114103/security-obligated-points-to-include-in-a-website-implementation-proposal/1114170#1114170>

Title: Security obligated points to include in a website implementation proposal

Question: What are the security topics that you should always include when writing a proposal for a website implementation?

Answer: You may find good material at the [Open Security Architecture](#) site.

I would start with Identity, Authentication and Authorisation, probably also include Audit trails too (perhaps overkill for some sites, but you do need know if you need to consider them and if not explicit discount them).

Another direction is to consider threats. For example Denial Of Service.

113. <https://stackoverflow.com/questions/20219099/exception-handling-for-user-input-outside-of-normal-interaction>

Title: xception handling for user input outside of normal interaction

Question:

Edit: I think my question's rambled on a bit, possibly detracting from the point. So, as concisely as possible: Should I be concerned with avoiding exceptions caused by users who fiddle with their HTML request?

I'm using a drop-down field in HTML which is backed by an integer value. This value gets parsed in the back office. Currently, if the integer parsing fails, the site gives a generic error (due to top-level exception handling) and places an entry into the audit trail containing the integer parse error.

Normally, I wouldn't want an un-handled exception to be thrown by bad user input, but in this case the bad input can only be produced by a bot or a clever user. In either of these cases, the error message will not be unexpected, and should not be a security concern.

Is there any compelling reason to handle the exception? If I do this, I'll need to formalise what I want to happen when the user commits this crime. Do I show bots and malicious users their own little validation error? Do I default their values and allow the form to submit?

Answer: The answer I have: It depends.

For example, if you're writing a bank account management system and find out that user is trying to move "Lorem ipsum" U.S. dollars from one of his accounts to another, then that is probably very bad and you should not let this operation happen. User message of a generic error would be fine.

On the other hand, if you are writing a "reverse polish notation online calculator" and encounter a ";" character, you can show the exact reason to the user.

If you are validating user's age, hope it is an integer between 0 and 100, but you get a 2,147,483,647 value, then it should be fine to simply substitute it by 10.

This is more like a *project-dependent* question rather than a *technology-dependent*.

114. <https://stackoverflow.com/questions/27319054/how-to-stream-an-audio-file-without-a-direct-link>

Title: How to stream an audio file without a direct link

Question: 2

I have a rails web app sitting on an nginx web server. I have some audio files on my server, and I want people to be able to listen to them, and to be able to seek to any part of the audio file to listen from that point.

Simple right?

I was using direct links in the src of my html5 audio element. It worked great. The file could be played and seeking worked.

Enter security and auditability.

My audio files are sensitive. I only want certain people to be able to listen to them. I also need to know each time that they listen to them. Suddenly the public directory isn't going to work.

Enter rails's send_file.

Send_file initially appeared to be exactly what I needed. It allows rails to serve my audio files, and I could keep my files in a protected directory, I could check the current user's permissions, and I could create the appropriate audit trail. Except...

With send_file I can't seek. That is a deal breaker.

A few stackoverflow questions address getting send_file to handle http-range/byte-range requests. The ones I reviewed are:

[what is the proper way to serve mp4 files through rails...](#)

[rails media file stream accept byte range request through send file ...](#)

After doing more research, I found the following blog post: <https://blog.echoplex.us/2014/08/19/so-you-want-to-stream-videoaudio-with-rails/>

tl;dr don't use rails send_file to serve media. don't try to make it like the stackoverflow questions say you can. Instead, use nginx and X-Accel-Redirect, and end up with a request pipeline that looks like you->nginx->rails->nginx->you

I am considering taking his approach, but didn't know if there was a better way to do this.

What are my options?

(also, you can assume that I'm using the current versions of rails and nginx)

Answer: DON'T USE sendfile please. Use X-Accel-Redirect or the advice below.

Nginx secure_link module helps you to serve files straight from disk with private links. No backend required. The full example is [here](#).

115.<https://stackoverflow.com/questions/711597/is-this-the-best-approach-to-creating-an-audit-trail/711693#711693>

Title: Is this the best approach to creating an audit trail?

Question: I'm trying to create some functionality that keeps an audit trail of how data in a given user form has been changed over time, with a dated audit at the foot of that page. For example:

02/04/09 21:49 Name changed from "Tom" to "Chris".

I'm doing this by storing the data in its present format in the session and then on save checking whether there are any differences in the data being stored. If there are, I'm storing the data how it was before the latest edit in a table called history, and storing the new values in the current user table.

Is this the best approach to be taking?

Answer: One suggestion; this would be relatively easy to do in a database trigger. In that case, you would never have to worry about whether the code running the update remembers to add a history record

Answer2: The session involvement makes me a little wary (are you sure you're handling it properly when two users are working on the same data at the same time?), but in general, yeah, keeping a history table is the right thing.

Answer3: I would also think about a database trigger on insert or update to record change details (who, when, what, value before, value after) to a separate audit table. That way you know that even if the data is changed outside of your app using the database directly, it will still be picked up.

You might also want to do something to detect if the data is changed outside of your app, such as calculate a hash or crc of the record and store it in a field somewhere, then check it when reading the data.

116.<https://stackoverflow.com/questions/7797099/pass-data-between-webpage-and-vb-application/7797317#7797317>

Title: Pass data between webpage and VB application

Question: I am developing an application for internal use in our company. The purpose of this application is for document imaging. What we are wanting to do is print a barcode label to attach to documents so that when they are scanned in a piece of software such as vfile will be able to read the barcodes and know how to file them.

The main focus is our ERP system which is web based (PHP). We are wanting to modify the code to allow the user to print the barcode label immediately once they enter an order or PO. I have access to the source code for the ERP web pages. I don't know of any way to make a web page print to a printer without displaying the printer select dialog. So, I decided that I wanted to try and create a VB application that would do the printing of the barcodes. This would allow me to bypass the the printer select dialog.

Now for the question. Is there any way to have a web page (PHP) running on the server call a VB app to perform a task? So, if I had a button on the webpage and the user clicked it, that button would somehow send the pertinent information (Order number) to the VB app and the VB app would print the barcode. The VB app will always be running on the machine. The label printers will be Zebra USB label printers on each person's machine.

Any thoughts appreciated

Answer: The way I implemented something like this was to have an Windows service, running on a different system from the webserver, watching the upload folders on the web server, then moving the files to the appropriate location for further processing. I tracked the movement of files through the system by creating an initial record upon a success upload, then creating a transaction record for each activity afterward (printed, faxed,

emailed, sent for manual review, etc). This insured a reportable audit trail for each document and helped identify 'orphan' files that would happen sometimes.

The important thing with a service like this is making sure that you've configured security properly so that the service has access to resources like printers and network drives.

117. <https://stackoverflow.com/questions/31283660/recommend-multi-tier-architecture-language-database>

Title: I'm looking at a new line of business application requirement (technical, not accounting). The application needs the following architecture:

- Backend database that is available to users around the world with decent response time. Can use replication of the database if necessary to ensure low latency performance. Client organization prefers to host this themselves rather than use an SaaS or Cloud because of data security / contractual issues regarding ownership of the data. Data is not particularly relational, is more of an object tree. There may be unique objects in the datastore that have attributes that exist ONCE in the database. However, need to store audit trail (not necessarily rollback) of all data changes, who made them and when, and allow for different versions of data where users might be looking at a mixture of datasets. Real-world description of this would be a master drawing with various transparencies over it with changes. When users are finished with changes they could publish back to the master and this would then be seen by others. Looking at various database options (SQL via ORM, NoSQL). No strict backend restrictions on platform
- Middle tier for business logic, including authentication and authorization of users. Auth must be Active Directory compatible for Client systems. Business logic is relatively straightforward, passing data from database to users and back. No restrictions on platform or language - but ideally would like something that is scriptable so business logic can be added without needing to recompile. Also need good performance when being hit by hundreds of concurrent users.
- Client tier would be primarily Windows Desktop based, with both graphical (drawings) and data entry/manipulation. COM layer / interfacing with MS Excel is business critical, so I'm thinking this should be a .NET application.
- Secondary Client tier would eventually be mobile / web interface. Would not have the full functionality of the Windows Desktop application (no drawing interface), but would have functionality to review / comment / approved data and publish data to "Master Layer" in the database.

I am NOT a full time programmer. But I have done some programming over the last 25 years in FORTRAN, Common Lisp, Pascal, VB and Python. I might be described as the idea guy here - not the implementer.

If we wanted to prototype this, what would be the best platform to do it in? I'm thinking because of the Client end that .NET would be good, but I'm concerned about the ability to use .NET for the backend if we use something other than SQL (I know nothing about LINQ - could that help me?). Also, I really like the idea of dynamically typed languages because of their expressiveness and speed of development.

Answer: Considering low latency and non-relational kind of data NoSQL would be right choice. Many of popular databases have good support for .net (like MongoDB, CouchBase), even for its lambdas/expressions and LINQ. Also you have to take into account *eventual consistency*, (whatever way you go relational or NoSQL, replication or sharding) that may affect the backend architecture.

Regarding audit trail, versioning and publishing changes look at *CQRS and Event Sourcing* architectural patterns, they solve such problems very well.

For client apps I'd suggest to try Xamarin. (it's better than WPF, I think, because it's not focused on particular devices as much as WPF is) This gives the main benefit of using the same dev platform/language for both server and client apps and lower development/support costs.

Regarding Desktop app, I'm not sure if Xamarin supports COM but if not you can [share client code](#) and decouple presentation layer. So you'll have separate layers for Desktop (Visual Studio) and Mobile (Xamarin)

All of this stuff can be made using .net and I see here a great pro: using common code base for all your apps.

118.<https://stackoverflow.com/questions/341271/should-application-users-be-database-users/341343#341343>

Title: Should application users be database users?

Question: My previous job involved maintenance and programming for a very large database with massive amounts of data. Users viewed this data primarily through an intranet web interface. Instead of having a table of user accounts, each user account was a real first-class account in the RDBMS, which permitted them to connect with their own query tools, etc., as well as permitting us to control access through the RDBMS itself instead of using our own application logic.

Is this a good setup, assuming you're not on the public intranet and dealing with potentially millions of (potentially malicious) users or something? Or is it always better to define your own means of handling user accounts, your own permissions, your own application security logic, and only hand out RDBMS accounts to power users with special needs?

Answer: I don't agree that using the database for user access control is as dangerous others are making it out to be. I come from the Oracle Forms Development realm, where this type of user access control is the norm. Just like any design decision, it has its advantages and disadvantages.

One of the advantages is that I could control select/insert/update/delete privileges for EACH table from a single setting in the database. On one system we had 4 different applications (managed by different teams and in different languages) hitting the same database tables. We were able to declare that only users with the Manager role were able to insert/update/delete data in a specific table. If we didn't manage it through the database, then each application team would have to correctly implement (duplicate) that logic throughout their application. If one application got it wrong, then the other apps would suffer. Plus you would have duplicate code to manage if you ever wanted to change the permissions on a single resource.

Another advantage is that we did not need to worry about storing user passwords in a database table (and all the restrictions that come with it).

I don't agree that "Database user accounts are inherently more dangerous than anything in an account defined by your application". The privileges required to change database-specific privileges are normally MUCH tougher than the privileges required to update/delete a single row in a "PERSONS" table.

And "scaling" was not a problem because we assigned privileges to Oracle roles and then assigned roles to users. With a single Oracle statement we could change the privilege for millions of users (not that we had that many users).

Application authorization is not a trivial problem. Many custom solutions have holes that hackers can easily exploit. The big names like Oracle have put a lot of thought and code into providing a robust application authorization system. I agree that using Oracle security doesn't work for every application. But I wouldn't be so quick to dismiss it in favor of a custom solution

Answer2: Edit: I should clarify that despite anything in the OP, what you're doing is logically defining an application even if no code exists. Otherwise it's just a public database with all the dangers that entails by itself. Maybe I'll get flamed to death for this post, but **I think this is an extraordinarily dangerous anti-pattern in security and design terms.**

A user object should be defined by the system it's running in. If you're actually defining these in another application (the database) you have a loss of control.

It makes no sense from a design point of view because if you wanted to extend those accounts with any kind of data at all (email address, employee number, MyTheme...) you're not going to be able to extend the DB user and you're going to need to build that users table anyway.

Database user accounts are inherently more dangerous than anything in an account defined by your application because they could be promoted, deleted, accessed or otherwise manipulated by not only the database and any passing DBA, but anything else connected to the database. You've exposed a critical system element as public.

Scaling is out of the question. Imagine an abstraction where you're going to have tens or hundreds of thousands of users. That's just not going to manageable as DB accounts, but as records in a table it's just data. The age old argument of "well there's only ever going to be X users" doesn't hold any water with me because I've seen very limited internal apps become publicly exposed when the business feels it's could add value to the customer or the company just got bought by a giant partner who now needs access. You *must* plan for reasonable extensibility.

You're not going to be able to share conn pooling, you're not going to be any more secure than if you just created a handful of e.g. role accounts, and you're not necessarily going to be able to affect mass changes when you need to, or backup effectively.

All in there seems to be numerous serious problems to me, and I imagine other more experienced SOers could list more.

Answer3: each user account was a real first-class account in the RDBMS, which permitted them to connect with their own query tools, etc.,"
not a good idea if the RDBMS contains:

- any information covered by HIPAA or Sarbanes-Oxley or The Official Secrets Act (UK)
- credit card information or other customer credit info (POs, lines of credit etc)
- personal information (ssn, dob, etc)
- competitive, proprietary, or IP information

because when users can use their own non-managed query tools the company has no way of knowing or auditing what information was queried or where the query results were delivered.

oh and what @annakata said

Answer3: I think generally. In your traditional database application they shouldn't be. For all the reason already given. In a traditional database application there is a business layer that handles all the security and this is because there is such a strong line between people who interact with the application, and people who interact with the database.

In this situation is is generally better to manage these users and roles yourself. You can decide what information you need to store about them, and what you log and audit. And most importantly you define access based on pure business rules rather than database rules. Its got nothing to do with which tables they access and everything to do with whether they can *insert business action here*. However these are not technical issues. These are design issues. If that is what you are required to control then it makes sense to manage your users yourself. You have described a system where you allow users to query the database directly. In this case why not use DB accounts. They will do the job far better than you will if you attempt to analyse the querys that users write and vet them against some rules that you have designed. That to me sounds like a nightmare system to write and maintain.

Don't lock things down because you can. Explain to those in charge what the security implications are but don't attempt to prevent people from doing things because you can. Especially not when they are used to accessing the data directly.

Our job as developers is to enable people to do what they need to do. And in the situation you have described. Specifically connect to the database and query it with their own tools. Then I think that anything other than database accounts is either going to be insecure, or unnecessarily restrictive.

Answer3: A lot of database query tools are very advanced these days, and it can feel a real shame to reimplement the world just to add restrictions. And as long as the database user permissions are properly locked down it might be okay. However in many cases you can't do this, you should be exposing a high-level API to the database to insert objects over many tables properly, without the user needing specific training that they should "just add an address into that table there, why isn't it working?".

If they only want to use the data to generate reports in Excel, etc, then maybe you could use a reporting front end like BIRT instead.

So basically: if the users are knowledgeable about databases, and resources to implement a proper front-end are low, keep on doing this. However if the resource does come up, it is probably time to get people's requirements in for creating a simpler, task-oriented front-end for them.

119. <https://stackoverflow.com/questions/215297/how-to-define-content-management/215340#215340>

Title: How to define context management

Question: First some background. I recently went for an interview and some of the questions asked to me was about Enterprise Content Management. Obviously, I did not have any experience and did not get the offer.

But, it increased my curiosity and tried Internet to get some info on the topic. Wikipedia made me more confused with even more buzzwords. Most of the stuff on the web is marketing related and relevant to specific products like Sharepoint or Drupal etc.

I need some help in understanding more about the topic or the **domain** in simpler terms. What is the requirement to use it? What kind of companies use it? What are the problem areas it tries to address? Any popular use cases? Any places where it looks like a good fit but it is not actually? Lastly, any good book or articles on the topic without being specific to any product?

Answer: The domain is vast and is not easy to cover it with a short answer. According to Gartner (which IMHO gives very good definitions, see links):

Enterprise Content Management (ECM) is an “umbrella term” and represents a vision and framework for integrating a broad range of content management technologies and content formats.
Moreover, Gartner defines ECM suites as encompassing the following core components:

- **Document Management** for check-in/check-out, version control, security and library services for business documents.
- **Document Imaging** for capturing, transforming and managing paper documents.
- **Records Management** for long-term archiving, automation of retention and compliance policies, and ensuring legal, regulatory and industry compliance.
- **Workflow** for supporting business processes, routing content, assigning work tasks and states, and creating audit trails.
- **Web Content Management** for automating the Webmaster function and managing dynamic content and user interaction.
- **Document-Centric Collaboration** for document sharing and supporting project teams.

Articles:

- [The Forrester Wave: Enterprise Content Management Suites, Q4 2007](#)
- [Gartner Magic Quadrant for Enterprise Content Management, 2007](#)

Answer: Panos has already given a good definition. You can check out [CMSWatch's current reports](#) to get a sense of what kinds of products are considered ECMSes. Open source examples would be things like [Alfresco](#), [Bricolage](#) and [OpenCMS](#), which you can take a look at to get a feel for what this space does.

We are talking about "real" traditional CMSes, like Documentum, Vignette, Filenet etc. The "E" in ECMS really came about because all sorts of low-end portal-ware/intranet applications like Drupal or Sharepoint (which you mentioned) started calling themselves CMSes, so the big original CMS companies needed to come up with another name for their products. (Aside: OK, I know Microsoft discontinued its Content Management Server product and made Sharepoint into more of a "real" ECMS, but it's still more intranet/collaborationware than ECMS to me).

The difference between something like Drupal and an ECMS is that Drupal has lots of "websitey" features (it is its own front-end web application, it has a search function, it allows users to register and comment) that an ECMS does not, while it lacks robust content-management features like structured content, workflow, versioning, asset/document management and metadata. (Drupal does have simplistic versions of most of these features, for instance structured content via CCK, but real ECMS is in another league.) An ECMS is almost never a front-end web application that public site visitors connect to (instead, it publishes to a separate web server) -- but an ECMS vendor might have other products, like a portal product, search product, user registration manager, ad manager that you would use for these features on a website, so if that's your goal it often makes sense to buy several of these products from one company.

For instance your fancy ECMS might run on Windows Server, be written in .NET (you can't touch the core code but you can write scripts and plugins in VB/C#), and use an Oracle database, but publish a mixture of HTML and PHP pages to a cluster of Linux/Apache web servers, while you have a Google appliance or Lenya or some other product handle search.

An example of an ECMS would be the editorial system for a newspaper. Lots of writers, editors, photo editors, page designers, ad designers, ad reps who take classified ads over the phone can log in and edit stories, work on photos and pages, and everything is versioned and flows from person to person with workflow rules and changes tracked. Wire service copy and photos flow in automatically through a connector. Reporters and editors' notes and all sorts of other metadata are integrated and everything lives happily in a database. You may have hundreds or thousands of employees and they all need to be able to log in and do "their" work easily, with security and workflow rules so they only see the things they work on and the system is customized to each user's needs. One output vector (possibly the most important one) is to publish to a website using all sorts of automated rules, but it doesn't have to be one or the only one.

Of course there are different products and some of them focus more on web publishing (or document/asset management, or intranet/collaboration à la Notes or Sharepoint) than others -- think of my description as sort of a generalization focused on content-publishing-centric companies.

Answer3: CMS (Content Management System) describe systems that are used to manage content :-) as for example Joomla, Drupal, Sharepoint and etc.

Content management means document, records, processes and other information related to your company business management.

Enterprise Content Management, as far as I know is this "Content management" concept applied to a organization. The mainly focus is to Capture, Manage, Store, Preserve, and Deliver content and documents related to the organization

120. <https://stackoverflow.com/questions/3989837/how-secure-would-github-hosting-be-for-private-repositories/8011897#8011897>

Title: How secure would github hosting be for private repositories?

Question: I have read [this thread](#) but I'm wondering how secure such a solution would be? I know that github offers ssh/ssl support and am familiar but could someone give me a breakdown of what sort of internal security they would use to make sure my committed conf/credential files don't get hacked?

EDIT: I've read <http://help.github.com/security/> but I would like an answer from someone who has worked with multiple repository hosts and has real-world experience with this.

Answer: We tried out github recently.

Compared with our previous git hosting (which was on our own linux virtual server), I'm not overly impressed with the security. We did decide to use it, but only for projects where keeping the code private wasn't a huge concern.

Namely:

1. There's no company control at all over the user accounts. We control which users have access to our repository, but there's no password policies, the users pick their own email addresses, etc.
2. There's no way to limit access by IP address
3. Passwords can only be reset by the user
4. Compromising the users email account (which we're unable to see what account they've set it to) also results in a compromise of their github account, as they use an email challenge to reset forgotten passwords.
5. There's no access logs (there is an audit trail for most or possibly all changes, but no logging at all for access)
6. Access to the web front end is only password protected, so is vulnerable to password reuse from other sites and to some extent to brute forcing (github's statement about what they do for failed logins is pretty unclear).

One or two of these we could live, but in combination they basically make github completely unsuitable.

They have added 2 factor authentication recently, and there is an API so that organisations can at least check if users with access to their repositories have two factor authentication enabled. Whilst I don't feel this is really the best solution, it probably just about moves github into being secure enough that it can be considered for private repos.

As mt3 notes, you can run an enterprise install instead, which presumably significantly improves security - but the cost difference between that and a standard github company account is staggering, and it would probably mean you miss out on all the third party tools that integrate with github.

On a non-security note, they do at least now support annual billing properly, which helps reduce the paperwork overhead.

GitHub have recently [announced new business plans with extra features](#) - this could solve '1'/'4'/'5'. (Though the 'uptime guarantee' that's part of it is pretty laughable - not even "four 9s", and excludes scheduled maintenance and anything they deem 'outside their reasonable control' - and it's not an actual guarantee, it's just a small credit against your next bill which is capped to be no more than a third of your bill. Basically very carefully worded marketing weasel words instead of any kind of commitment from them.)

Answer2: How long is a piece of string?

This is a pretty hard question to answer.

Looking at their [security page](#) they seem to have pretty much everything covered, assuming they actually do all that stuff.

You could argue that putting your code on github is more secure than having it stored on an in-house server, many companies would not have as good a setup or security policies as github describe. Does yours?

Answer2: You are not very clear about who a partner is; or whether you are protecting access to data, limiting API calls, or both.

What you are doing is likely to be very specific to your business. Assuming you need to protect the data that the services provide access to you need to authenticate each user and protect the transport layer. For the former you need to have user name and password or unique API token for end users. This should be checked on every request. The transport security can be enabled using SSL if you are using HTTP for your services. It is generally

easiest to enable this at the web server level, you don't mention that you are doing any special hosting of web services.

Assuming that this security is in place, it should provide a foundation for auditing which is what I assume you mean by log calls. The username or API token will give you an idea about who is making a call which is fundamental to auditing. Next create a list of data you would like to see an the audit trail. Ask a business user if the info logged can help deal with the questions you have (what is driving you to add logging).

The next things to consider is where the logging code should go (is there a central point? do you use AOP to add it?), and where the audit trail should be logged to. There are tools like [PostSharp](#) that let you weave logging through your application without a great deal of modifications, but before doing this see if there an easy way to add a log function to a common location in you application to 'trap' the information you need.

Once you have your hands on the data you need to save it somewhere. This is where things can get interesting. You will need to understand the performance characteristics of your application, and what usage patterns are likely. In many applications it is OK to just log to a database, but at times this will be a performance problem. Logging to text files is OK for some people, but what if the data needs to be related back to your user database? In that case you need some code to process the log files an import data.

Before you spend too much time building any logging code it is worth looking at [NLog](#), [Log4Net](#), and the Enterprise Library [logging block](#). These are general purpose tools that might provide a better foundation. If you need to enforce user quotas you might want to consider how quickly your log can be processed to determine how many calls a user has made. Ideally each time you process an incoming request you would have the current status of a user on hand to be able to return an appropriate response. It can be an effort to add this functionality into existing applications, and provide the 'infrastructure' to support it.

Whether to use REST, JSON, XML, SOAP etc really depends on your audience. Are they going to be using languages like Ruby and Python to call your services, or will they be using .NET? If they are going to be mainly .NET users then it may not make a lot of sense to build purely REST interfaces using JSON since .NET makes SOAP very easy. On the other end of the scale SOAP and XML suck if you are using JavaScript on the client side. Just remember that there is no right answer without more information on your users. Generally JSON is not a panacea, and XML is not always the worst option.

Update

I am not interested in surveying our partners for which formats/protocols they'd prefer, since one of the requirements is the ability to add new partners without IT involvement. I'd just like some tips on best practices, so that we're doing it the "right" way and they can conform.

The most flexible option is likely to be REST and XML. This most broadly supported since almost all platforms have an HTTP stack. XML is arguably more flexible than JSON to represent your data. I would start here and work back in terms of support, maybe adding JSON. However this not what I would call a customer focused approach. If this is a core feature of a platform you should really take an interest in what your customers want. Hey even if you do a quick survey today at least you'll have a more reasonable starting point. If you know any developers at partners then you might be able to surmise what they would prefer from the tools and languages they use (even going as far as looking at their job ads might give you some idea of whether they are a .NET or Java shop - far from a scientific approach though)

Answer3: To restrict access to your web services, an option would to implement a custom authentication mechanism based on custom soap headers. It's not really complicated and you won't sacrifice interoperability. There are plenty of article to do this on the web, e.g.: [Build Secure Web Services With SOAP Headers and Extensions](#), [Authenticate .NET web service with custom SOAP Header](#), etc.

Or you could have a look at WS-Security and the forthcoming WS-Authorization to deal with concepts like identification, authentication and authorization (see [An Overview of the WS-Security Framework](#)). But actually, I don't know the Microsoft Web Services stack well enough to provide valuable pointers.

Regarding the logging of the calls, I don't see any particular difficulty. Once the restrict access will be implemented, you'll find out what to log and where.

121.<https://stackoverflow.com/questions/30381313/what-is-the-best-way-to-create-interfaces-that-are-injected-into-constructor-in/30384934#30384934>

Title: What is the best way to create Interfaces that are injected into constructor in C#? [closed]

Question: It helps us in unit tests because we create mock implementations of these interfaces.

When developing the code, there are some common functions between all classes such as Datetime operations, Fixed values methods, etc. I decided to create some static classes to divide this functionality into specific classes such as DatetimeHelper, FixedCalculationsHelper, StringHandlingHelper, etc.

I got the suggestion to avoid using these static classes and convert them into strategies with interfaces and pass them in the constructor as the other external data access interfaces.

1. When I apply this, the constructor of my classes will have a lot of Interface parameters, such as:

```
public Dog(IDataAccess dataAccess, IConverter converter, IConfigAccess configAccess,  
ITimezoneAccess timezoneAccess, IStringHandling stringHandler, IDatetimeHelper  
datetimeHelper ...etc...
```

What is the most elegant/best way to handle with this scenario? (Not sure if some techniques are used here such as a container or something similar)

2. Why is it better to convert this static classes into interface/implementation strategies (even if these methods are static such as CalculateArea(int value1, int value2))?

Any comment or explanation is very welcome. Thanks in advance.

122. <https://stackoverflow.com/questions/28035576/im-looking-for-suggestions-on-how-to-store-things-of-value-in-my-db/28035741#28035741>

Title: I'm looking for suggestions on how to store things of value in my db

Question: I have a requirement (pending) that allows the user to buy "credits" and then to trade those credits for real goods or services.

This is the first time I have had to do this in an application and I am concerned it would paint a target on my database's back. A hacker could (in theory) change the amount of credits a user has and then "spend" those credits, or convert them to cash.

I'm building the solution in ruby/rails, but I am not limited to this tech. I can even use an outside provider if it's more practical.

Does anyone have any suggestions on how to do this? Would you encrypt your DB? Would that be enough?

Answer: There are a lot of different things to consider. When it comes to matters of security, there is never a silver bullet (anyone who suggests that is likely selling snake oil); rather, security often involves many different steps to mitigate and manage risks and also redundant layers of protection so that one is still protected if some subset of those layers fail for whatever reason.

In terms of storing monetary transactions, there are often a number of legal regulations that need to be followed, so I suggest consulting those in addition to other security measures. In terms of encrypting the database, there are many different ways to apply encryption... one can encrypt the database as a whole or individual rows of the database using different keys. If you just encrypt the database as a whole, it won't provide you much protection if someone has access to the key (which also begs the question of who has the key, where is it stored, etc.?). What you probably want, in addition to the database itself, is a write-only log of transactions with some sort of checksumming so that you can be assured of its authenticity that provides you with an audit trail that is independent of the database (and from which the database could be reconstructed in the event of some sort of breach). In addition, you'll want to ensure that only authorized applications (such as your production instance of your frontend server) can talk to and decrypt the database (and ensure that only a very limited number of people you trust can deploy new versions of those, so that no one can arbitrarily deploy malicious versions that abuse that access). If it's possible to independently encrypt individual rows with different keys (e.g. to encrypt each per-user row with key material derived from the user's login credential), then that is highly advisable (though this is not always possible to do, such as if you need to be able to process that row even when the user is not actively interacting with your application). I'm sure there are other things that I have not thought of, which is

why you'll also want to regularly conduct penetration testing to check for any vulnerabilities (and not only fix anything you discover this way, but also use it to inform projects or processes that you can employ to prevent similar vulnerabilities in the future).

In addition to the security considerations, monetary transactions is one of the few cases where "eventual consistency" doesn't really work; you'll need to make sure that you are careful in your programming to make transactions appropriately atomic. That is, you wouldn't want the number of credits to decrease at a separate time step from the dispersion of dollars, as that would allow the same credits to be spent twice... you'll want to be very careful in your coding that the decrease in credits and increase in dollars (or vice-versa) happen simultaneously. For this and other reasons thorough testing and good code review practice is a good idea.

123.<https://stackoverflow.com/questions/11086388/is-there-an-example-of-a-twelve-factor-app-with-tweaks-specifically-for-a-net-t/11250698#11250698>

Title: Is there an example of a twelve-factor app with tweaks specifically for a .NET/TFS environment?

Question: There is an excellent document called the "Twelve-Factor App" (<http://www.12factor.net/>) in which the authors attempt to define the perfect way to design, build, and deploy a modern app-as-a-service. The document is very general and in many cases the practices described are not optimal, not easily possible or in contravention of Microsoft's best practices. eg: The document discourages using config files but rather to use environment variables for config. This would seem incorrect in the .NET where it is common (best?) practice to use XML config files.

In an ideal world (i.e. forget budget/technical/skills constraints) in an organisation where the Microsoft platform has been chosen as the platform of choice for all deployments and .NET/TFS the development environment/tools of choice how would one follow the guidance in the Twelve-Factor App?

Are there any good examples of such an application (perhaps an open source one that has an excellent reference architecture)?

Answer: 12

+50

I have read the part about configuration, and the authors clearly don't understand the use of configuration files in .NET. The issues they express are issues we used to have with .ini files. These issues do not exist with .NET because:

1. A "desktop" application will have a single config file per deployment. "app.config" will exist as program.exe.config deployed to the same folder as the application.
2. In a web application, a hierarchy of web.config files will exist, again, in well-defined locations, and with a well-defined name.
3. The web.config transforms feature in Visual Studio 2010 permits the main configuration file to be checked into source control, along with transform files which specify how to automatically edit the main file for each build configuration (environment). All of these files may be stored in source control.
4. While it is the default for credentials to be stored in such files (and therefore checked into source control), this is not necessary.
5. At least in the case of web applications, the MSDEPLOY feature of IIS along with the Web Publishing Pipeline of Visual Studio 2010, permit the deployment to be parameterized. By default, this includes parameterization of connection strings, one of the main areas where credentials are likely to occur. This can be extended to include parameterization of all credentials or other sensitive data, so that developers do not have access to this information. The parameters may be filled in as part of the deployment process.

Answer: 12 Factor has 3 "requirements" for configuration.

1. Don't store configuration in code
 2. Don't put your configuration in source control (or in a format that's likely to end up in source control). They want a "single codebase".
 3. Put your configuration in a format that's accessible to any technology stack (.NET/Java/Ruby/.. etc).
- I'd say that .NET config files comply with half of these.

1. Config files aren't in code (pass).
2. Config files don't have to be in source control, but they often end up there (fail).
3. Despite being in XML format and accessible to other technologies, .NET config files have a lot of .NETisms. Schema for configsections are provided by .NET types, so a Java app couldn't verify the schema. (half-credit).

While I can agree with the intent of their requirements, I think that their suggestion of Environment Variables is a bad suggestion. They chose Environment Variables because they view them as a lowest common denominator and available on all platforms, but they really might not be available on all platforms. If you're running in a partial-trust web app (common on a shared hosting platform), you might not have access to get/set environment variables.

Environment variables are set per machine. If I have to make a configuration change to my production environment I want to make it once, in one place, for all servers. Environment variables don't let you do that.

While I can see their point that you don't want secrets stored in version control that are accessible to all developers. There are definitely benefits to version controlling your configuration. When your production environment goes down because of a configuration change, it's easy to ask .. "what changed"? The audit trail left by someone just ssh'ing to a prod machine and setting an environment variable might not be so easy to trace. Having said that, I often don't store my configuration files in the same part of version control as the rest of the code. I put them in a folder that has restricted security so that only the necessary people need access. You could conceivably take that a step further and put them in a different project.

I'd be willing to bet that they violate their own rules of not putting configuration in files. For example. The first bullet point on their home page is "Use declarative formats for setup automation, to minimize time and cost for new developers joining the project;" I'm betting that all those config settings that aren't supposed to be in a file anywhere are in a chef recipe. To achieve the goal of automation, you have to persist them in some file somewhere. And I'd be surprised if someone that spent a lot of time getting a chef recipe right didn't store it in version control somewhere.

I think they could have written the configuration page differently and just said keep your configuration separate from your code. Keep it in separate files (don't embed it in code), and store it somewhere separately (don't put it in the same repository). Your deployment process will bring these back together (code and config) into one deployable package, but they should be separate until that point.

My suggestion for configuration would be to treat the configuration as an "attached resource" and store it in a backing store (a database). This makes your app tier even more stateless which is another one of their goals.

124. <https://stackoverflow.com/questions/30984990/umbraco-v7-audit-trail-history-information>

Title: Umbraco V7 Audit Trail History Information

Question: I have done several google searches and even several searches in the Our Umbraco forum (<http://our.umbraco.org/forum>) and stackoverflow (<http://stackoverflow.com>) which have resulted in little to no information about the Audit Trail functionality in any version of Umbraco much less the newest version 7. So hopefully someone can answer the following questions about Umbraco v7 Audit Trail Functionality:

1. What is the basic functionality offered in Umbraco's Audit Trail?
2. Where is the documentation describing this basic functionality?
3. Is there any default functionality around trimming or deleting these audit trails in Umbraco?

4. If so, can you turn the trimming/deleting feature off?

I have a client that wants to be able to query audit log data for all time of their website once they go live in production. My hope is that this is the default functionality of Umbraco but please help me understand how I might change this if this is not the case.

Answer: The Audit Trail logs the changes to a document. It logs the node id, the date/time, the user and the action that was performed.

From my experience the Audit Trail is not trimmed or deleted.

The Audit details are stored in the umbracoLog table in the database. Looking at the data in the table can give you better insight than through the Umbraco Backoffice if more detail is required. The Backoffice will only show the activity on a given document so it is not possible to see history across the site. The data in the table also gives you access to delete actions. It is not possible to see when something was deleted in the back office. The table only stores the node id so it does have to be joined with the other tables to get document names.

Also see Dan Diplo's [Audit Log Viewer](#) package.

125. <https://stackoverflow.com/questions/4216262/using-oracle-streams-to-implement-audit-trails>

Title: Using Oracle Streams to implement audit trails

Question: I'm going to implement asynchronous audit trails functionality for highly loaded system with using of Oracle Streams (for log mining on redo and archive logs). Audit trails in my case mustn't slow down any DML operations over set of my tables. Also audits must contain additional information about end user identity and date and time of modification.

Does someone have experience in implementing audit trails with using of Oracle Streams? Is it good idea to move this way?

Is there any tutorials exist with tips and tricks about implementing audit trails with using of Oracle Streams?

Answer: Oracle claims the auditing features in the database create an insignificant amount of overhead. Have you tried those as a test case to see how it performs? It doesn't require any DML triggers on the tables. I've used them and got no noticeable difference but the system resources weren't maxed out either.

Using streams for auditing sounds possible but I think it's an overly complicated solution. I suppose you could use streams to replicate transactions to another database and then use the auditing in that database. You're still going to add I/O load to wherever you store your redo logs.

126. <https://stackoverflow.com/questions/24506314/audit-trail-for-specific-controls-in-presentation-layer>

Title: Audit trail for specific controls in presentation layer

Question: I have a project using ASP.NET with a MS SQL DB, using LINQ classes and require change tracking / audit trail for specific fields. Since the project is quite big, adding the audit-trail functionality manually would be cumbersome. Also, tracking ALL changes on the data-layer would not be perfect (since I also have to handle external data, coming from JSON files sent by HTTP POST, and more ...).

My idea is to implement the usual audit-trail functionality (which is discussed and shown in various other questions/tutorials and should not be the issue here) by extending the existing ASP.NET controls (such as asp:TextBox, asp:CheckBox, asp:DropDownList, etc) with a simple property "bool auditTrail", which can be set to TRUE in my .aspx-file and then tracks the changes in code-behind. This functionality would simply speaking just store the origin page, element #ID, old + new value, logged user and timestamp.

Can this be done - more or less easily? To be honest I am quite firm in ASP.NET but not-so-firm when it comes to extending existing classes. Or maybe the whole idea has a big flaw and you can point me to the right direction? I found solutions using NHibernate, but, if possible, I would prefer to avoid external dependencies

Answer: Also "Thinking out loud"... I'm thinking that the controls you suggested in your question are server controls. this means that on selecting/clicking they will produce a postback. @konrad_pe can I suggest that perhaps a HttpModule would be a good idea to tackle your problem? since HttpModules are hit for every request you could query the form data for the control that caused the request and take it from there.

I read similar here: [Get which control...](#)

I hope this gives you another point of view and you find it interesting enough to explore. Good luck!

127. <https://stackoverflow.com/questions/711597/is-this-the-best-approach-to-creating-an-audit-trail>

Title: [Is this the best approach to creating an audit trail?](#)

Question: I'm trying to create some functionality that keeps an audit trail of how data in a given user form has been changed over time, with a dated audit at the foot of that page. For example:

02/04/09 21:49 Name changed from "Tom" to "Chris".

I'm doing this by storing the data in its present format in the session and then on save checking whether there are any differences in the data being stored. If there are, I'm storing the data how it was before the latest edit in a table called history, and storing the new values in the current user table.

Is this the best approach to be taking?

Answer: ne suggestion; this would be relatively easy to do in a database trigger. In that case, you would never have to worry about whether the code running the update remembers to add a history record.

Answer2: I'm not sure there is one "best approach", there are so many variables to take into consideration, including how far down the development path you are.

Having been through both code-based and db-trigger auditing solutions, I've listed some comments below; I hope you can see where you are now at (in terms of development) could affect these issues:

- If you need to map the user who changed the data (which you normally do) then db triggers will need to get this information somehow. Not impossible, but more work and several ways to approach this (db user executing query, common user column in each table, etc.)
- If you use db triggers and you rely on affected rows count returned from queries, then your audit triggers need to have this turned off, or your existing code modified to account for them.
- IMHO db triggers offer more security, and offer an easier path to audit automation, however they are not foolproof, as anyone with appropriate access can disable the triggers, modify data and then enable them again. In other words, ensure your db security access rights are tight.
- Having a single table for history is not a bad way to go, although you will have more work to do (and data to store) if you are auditing history for multiple tables, especially when it comes to reconstructing the audit trail. You also have to consider locking issues if there are many tables trying to write to one audit table.
- Having an audit history table for each table is another option. You just need each column in the audit table to be nullable, as well as storing date and time of action (insert/update/delete) and the user associated with the action.
- If you go with the single table option, unless you have a lot of time to spend on this, don't get too fancy trying to audit only on updates or deletes, although it may be tempting to avoid inserts (since most apps do this more often than updates or deletes), reconstructing the audit history takes a fair bit of work.
- If your servers or data span multiple time-zones, then consider using an appropriate datetime type to be able to store and reconstruct the timeline, i.e. store audit event date in UTC as well as including the timezone offset.

- These audit tables can get huge, so have a strategy if they start affecting performance. Options include table partitioning onto different discs, archiving, etc. basically think about this now and not when it becomes a problem :)

128. <https://stackoverflow.com/questions/39953506/collecting-checkpoint-firewall-rules-using-opsec-api>
 Title: Collecting CheckPoint Firewall Rules using OPSEC API

Question: I need to collect Firewall Rules data belonging to my client remotely using OPSEC API. I researched a little bit on the net and found out that I could use OPSEC API's LEA(Log Export API)(more info: <https://www.fir3net.com/Firewalls/Check-Point/a-quick-guide-to-checkpoints-opsec-lea.html>). I also found out that there is a project named fw1-loggrabber (<https://github.com/certego/fw1-loggrabber>). I am quite new to network security and practically do not know anything about CheckPoint Firewalls. So my question is a brief explanation on the basics of Firewall Rules for CheckPoint and how to collect them using OPSEC API. More specifically are the rules included in the checkpoint logs or is there a specific method in LEA to grab the rules?

Answer: To collect firewall rules you can't use LEA, this API is able to work with CheckPoint logs.

To read rules and objects you need to use CPMI API. There are some samples at CheckPoint website, ask for your customer to download the documentation and sample.

CheckPoint OPSEC Documentation:

https://supportcenter.checkpoint.com/supportcenter/portal?eventSubmit_doGoviewsolutiondetails=&solutionid=sk63026

129. <https://stackoverflow.com/questions/23624209/checkpoint-vpn-issue-connectivity-with-vpn-service-is-lost>

Title : Checkpoint VPN issue: Connectivity with VPN service is lost [closed]

Question: I installed checkpoint E75.30 Client for windows 8 SecuRemote. When I try to do anything with the SecuRemote (see client; add client; see options) all I get is "Connectivity with VPN service is lost" I looked at the services and Check Point Endpoint Security VPN service did not start automatically. When I try to start it manually I get Error 1075: Dependency service does not exist or has been marked for deletion Dependency service is DHCP client which is running fine... Any ideas?

Answer: I managed to fix this issue on Windows 7 by going to

1. Control Panel
2. Programs and Features
3. Check Point Endpoint Security VPN
4. right click
5. repair

Answer2: It's happening a lot in windows 10 updates. To solve, just found the Check point services, there are two, and start then. In msconfig, check the services to start with windows. I don't know why, windows 10 updates disable this services.

Answer3: I found a solution to this problem.

I had McAfee installed on a new laptop (win 10 x64). Installed VPN, Error connecting. Uninstalled McAfee. Error. Repaired Checkpoint VPN. Error. Restart and repair. Error. Always got the error "*Unable to load Virtual Network Adapter*".

I am a contractor to a client who uses Checkpoint so cannot view checkpoint's KB articles. So cannot view any of their solutions. Client cannot give me login.

So. Finally figured this out:

1. Click **Start**, click **Run**, type cmd.exe, and then press **ENTER**.
2. Type set devmgr_show_nonpresent_devices=1, and then press **ENTER**.
3. Type Start DEVMGMT.MSC, and then press **ENTER**.
4. Click **View**, and then click **Show Hidden Devices**.
5. Expand the **Network Adapters** tree.
6. Right click on **Check Point Virtual Network Adapter For Endpoint VPN Client** select **Disable** and then again and **Enable**
7. Attempt to connect now.

Thanks to [This Link](#) for steps 1-5.

Answer3: I am not sure if you are still getting this error, or if you have resolved it, but I was having the same problem and found this question.

I was getting the same error message, but I was able to restart the service without any errors.

Here are the dependant services that I have running:

- Check Point Virtual Network Adapter - Apollo
- DHCP Client

DHCP Client is dependant on the following:

- Ancillary Function Driver for Winstock
- NetIO Legacy TDI Support Driver
- Network Store Interface Service

Have you checked if those services are running? Try restart them if possible.

[This page](#) recommends deleting the services and restarting your machine. I would create a restore point before you try deleting any services

130. <https://stackoverflow.com/questions/11380752/which-security-packages-exists-for-smalltalk/28734312#28734312>

Title: Which security packages exists for Smalltalk?

Question: I'm looking for a package in any Smalltalk dialect that provides me to provide several security features for my system. For example: To manage failed logins, brute force attacks, user/password organization, ACL's, check points, etc. It could be based in roles or capabilities. If you could share your experience with the library it will be even better to gain some additional insight.

Answer1: The Application Security package in Pharo implements the CheckPoint security pattern, uses the Nacl cryptographic library (SHA-512 through the libsodium binding), an user model supporting groups and candidates, network security utilities like network class based filtering, and password rules as recommended by the FIPS. Sample code is provided in SUnit tests and linked blog posts.

Answer2: I am not aware of such a library.

The Pier content management system has a sophisticated security system, modelling users, groups and permissions. This is used in most Pier sites to have a fine-grained access control over parts of the site (e.g. visitors that see only the public parts, editors that can edit the public parts and see some internal things, admins that have access to everything).

Also there used to be a pluggable security system based on ACL for Pier. It is not maintained anymore, but you might leverage code from there.

131. <https://stackoverflow.com/questions/6102957/is-ssl-for-wcf-needed-when-using-transport-security>

Title: Is SSL for WCF needed when using Transport Security?

Question: OK I am probably getting too far in the weeds with my WCF configuration and can't see the forest through the trees, so I want to checkpoint on security.

I have (2) bindings exposed in a WCF service for options on the client side consuming: netTcpBinding and wsHttpBinding (both fine and working). I have both configured with the default: clientCredentialType="Windows". I have the wsHttpBinding configured to use a SSL certificate and expose the endpoint via https (I want this), and also have an SSL cert configured for the netTcpBinding to use SSL over TCP (I want this too).

Here is where I keep getting mixed information. Apparently "Transport" security is inherently secure. Does this mean I do *not* need a SSL cert then if I want to secure the Transport layer?

Answer: I had to do a lot of reading between multiple articles to get the details I was looking for from my original post. The information that helped things to clear up a bit for me was the following:

Each protocol (TCP, HTTP, MSMQ, NamedPipes) has its own mechanism for passing credentials and handling message protection.

Above is from the [WCFSecurityGuide](#)

Coming from a primarily web background I have a pretty good understanding of HTTP and securing it with a SSL cert. However this exact procedure is not required in a Windows environment for net.tcp which uses its own method in Windows to secure the transport layer.

So when it gets down to it, here are the (2) explanations in regards to securing a HTTP binding and net.tcp in a Windows environment that I wanted to understand:

For net.tcp: *The service and clients are authenticated using Windows authentication, and the messages are secured at the transport level by Windows security*

For a HTTP binding (i.e. wsHttpBinding): *When using HTTP bindings, the transport security is provided by SSL. The SSL certificate is used to provide the message protection.*

So I will *not* need a SSL cert for the net.tcp binding as that is handled by Windows Security and is inherently secure when using Transport security. When using a wsHttpBinding I will still need to secure the Transport with a SSL certificate which I had done as mentioned previously, and exposed the binding via HTTPS.

If any future readers have similar questions the WCF guide link I posted and the link below are a good place to start:

Common WCF Security Scenarios:

<http://msdn.microsoft.com/en-us/library/ms730301.aspx>

Answer2: In this setup, "Transport" security is how you tell WCF that you really want it to use SSL. In order for SSL to work you need a server certificate that the client can verify (either from a signing authority or a self-signed one that you install on the client).

So you've got it right. :)

132. <https://stackoverflow.com/questions/19890635/do-commercial-firewalls-have-api-remote-cli>

title: [Do commercial firewalls have API / Remote CLI? \[closed\]](#)

Question: I mean firewalls like Checkpoint, Fortigate, sonicWALL etc. Do they have have API or Remote CLI ? can i, for example, send them a remote call to filter in\out a certain port? I Just want to know if that's possible, if you have examples that's awesome, but evena simple "yes, Checkpoint and soincwall does that" are great!

Answer: I only have some experience with Fortigate-firewalls. They usually have SSH.

This means you could use a command like this:

ssh <hostname _ or _ IP> -t "echo 'hello world'"

to sumbit your new rules to your firewall.

133. <https://stackoverflow.com/questions/50328936/is-sending-customer-data-via-javascript-post-messages-forbidden-from-security>

Title: Is sending customer data via Javascript (post messages) forbidden from security perspective?

Question: We have a child iframe (3th party) which wants to communicate with the parent (my account section). The iframe sends facebook id and receive registered user phone number. If we follow all post message security checkpoints like:

- configuring the targetOrigin on both side
- checking event.origin for both iframe and parent
- sanitize the input in order to not allow xss attacks (script tags)
- checking if the messages in a specific format (json and with some specific keys)
- checking if the user is authenticated on parent side

are there any other security concerns that can make this method unsuitable for sending customer sensitive data?

Answer: Use HTTPS. To address the title - no, otherwise you literally cannot send customer data in any way. HTTPS should be your first idea, so you don't send data in plain text, thus it cannot be (easily) intercepted and captured.

134. <https://stackoverflow.com/questions/40403229/how-do-i-get-rid-of-the-error-self-signed-certificate-in-certificate-chain-in>

Title: How do I get rid of the error “self signed certificate in certificate chain” in VS Code when installing plugins?

Question: I have installed VS Code (Windows 7 x64) and when I try to install any plugin I get the error “self signed certificate in certificate chain”. I set "http.proxyStrictSSL": false and it helped me to get list of plugins but when i push the install button I get the error.

I have not set the proxy settings on my computer but I know that the network in my office is protected by CheckPoint firewall.

Can I somehow solve this problem to install plugins in VS Code? Or if I need to ask our security service for some extra permissions what kind of permit is required?

Answer: I know this is an older post, but I ran into the same problem... maybe this will help someone. I got it to work by using the setting you mentioned, as well as running as Administrator.

135. <https://stackoverflow.com/questions/31832876/createobject-randomly-fails-since-recent-windows-security-update-that-does-not-s>

Title: CreateObject randomly fails since recent windows security update that does not seem related

Question: We use MSWC.BrowserType (browscap.dll) in our classic asp website to help identify user agents.

Since July 21 our code began to throw Server.CreateObject failed errors when trying to create this object. It works most of the time, but randomly fails several times each day.

I was on vacation when the problem began, I know we didn't change anything in our code or system configuration, the only thing I see is the windows update kb3079904 that was installed on the July 21, but it does not seems related because it is about font driver !?

I wonder if someone else have the same problem or have an idea how to solve it, I did some research about intermittent createobject failing but didn't find anything relevant.

I may try to restore the system to the checkpoint before this update to see if it is really the cause, but this is an important security update and I will have to re-install it after so it may not solve the problem.

Answer: It turned out to be related to this other post, object creation failed because the component likely uses the cookie collection.

Response.Cookies collection seems corrupted and causes error.

136. <https://stackoverflow.com/questions/52418049/which-security-parameters-to-consider-before-third-party-sdk-integration>

Title: Which security parameters to consider before third party SDK integration

Question: Working towards security is critical for any project. Currently looking towards integration of an third party SDK into my iOS App. However before that I would like to thoroughly analyse and scrutinize the SDK.

Some of the checkpoints are -

- Pasteboard Analysis
- Use of private API's banned by Apple e.g CTTelephonyNetworkInfo
- Database encryption (if any is created by the SDK)

What I looking for as an answer here is the way I can achieve the above plus any other things that I should look for.

I know the question might sound off the topic or rather like a discussion, but a checklist like this can turn out to be very important for all developers out there.

Answer: So I was able to check a simple checklist for this. However, I believe this answer would get out of date rather sooner. Still I will share what I should.

• Pasteboard analysis - This is to check if the SDK copies anything on the public pasteboard. As this is shared across all apps, it could lead to vulnerability.

- Persistent Data - Add the SDK to the app and check if it creates any persistent storage like .sqlite file. Check the contents of this file to understand what is being stored and if this information is sensitive in any way.
- UserPreferences - NSUserPreferences can be extensively used in any SDK, this can rather lead to data being stored into simple text format.
- Private API usage - An SDK can use private iOS API's with help of methods like NSClassFromString and NSSelectorFromString. The usage for such API's is banned by Apple and can lead to rejection in review.

One can closely follow the following post. It would help to understand how to take a class dump. Check for hardcoded strings. Specially usage of Hopper Disassembler turned out helpful for me.

137. <https://stackoverflow.com/questions/13552735/java-web-service-client-acesso-by-vpn/18182907#18182907>

Title: Java web service client acesso by VPN

Question: im trying to acces a web service by VPn andi mgetting connection refused.. I can ping the adress and i can access web service if im not working with VPN,but this way i cant. Do i need to do something when im inside VPN?? Code is below..

Answer: This is not related to java web services. This is a networking issue. If you can't ping the machine when you are using VPN you should look into your network topology and routing.

138. <https://stackoverflow.com/questions/41729120/using-regex-to-split-text-content-into-dictionary>

Title: Using regex to split text content into dictionary

Question: I have a xPage application which shows list of emails of the currently logged user. Using some button user can remove selected email from inbox and put it into another folder.

UI works fine except the fact that document.removeFromFolder and document.putInFolder in my JAVA backend class throws an error "Notes error: You are not authorized to perform that operation (\$Inbox)". There is the same error for removing or putting document from/into inbox/another folder. But ACL is correct, user can create emails, delete them ...

Has anyone some hint whats wrong here?

Here is the error message I'm getting(just a small part):

```
JavaScriptMethodBinding.invoke(JavaScriptMethodBinding.java:111) ... 32 more Caused by:  
NotesException: Notes error: You are not authorized to perform t hat operation ((\$Inbox)) at  
lotus.domino.local.Document.removeFromFolder(Unknown Source)
```

Answer: There are a number of checkpoints to watch out for:

- If you use "session as signer that signer needs to have access to the mail file
- If application and NSF are on different servers you need a setting in the server document needs to include a trust relation for these servers. That's the server document - Security - left column, bottom: Trusted servers.
- I presume the servers have ACL access.

139. <https://stackoverflow.com/questions/41442093/pyqt-application-debugging-does-not-work-in-eclipse>

Title: PyQt application debugging does not work in eclipse

Question: I am currently writing my first PyQt application using eclipse. I have used qt designer to develop the main window gui and i am able to run it without problems in eclipse.

I noticed however that when I try to debug it in eclipse that this doesn't work... It seems to go wrong on the first qt related line of code: app = QtGui.QApplication(sys.argv)

As a test I used the same code and debugged it with IDLE (python GUI) and then everything is ok (I can set breakpoints and step through the code).

I did already add the location of PyQt to the python path of PyDev (c:\python27\Lib\site-packages\PyQt4) in the external libraries section, but this doesn't seem to fix the issue. The debugger always terminates with exit value -1073740771.

Answer: It does work fine for me here (both in PyQt4 and PyQt5), so, it's probably something in your configuration...

One note:

Don't add the folder site-packages\PyQt4 to the PYTHONPATH. If you're importing as import PyQt4, only the parent folder should be in the PYTHONPATH (i.e.: site-packages in your case).

Some notes on how to tackle the issue:

1.If the simple hello doesn't work, try to work on that first.

2.Try to make the regular run (just F9 with the focus on the editor) before the debug run (see: http://www.pydev.org/manual_101_run.html for more details on running a module).

3.Print the PYTHONPATH on the case that works and in the case that doesn't work and make sure that you update your interpreter/project configuration so that it's the same (see: http://www.pydev.org/manual_101_interpreter.html and http://www.pydev.org/manual_101_project_conf2.html for how to change those configurations).

i.e.: run: `import sys;print('\n'.join(sorted(sys.path)))` in both and compare the results.

4.If it's still a no-go, try to compare the environment variables on both cases (mainly PATH on Windows, LD_LIBRARY_PATH on Linux and DYLD_LIBRARY_PATH on Mac).

i.e.: run: `print('\n'.join(sorted(os.environ['PATH'].split(os.pathsep))))` where it works and compare with what you have in PyDev.

If it still didn't work, please give more details on your actual example along with your python version and the info on your PYTHONPATH and PATH (with the prints from items 3 and 4 above) as it may be related to that.

140. <https://stackoverflow.com/questions/37942656/for-azure-web-applications-how-do-you-monitor-security-threat-traffic/38080528#38080528>

Title: For Azure Web Applications, how do you monitor Security Threat traffic?

Question: I want to monitor any suspicious traffic into our Azure web application. I want to know the IP addresses and what they are probing with a view to blocking those IP addresses. I am mindful of trying to protect the application via secure coding practices, but also I feel a little blind to what is hitting our site at present.

I have looked at what Azure provides, but cannot see anything obvious in terms of some form of dashboard. I may be looking in the wrong place.

It may be that I need a proper Web Application Firewall to do this, and Azure does not provide this ?? The only one I am sort of familiar with is Cloudflare, but for other reasons, we cannot use it at present, although these could be surmountable.

So how are folks monitoring their "attack interfaces"?

Answer2: If you're referring to Azure Web Apps there is a log that displays very detailed information about the requests made to your website. The logs are the Web Server logs which are in the W3C extended log file format and may contain the information you're looking for. You have to enable these logs under diagnostics for the web app.

You can view these logs by downloading them or streaming them via PowerShell or azure CLI. You may also find the Kudu site that comes with web apps helpful. It can be found at <https://your-web-app.scm.azurewebsites.net>.

Answer2: You are correct, Azure web apps by itself does not offer extensive security monitoring. While ApplicationInsights and ApplicationInsights Analytics can give you a lot of data for monitoring, it does not target security specifically. It will tell you which IP address is probing what and with which result, so I would start there and see if it fits your requirements.

If you want to do security monitoring, packet inspection, etc., your best bet is to use a virtual appliance in Azure. The Azure marketplace offers security/WAF appliances from Checkpoint, Barracuda, Cisco, F5, etc. that might fit your needs. These virtual devices run on virtual machines in Azure and have a public IP address on the outside for incoming traffic which they can route to internal (vnet) or external (webapp) resources. While these are generally very powerful solutions, they come at a cost.

A possible set up might be to use an appliance like this to offload SSL, inspect traffic on the appliance and then forward traffic to the web app (over http, within the same datacenter). If the appliance of your choosing does not allow SSL offloading, you might place an Azure Application Gateway in front.

Again, start with Application Insights and see if it works for you. If not, do a price/feature comparison on the various virtual firewalls/security devices.

141. <https://stackoverflow.com/questions/37942656/for-azure-web-applications-how-do-you-monitor-security-threat-traffic/38080528#38080528>

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I have looked at what Azure provides, but cannot see anything obvious in terms of some form of dashboard. I may be looking in the wrong place.

It may be that I need a proper Web Application Firewall to do this, and Azure does not provide this ?? The only one I am sort of familiar with is Cloudflare, but for other reasons, we cannot use it at present, although these could be surmountable.

So how are folks monitoring their "attack interfaces"?

Answer: If you're referring to Azure Web Apps there is a log that displays very detailed information about the requests made to your website. The logs are the Web Server logs which are in the W3C extended log file format and may contain the information you're looking for. You have to enable these logs under diagnostics for the web app.

You can view these logs by downloading them or streaming them via PowerShell or azure CLI. You may also find the Kudu site that comes with web apps helpful. It can be found at <https://your-web-app.scm.azurewebsites.net>

Answer2: You are correct, Azure web apps by itself does not offer extensive security monitoring. While ApplicationInsights and ApplicationInsights Analytics can give you a lot of data for monitoring, it does not target security specifically. It will tell you which IP address is probing what and with which result, so I would start there and see if it fits your requirements.

If you want to do security monitoring, packet inspection, etc., your best bet is to use a virtual appliance in Azure. The Azure marketplace offers security/WAF appliances from Checkpoint, Barracuda, Cisco, F5, etc. that might fit your needs. These virtual devices run on virtual machines in Azure and have a public IP address on the outside for incoming traffic which they can route to internal (vnet) or external (webapp) resources. While these are generally very powerful solutions, they come at a cost.

A possible set up might be to use an appliance like this to offload SSL, inspect traffic on the appliance and then forward traffic to the web app (over http, within the same datacenter). If the appliance of your choosing does not allow SSL offloading, you might place an Azure Application Gateway in front.

Again, start with Application Insights and see if it works for you. If not, do a price/feature comparison on the various virtual firewalls/security devices.

142. <https://stackoverflow.com/questions/7603644/intermittent-missing-email-address-in-facebook-api/23788967#23788967>

Title: Intermittent missing email address in facebook API

Question: My application uses the "https://graph.facebook.com/me" request with an OAuth token to obtain properties about the user. Email address is one of the properties we need, and we do explicitly request that permission when we request access.

It's working fine 99% of the time, but on a few occasions the response comes back without any object in the JSON data named "email".

Is there an explanation as to why this might happen, such as a way a user could grant us permission but still block their email address? Or could it be found under another key?

Answer: Short answer: Not all users have an email address available and those who do may not have a valid, reachable email address

The documentation for the email field of the user object

(<https://developers.facebook.com/docs/reference/api/user/>) clarifies the expected behaviour here, which is: "this field will not be returned if no valid email address is available"

There are a number of circumstances in which you may think a user should have an email address returned but they will not. Some common reasons:

- No Email address on account
- No confirmed, verified email address on account

- User entered a security checkpoint which required them to reconfirm their email address and they have not yet done so
- Users's email address is unreachable

You also need the email extended permission (which users can choose not to allow), even for users who have a valid, confirmed, reachable email address on file.

143.<https://stackoverflow.com/questions/53062539/failed-to-find-affinity-server-node-with-data-storage-configuration-for-starting>

Title: Failed to find affinity server node with data storage configuration for starting cache

Question:

144.<https://stackoverflow.com/questions/50982620/sort-operation-on-spark-structured-streaming-dataframe>

Title : Sort operation on Spark Structured Streaming DataFrame

Question: I am trying a very simple sort operation on spark structured streaming dataframe but ending up "Exception in thread "main" org.apache.spark.sql.AnalysisException: Sorting is not supported on streaming DataFrames/Datasets, unless it is on aggregated DataFrame/Dataset in Complete output mode" with below exception. Can you please help me on this.

Answer: You may want to rethink which will be the output of sort in stream. In real streaming, you never get the output since you're unlikely to encounter the last event in stream theoretically. While Spark actually does micro-batch, it tries to keep the semantic similar as real streaming. You may end up with redefine your problem, and leverage stateful operations like windowing, or flatMapGroupsWithState. You might also be able to split range manually and run batch.

145.<https://stackoverflow.com/questions/7212555/webapp-security-for-client-side-game-logic-operations/7223247#7223247>

Title: Webapp security for client-side game logic operations

Question: I am working on an in-browser game, taking advantage of the Canvas available in HTML5. However, I realized that I have a big vulnerability in the system. The game score and other statistics about game play are calculated on the client-side in Javascript, then submitted to the server for storage and comparison to other players through XMLHttpRequest. This obviously exposes the statistics to manipulation and potential cheating.

I am worried about moving these to the server-side due to latency issues. I expect the timing to be close.

Answer: Not really. Your server in this scenario is nothing more than a database that trusts the client. You can obfuscate but people will be easily able to figure out what your api is doing. This is an intractable problem with all standalone games, and is why for example, you see Blizzard making Diablo3 a client-server game. The fact that it's a javascript game just makes it even more transparent and easy for people to debug and exploit.

Answer2: The 100% security is not achievable when you have to trust to data from client. However, you can make it hard to cheat by obfuscating the js code and also the data that you send from client.

I have got an idea that is similar to gviews comment.

On the server, you should keep track of the players process of the game by batch updates, that you will send from client regularly in some interval... Player will not recognize it in the latency, and you will have the tool to detect obvious cheaters. You know the starting point of the players game, so you can easily detect the cheating right from the beginning.

Also, i would suggest to use some checkpoints where you would check the real state of the game on client and the state on the server. (the state of the client would not change if the cheater changes only the server updates by xhr).

There is lot of ways to make it harder to cheat, and it is quite individual for each game... there is no standard that solves it all.

146. <https://stackoverflow.com/questions/21795248/i-need-to-grant-every-privilege-to-my-local-database-user/21795249#21795249>

Title: I need to grant every privilege to my local database user

Question; I need the ability to create anything and need to have the debug privilege especially.

I have a Oracle database in my home and I want to run its export script against my work PC database but I don't want to use the system user.

Answer: This is a short paper showing how to grant "all privileges" to a user in Oracle and more importantly what privileges are needed to do this. This was a posting I made to one of the newsgroups/mailing lists recently. This is for information only as it is useful to know BUT one important fact that should be highlighted here is that i cannot think of any circumstances or when ALL PRIVILEGES should be granted to anyone. It is simply unnecessary. Do the job correctly and find out the exact privileges needed for the job in hand and grant those. Granting all privileges is a security risk as it means the user having those privileges can do just about anything in your database.

147. <https://stackoverflow.com/questions/33206165/getting-the-current-directory>

Title: Getting the current Directory

Question: I have been working with a simple program essentially designed to be digital flash cards. Ideally, I want the program to be portable. I am trying to get the current directory. My setup is this:

I have a FileIO.cs method which reads currentDir/Data. I then have a winform which calls the method and retrieves a string[] array of the list of folders. Both of these methods are public static. I then have a separate button to create controls on the form.

The problem: I have cleaned/rebuilt the solution and been using the debugger; The program is running from C:\Users\user\appdata\local\solution\bin\debug. The control (radioButton) I created to verify this data is telling me the 'currentDir' is C:\Users\user and not the programs current directory.

Notes: I have manually created Debug\Data and 4 folders within the data folder so I am 100% sure they exist. No warnings or compile or run time errors are thrown. Card_Base.GetGrades is automatically called on form load successfully.

I have also confirmed the Release folder is empty and not being used. Also I have a backup program which shows an icon when a file is being uploaded to my backup every time the file(s) change. So I am 100% sure bin\debug is the proper working folder in this scenario.

Perhaps what is puzzling me most is that I have a totally separate program written on the same PC using the same IDE and it properly retrieves the path using the same setup.

Answer: Update1: The text also appears slightly misaligned, slightly higher than the radioButton bubble itself, very strange. However, I've gone back into the editor and confirmed the panelGrade is initially empty. Click/Drag grabs nothing and right clicking the panel does not reveal any underlying objects in the panel's space.

After modifying the target directory to its parent (1 level higher), each messageBox checkpoint reveals the proper string/path is being sent in. The visible radioButton when the program is launcher, after the "test" button is pushed is the only occurrence of this unusual text/string appearing anywhere.

Placing messageBoxes before/after the loop within the test button itself shows that the control (radioButton in buttonGrade[0]) DOES contain the proper string / text / path. Thus the change must occur at some point after the buttonTest code is finished executing.

Update2: I just opened a brand new solution and copy/pasted the relevant code eliminating anything extraneous. Named all the items/controls with the same names. Completely bare bones. Exact same problem.

HOWEVER, when I change radioButtons to TextBoxs ... the program displays the proper information. Um. What???

Update 3: Looking through the MSDN radioButtons are derived from buttonBase. The only relevant event I see at a glance is the textChanged event. While it does note that the way the text property of derived classes like radioButton varies, it fails to specify exactly how or what limits it has.

Control.Text is simply a System.String , thus I see no reason why a radioButton would not be able to contain that information.

I tried creating a 'test2' button to change 'buttonGrade[0].Text = FileIO.pathPortable;'. Oddly enough, it does not change the text all. Nor does it throw an error.

AH HA! I noticed that the folder after user was my google drive, which is "Google Drive" and has a space in it. I then copied my trash program to C:\ and named it TrashMe2 and ensured no folder names contained spaces. The result was "C:\TrashMe2\b1". I then tried "1234567890123456789". The result was that it showed up to the second 3.

The radioButton wasn't receiving a different string and the string/path/data was never changed. It simply showed a 'different folder' because that, by luck of the draw' was the exact number of visible characters it showed. Because I created the radioButtons programmatically, AutoSize did NOT default to true. The proper string was part of the radioButton, it simply was not all visible.

And for security reasons (and a bit of humor), I actually call my user account "user". So it wasn't a scenario where I would see C:\Users\JoeNomidBlow was cut off.

I feel... rather stupid at this particular moment. Thanks for the help!

148. <https://stackoverflow.com/questions/10470037/mysql-start-failed-on-aws-instance>

Title: Mysql start failed on AWS Instance

Question: I'm having trouble figuring out the type of problem this is. I'm still a student and haven't taken a graph theory/linear optimization class yet.

The only thing I know for sure is to check for negative cycles, as this means you can rack the resource limit up to infinity, allowing for you to pick up each rabbit. I don't know the "reason" to pick the next path. I also don't know when to terminate, as you could keep using all of the edges and make the resource limit drop below 0 forever, but never escape.

I'm not really looking for code (as this is a coding challenge), only the type of problem this is (Ex: Max Flow, Longest Path, Shortest Path, etc.) If you an algorithm that fits this already that would be extra awesome. Thanks.

The time it takes to move from your starting point to all of the bunnies and to the bulkhead will be given to you in a square matrix of integers. Each row will tell you the time it takes to get to the start, first bunny, second bunny, ..., last bunny, and the bulkhead in that order. The order of the rows follows the same pattern (start, each bunny, bulkhead). The bunnies can jump into your arms, so picking them up is instantaneous, and arriving at the bulkhead at the same time as it seals still allows for a successful, if dramatic, escape. (Don't worry, any bunnies you don't pick up will be able to escape with you since they no longer have to carry the ones you did pick up.) You can revisit different spots if you wish, and moving to the bulkhead doesn't mean you have to immediately leave - you can move to and from the bulkhead to pick up additional bunnies if time permits.

In addition to spending time traveling between bunnies, some paths interact with the space station's security checkpoints and add time back to the clock. Adding time to the clock will delay the closing of the bulkhead doors, and if the time goes back up to 0 or a positive number after the doors have already closed, it triggers the bulkhead to reopen. Therefore, it might be possible to walk in a circle and keep gaining time: that is, each time a path is traversed, the same amount of time is used or added.

Write a function of the form answer(times, time_limit) to calculate the most bunnies you can pick up and which bunnies they are, while still escaping through the bulkhead before the doors close for good. If there are multiple sets of bunnies of the same size, return the set of bunnies with the lowest prisoner IDs (as indexes) in sorted order. The bunnies are represented as a sorted list by prisoner ID, with the first bunny being 0. There are at most 5 bunnies, and time_limit is a non-negative integer that is at most 999.

Answer: It's a planning problem, basically. The generic approach to planning is to identify the possible states of the world, the initial state, transitions between states, and the final states. Then search the graph that this data imply, most simply using breadth-first search.

For this problem, the relevant state is (1) how much time is left (2) which rabbits we've picked up (3) where we are right now. This means 1,000 clock settings (I'll talk about added time in a minute) times $2^5 = 32$ subsets of bunnies times 7 positions = 224,000 possible states, which is a lot for a human but not a computer.

We can deal with added time by swiping a trick from Johnson's algorithm. As Tymur suggests in a comment, run Bellman-Ford and either find a negative cycle (in which case all rabbits can be saved by running around the negative cycle enough times first) or potentials that, when applied, make all times nonnegative. Don't forget to adjust the starting time by the difference in potential between the starting position and the bulkhead.

149. <https://stackoverflow.com/questions/9506596/what-harm-can-a-c-asm-program-do-to-linux-when-run-by-an-unprivileged-user/9506833#9506833>

Title: What harm can a C/asm program do to Linux when run by an unprivileged user?

Question: I have been thinking about a scenario where one lets users (can be anyone, possibly with bad intentions) submit code which is run on a Linux PC (let's call it the benchmark node). The goal is to make a kind of automated benchmarking environment for single-threaded routines. Let's say that a website posts some code to a proxy. This proxy hands this code to the benchmark node, and the benchmark node only has an ethernet connection to the proxy, not internet itself.

If one lets whatever user post C/asm code to be run on the benchmark node, what security challenges will one face? The following assumptions are made:

- The program is run as an unprivileged user

- The proxy will have the opportunity to kill the process on the benchmark node (take the scenario of an infinite loop for instance)
- The proxy is able to restart the benchmark node (if it replies...)

So, is it in practice possible that this user space program can make the OS crash, or make the machine unavailable to the proxy? With assembly the programmer can do basically whatever he wants (manipulate stack pointer for instance), and I wonder how restrictive/robust Linux is in this respect. I also know about the possibility for processes to request shared memory regions with other processes (shm), which might also play a role here?

Any literature or articles about this subject are very welcome.

Sandbox solutions might also be interesting, but it's important that the CPU must perform 100% of what it is capable of during the benchmark (at least on the core the benchmark is run).

Answer: Just a quick list off the top of my head. Essentially, if you do not trust the users at least a little, you are in deep trouble:

- Filesystem manipulation: delete or overwrite files belonging to the user the process is run as
- Snooping all sorts of data found on the system (files, sometimes network traffic of same user)
- Killing the user's other processes
- Consuming memory until OOM Killer starts killing random processes or (if you have swap enabled) until the machine slows down to a crawl
- Generating lots of I/O to slow down the system
- Executing exploits at will (you are close to certain to have some unpatched privilege escalation vulnerability somewhere)
- Exploiting vulnerabilities in any software the user is able to run
- Hosting a DDoS network or child pornography file server on your machine
- Using your machine as a proxy for starting attacks against CIA and FBI servers
- The sky is the limit...

Answer: Yes, such techniques as spawning an excessive number of processes, allocating excessive memory (causing swapfile use), or queuing up a lot of disk I/O will make the machine unresponsive so that your supervisor process won't run in a timely fashion.

If your supervisor code ends up swapped out to the disk, then even if it has high priority, it won't run until the disk becomes available, which can be a very long delay due to seek times.

Linux does have ulimit which can protect against some of these, see Limit the memory and cpu available for a user in Linux And malicious network activity can be likewise blocked. You can also disable swap and chroot the program into a tmpfs mount. But some mischief will still be possible.

150. <https://stackoverflow.com/questions/7573253/method-for-runtime-comparison-of-two-programs-objects>

Title: Method for runtime comparison of two programs' objects

Question: I am working through a particular type of code testing that is rather nettlesome and could be automated, yet I'm not sure of the best practices. Before describing the problem, I want to make clear that I'm looking for the appropriate terminology and concepts, so that I can read more about how to implement it. Suggestions on best practices are welcome, certainly, but my goal is specific: what is this kind of approach called?

In the simplest case, I have two programs that take in a bunch of data, produce a variety of intermediate objects, and then return a final result. When tested end-to-end, the final results differ, hence the need to

find out where the differences occur. Unfortunately, even intermediate results may differ, but not always in a significant way (i.e. some discrepancies are tolerable). The final wrinkle is that intermediate objects may not necessarily have the same names between the two programs, and the two sets of intermediate objects may not fully overlap (e.g. one program may have more intermediate objects than the other). Thus, I can't assume there is a one-to-one relationship between the objects created in the two programs.

The approach that I'm thinking of taking to automate this comparison of objects is as follows (it's roughly inspired by frequency counts in text corpora):

1. For each program, A and B: create a list of the objects created throughout execution, which may be indexed in a very simple manner, such as a001, a002, a003, a004, ... and similarly for B (b001, ...).
2. Let Na = # of unique object names encountered in A, similarly for Nb and # of objects in B.
3. Create two tables, TableA and TableB, with Na and Nb columns, respectively. Entries will record a value for each object at each trigger (i.e. for each row, defined next).
4. For each assignment in A, the simplest approach is to capture the hash value of all of the Na items; of course, one can use LOCF (last observation carried forward) for those items that don't change, and any as-yet unobserved objects are simply given a NULL entry. Repeat this for B.
5. Match entries in TableA and TableB via their hash values. Ideally, objects will arrive into the "vocabulary" in approximately the same order, so that order and hash value will allow one to identify the sequences of values.
6. Find discrepancies in the objects between A and B based on when the sequences of hash values diverge for any objects with divergent sequences.

Now, this is a simple approach and could work wonderfully if the data were simple, atomic, and not susceptible to numerical precision issues. However, I believe that numerical precision may cause hash values to diverge, though the impact is insignificant if the discrepancies are approximately at the machine tolerance level.

First: What is a name for such types of testing methods and concepts? An answer need not necessarily be the method above, but reflects the class of methods for comparing objects from two (or more) different programs.

Second: What are standard methods exist for what I describe in steps 3 and 4? For instance, the "value" need not only be a hash: one might also store the sizes of the objects - after all, two objects cannot be the same if they are massively different in size.

In practice, I tend to compare a small number of items, but I suspect that when automated this need not involve a lot of input from the user.

151. <https://stackoverflow.com/questions/51085198/how-print-class-object-information-in-spring-boot-web-flux-prints-hash-code-and>

Title: How print class object information in Spring Boot? Web-flux prints hash code and not class context in Spring Boot

Question: I'm new to Spring Boot and I bought the book for Spring Boot 2.0 by Greg Turnquist. In chapter 1 there is a simple application in which if I take a look to `http://localhost:8080/chapters` URL I'll be able to see the chapter list.

The error I'm having is that on the console the app prints the hashCode of the classes in the repository. In the web browser the app prints a dictionary with three empty elements.

Code Example: <https://github.com/learning-spring-boot/learning-spring-boot-2nd-edition-code/tree/master/1>

152. <https://stackoverflow.com/questions/30041086/spark-checkpointing-implication-on-performance>

Title: Spark - Checkpointing implication on performance

Question: From the Spark's DStreamCheckpointData, it seems like checkpointing mechanism collects the time window to be checkpointed and updates/writes it to checkpoint files. I am trying to understand couple of things specifically:

1. At every checkpoint interval, does it read all the previous checkpoint data and then update the current state?. If so, what will be the impact on performance when checkpoint state grows very large, that would certainly slow down a long running streaming context.

2. Is there any general rule or formula to calculate checkpoint interval for different data ingestion rates, sliding window and batch intervals?

Answer:

On the other hand, prior checkpointing data is not read on every new checkpointing operation : the stateful information is already being maintained in Spark's cache as the stream is being operated upon (checkpoints are just a backup of it). Let's imagine the most simple state possible, a sum of all integers, met in a stream of integers : on each batch you compute a new value for this sum, based on the data you see in the batch — and you can store this partial sum in cache (see above). Every five batches or so (depending on your checkpointing interval) you write this sum to disk. Now, if you lose one executor (one partition) in a subsequent batch, you can reconstruct the total for this by only re-processing the partitions for this executor for up to the last five partitions (by reading the disk to find the last checkpoint, and re-processing the missing parts of the last up-to-five batches). But in normal processing (no incidents), you have no need to access the disk.

2. There is no general formula that I know of since you would have to fix the maximum amount of data you're willing to recover from. Old documentation gives a rule of thumb.

But in the case of streaming, you can think of your batch interval like a computation budget. Let's say you have a batch interval of 30 seconds. On each batch you have 30 seconds to allocate to writing to disk, or computing (batch processing time). To make sure your job is stable, you have to ensure that your batch processing time does not go over budget, otherwise you will fill up the memory of your cluster (if it takes you 35 seconds to process and "flush" 30 seconds of data, on each batch, you ingest some more data than what you flush during the same time — since your memory is finite, this eventually yields to an overflow).

Let's say your average batch processing time is 25 seconds. So on each batch, you have 5 seconds of unallocated time in your budget. You can use that for checkpointing. Now consider how long checkpointing takes you (you can tease this out of the Spark UI). 10 seconds ? 30 seconds ? One minute ?

If it takes you c seconds to checkpoint on a bi seconds batch interval, with a bp seconds batch processing time, you will "recover" from checkpointing (process the data that still comes in during that time of no processing) in:

$\text{ceil}(c / (bi - bp))$ batches.

If it takes you k batches to "recover" from checkpointing (i.e. to recover the lateness induced from the checkpoint), and you are checkpointing every p batches, you need to make sure you enforce $k < p$, to avoid an unstable job. So in our example:

- so if it takes you 10 seconds to checkpoint, it will take you $10 / (30 - 25) = 2$ batches to recover, so you can checkpoint every 2 batches (or more, i.e. less frequently, which I would advise to account for unplanned loss of time).
- so if it takes you 30 seconds to checkpoint, it will take you $30 / (30 - 25) = 6$ batches to recover, so you can checkpoint every 6 batches (or more).
- if it takes you 60 seconds to checkpoint, you can checkpoint every 12 batches (or more).

Note that this assumes your checkpointing time is constant, or at least can be bounded by a maximal constant. Sadly, this is often not the case : a common mistake is to forget to delete part of the state in stateful streams using operations such as `updateStateByKey` or `mapWithState` — yet the size of the state should always be bounded. Note that on a multitenant cluster, the time spent writing to disk is not always a constant — other jobs may be trying to access the disk concurrently on the same executor, starving you from disk iops (in this talk Cloudera reports on IO throughput degrading dramatically after > 5 concurrent write threads).

153. <https://stackoverflow.com/questions/27134418/how-to-change-mysql-checkpoint-interval>

Title: How to change MySQL checkpoint interval

Question: I've tried changing "progress status update interval" in MySQL Workbench but I'm not sure if the change happened. The interval that I've tried are 1, 4, 20, 200, and 400000.

However, the running time of this query doesn't change much under those different interval settings:
`UPDATE trade SET quantity = quantity + 100;`

Could anyone help me on change the checkpoint interval? Thanks.

Answer:

"I've tried changing "progress status update interval" in MySQL Workbench but I'm not sure if the change happened. The interval that I've tried are 1, 4, 20, 200, and 400000.

However, the running time of this query doesn't change much under those different interval settings:"

These settings don't affect the running time of a query at all. They are parameters you might change if you have a long running query and a slow connection. But this parameter has nothing to do with how long your queries will actually take.

That being said, you might be able to speed up this query a bit using an index on your `quantity` variable. Alternatively, you might try chunking the table into pieces, eg,

`UPDATE trade SET quantity = quantity + 100 WHERE trade.id BETWEEN 1 AND 10000;`
`UPDATE trade SET quantity = quantity + 100 WHERE trade.id BETWEEN 10001 AND 20000;`

etc. But just changing progress status update interval in the Workbench... that's not gonna affect your query speed at all. Totally unrelated.

1. <https://stackoverflow.com/questions/5454337/mvc-vs-hmvc-for-web-application-development/30301846#30301846>

T: MVC vs HMVC for web application development

Q: Now, I'm using MVC pattern for web development. I use codeIgniter framework. I found <http://fuelphp.com/> and <http://kohanaframework.org/>, they are using HMVC. I still not clear of HMVC and why we should use HMVC instead of MVC? I confuse after reading HMVC pattern and it's not too much different with MVC. Can you explain why we should use HMVC for web application development ?

A1: The Hierarchical-Model-View-Controller (HMVC) pattern is a direct extension to the MVC pattern that manages to solve many of the scalability issues already mentioned. HMVC was first described in a blog post entitled HMVC: The layered pattern for developing strong client tiers on the JavaWorld web site in July 2000. Much of the article concentrates on the benefits of using HMVC with graphical user interfaces. There has been some suggestion that the authors were actually re-interpreting another pattern called Presentation-Abstraction-Control (PAC) described in 1987. The article in JavaWorld provides a detailed explanation of how HMVC can aid in the design of desktop applications with GUIs. The focus of this article is to demonstrate how HMVC can be used to create scalable web applications.

HMVC is a collection of traditional MVC triads operating as one application. Each triad is completely independent and can execute without the presence of any other. All requests made to triads must use the controller interface, never loading models or libraries outside of their own domain. The triads physical location within the hosting environment is not important, as long as it is accessible from all other parts of the system. The distinct features of HMVC encourages the reuse of existing code, simplifies testing of disparate parts of system and ensures that the application is easily enhanced or extended.

A2: one of the things that you will or had struggled with in MVC is that you can't call a controller from another controller (unless you use a custom library or helper to do that) in HMVC (Hierarchical Model View Controller) you can do that, I would sum all the qualities in here:

- reuse your code in other projects
- simplify maintaining your project
- scale your project
- organize code
- modular structure

you will never go back to MVC after trying HMVC here is a picture to be more clear.

for CodeIgniter use "Modular Extensions - HMVC"

Modular Extensions makes the CodeIgniter PHP framework modular. Modules are groups of independent components, typically model, controller and view, arranged in an application modules sub-directory that can be dropped into other CodeIgniter applications.

Module Controllers can be used as normal Controllers or HMVC Controllers and they can be used as widgets to help you build view partials.

if you want to use codeigniter with HMVC pattern, you can use Modular Extensions - HMVC here
<https://bitbucket.org/wiredesignz/codeigniter-modular-extensions-hmvc>

and here are some nice and funny video tutorials that will get you on rails with HMVC in codeigniter

https://www.youtube.com/watch?v=8fy8E_C5_qQ&list=PLBEpR3pmwCawDZ6FgNYoyvicEz4HrJPec&index=1

hope that helps!

A3: Another HMVC framework that you should check out is Alloy. I have attempted to explain the concept in layman's terms on the HMVC Architecture manual page, and in this StackOverflow response to a similar question.

2. <https://stackoverflow.com/questions/4461878/is-a-three-tier-application-architecture-necessary/4462009#4462009>

T: Is a three-tier application architecture necessary?

Q: I've worked on a project that implements a three-tier architecture with the following design:

Presentation Layer - Uses PHP with an MVC framework to handle frontend presentation and business logic. This layer makes calls to the service layer, which accesses the data.

Data Access Layer - Uses C# .NET and is separated into Service, Business Logic, and Data Layer. Called by the Presentation Layer. Makes calls to the database and serializes responses to return to the Presentation Layer.

Data Layer - The database. Provides all of the data for the above two layers.

I understand that a three-tier approach can help security, since there is still no access to the data if the Presentation Layer is compromised. Although this is true, it seems like this approach is over-complicating it a bit, especially since I'm forced to write two models for the same object in the first two layers.

So my question: Is this a bad implementation of a three-tier architecture? If so, how could it be improved? What are the drawbacks, if any, of simply having an MVC implementation that has access to the database? What approach(es) do you use for your web applications?

A1: It looks to me like your 3 tiers are the same as View, Controller Model. If your php is mainly making calls to your #2 layer, then I would think itself doesn't need to be MVC unless you have a very complicated presentation layer that itself should be organized into MVC, for instance if you have complicated navigation or user authentication logic.

A2: The value of the approach is not just for security, it also facilitates maintainability.

I am not sure I understand the concern: "especially since I'm forced to write two models for the same object in the first two layers." This would seem to be because you are using two different programming languages for the UI and the back-end. I'm guessing C# "data access layer" contains a complete object model which you then have to replicate in your front end.

The problem seems to be that you have two middle tiers that mirror each other, because you're using two languages, not that you are using a n-tier architecture.

A3: I think your complication stems from the fact that you're using PHP and .NET, which aren't directly compatible. If you eliminated one of those (only used PHP or only used .NET) that would simplify things. Otherwise, I think you're using a good approach.

A4: There is nothing necessary in programming. But there are a bunch of practices, that were proven by years as something-you-can-follow-to-get-better-results. N-tier separation is just one of that practices.

http://en.wikipedia.org/wiki/Multitier_architecture

Your description follows the description in the wiki, so - it is suitable way to implement 3-tier app.

But remember, you don't ought to do anything - just follow the way it is comfortable for you. And in future you'll have your own set of practices that work for you specifically.

3. <https://stackoverflow.com/questions/1551663/are-the-ms-mvc-framework-and-jquery-suitable-for-a-long-lived-application>

T: Are the MS MVC framework and jQuery suitable for a long-lived application?

Q: I'm working on a web-based application that is intended to have at least a 6 year lifetime. Once the application is delivered, chances are that it won't be modified during that time frame.

We're considering using the asp.net MVC framework and jQuery, but I'm wondering if that's a good choice. The customer is probably not going to want to spend additional time and money down the road because javascript, browser standards, etc have changed.

What's the best option to minimize the chances that the application would require maintenance over the next 6 years?

A: For ASP.NET MVC, it isn't going to die soon; nonetheless, since it's a very young technology and likely to change frequently in the first releases, maintenance problems may be expected.

The same used to happen with rails: an app written with rails 1.x needed some changes to work the rails 2.x.

This may be a problem or not: an app written with rails 1.x will keep working with rails 1.x, and an app written with MVC 1 will keep working with MVC 1.

I think that it's still too early to say how much MVC 2 will differ from MVC 1: MVC 2 Preview 2 is out, but it must be remarked that many many classes, methods, interfaces etc. changed name and behaviour several times between MVC 1 RC1, MVC1 RC2 etc.

On the other hand, if your app is complex enough, using MVC may still be the right choice, even considering the extra effort needed to update to the newer releases (which is usually not so big): an MVC app is more maintainable (in my opinion).

A final consideration: please note that 6 years are a very long time in the wild web world, so it's not possible to say in advance what will change and what will not.

4. <https://stackoverflow.com/questions/23031060/developing-application-with-three-layers-and-two-tier>

T: Developing application with three layers and two tier.

Q: As fas as I have understood we can say that 3 layered architecture means separate projects for each concern. Those UI Layer, Business Layer and Data Layer. UI talks to BL and BL talks to DB and vice versa. That's good for maintainability and idea of separation of concerns are reasonable. But on the other hand, the tiers are different than layers. Namely, tiers are directly related to machines/network. I mean when we say 2 tier, it is generally client machine and database server machine. When we say 3 tier, it is generally client machine, application server machine and database server machine. So in terms of these information developing two tier application that uses 3 layer architecture is possible.

So far, I have used 3 layer but it is time to decide whether should we develop in 3 tier or 2 tier. There will be windows form project in the field and around 150 clients and 100 hand terminals that will be using windows form project and communicate over web services. In hand terminals, it is obvious that best solution is using three tier but for windows clients which will be running on Windows 7, it is hard to decide whether should we talk with database over one application server or directly connecting to database.

Main question here what are **benefits of 3 tier architecture over 2 tier**. For me one more tier means one more server/host/machine that needs to be up and running all the time which may be overhead.

Please guide us for choosing best tier architecture.

A1: I would only recommend using a '3 tier' (Client, Application Server, and Database Server) if you're going to be doing some major task on the Application Server that would otherwise consume resources available to also run a Database Platform. For example, connection pooling or connection management software running in between the application (Business Layer) and the Database server (Data Layer).

A2: Lets say you have this components: UI, Common, Biz, DAL

In 2 or 3 tier application development, you deploy UI and Common on client and Common, Biz , DAL on server (pay attention common is deployed on both) and you try to connect t your BIZ via .Net Remoting or WCF And finally DB can be on Server or other Servers for the last tier.

I hope this helps.

5. <https://stackoverflow.com/questions/23213599/mvc-razor-over-aspx>

T: MVC Razor over ASPX

Q: I'm new to MVC, There is one MVC application on which I'm working which used aspx engine (views are created in aspx). Now there is a requirement of migrating the GUI of application and I've read on that razor provides benefits over aspx engine. So, which is better to implement. But, I'm more concerned about the performance of the application and its maintainability. So, could anyone please let me know which one satisfies above requirement?

A1: You can mix Razor and ASPX in one project, BUT you can not reuse the Master page from ASPX as a Razor layout page (at least not without some tricks AFAIK). So depending on the size of the already existing application and the amount of additions it may makes sense to convert the existing pages to Razor or continue to use ASPX. For maintainability reasons I personally would NOT mix the two in the same application. UPDATE after comment: 1000 screens is definitely NOT mid-size anymore IMO, BUT if you are not using layouts and/or Master pages your may are really best of "mixing them" to benefit from the better/easier syntax and performance for new pages, but no requirement to adapt the old ones right away. Old pages can be adapted one by one, when they are changed for other reasons...

Your team shouldn't have a big problem getting into Razor, as it is very near to "normal programming" and you only need to learn very few syntax "specialities"...

A2: I would say that the advantages of Razor are as follows:

Concise syntax, which is very similar to the way you write regular C# code (check out the following recent blog post by Phil Haack comparing Aspx with Razor syntax: <http://haacked.com/archive/2011/01/06/razor-syntax-quick-reference.aspx>)

Automatic HTML encoding of output (which helps protect you from html injection attacks)

Built in (though not 100%) validation of your markup which helps you avoid unbalanced tags

The page-related concepts also map easily from what you have in ASPX

As you can see inline code is still allowed

Sections (which can be optional) are equivalent to content placeholders

Layout pages instead of Master pages

The concepts of full and partial views are the same

@functions { ... } blocks instead of ...

In addition Razor has a number of useful concepts that I would say are better than what is available in ASPX:

@helper functions for really easy creation of functions that emit markup

@model keyword for specifying your view's model type without having to write a <%@ Page ... directive with the full class name

As per my advice Razor is better option.

A3: Have you read ScottGu's Blog. It's not specifically about performance but you'll be convinced why to use Razor.

Compact, Expressive, and Fluid: Razor minimizes the number of characters and keystrokes required in a file, and enables a fast, fluid coding workflow. Unlike most template syntaxes, you do not need to interrupt your coding to explicitly denote server blocks within your HTML. The parser is smart enough to infer this from your code. This enables a really compact and expressive syntax which is clean, fast and fun to type.

This topic has been discussed already so many time.

ASP.NET MVC 3 Razor performance

ASP.NET MVC View Engine Comparison

MVC 3 ASPX VS RAZOR View Engine

A4: It mostly depends on personal preference, but Razor should have a great performance because it is fully compiled. Also the maintainability is in my opinion better, because of better readability and a syntax which isn't only familiar to ASP.NET developers. For a complete discussion have a look at this blog post.

6. <https://stackoverflow.com/questions/6875110/how-can-i-convince-my-manager-not-to-give-up-on-mvc-to-get-back-to-web-forms/6875379#6875379>

T: How can I convince my manager not to give up on MVC to get back to Web Forms?

Q: I work in a company where, since I arrived, I had full freedom to use whatever Microsoft technology, pattern and tool in order to develop my applications.

I started to develop all the applications with ASP.NET MVC3 and I currently have 5 applications deployed and working.

The other day I had a meeting with my manager to review all the applications and he realized that my code was completely different than what he expected. He basically realized that I do not use Web Forms and that I use MVC instead. He thought he was just some component/tool and not a totally different approach to programming. He was curious and he briefly studied what ASP.NET MVC was.

After two days he said that I need to convert all the applications to Web Forms and use just Web Forms from now on. He says that MVC resembles the old asp(that for certain aspects is true) and that it takes longer time to develop the application and makes people confused when there is the need to change/maintain the application.

I think it is not true because, after a steep beginning, I got used to the magic of MVC and it eases development, componentization and maintenance of applications.

I said him that Web Forms is too coupled UI/Logic/DAL, after a while the code becomes unreadable and it jeopardizes unit testing. I also shown the possibility to replace the old GridView(one of his main concerns) with the jQuery or MVCContrib grids.

There was no way to convince him. Both for work and personal development I do not want to take a step back to Web Forms, therefore I kindly ask you to tell me the most important points that make MVC "superior" to Web Forms.

Thanks

A1: Unfortunately, it's not uncommon for a manager to give a business-speak-laden version of "I don't understand this, so I want you to do it my way instead." This often stifles progress. (I've actually left jobs in the past for this very reason, managers who refused to allow any development that they personally didn't design.)

However, you also need to keep an open mind on the subject. He may very well have good reasons for this. Supporting the code is a big concern, and while I agree that it's easier to write clean and de-coupled code in MVC, at the same time he might be seeing a market where it's much easier/cheaper to hire farmed out developers at low cost to support a WebForms application. He may have a stack of resumes in his drawer that paint a very different picture between WebForms and MVC.

The best thing you can do, really, is approach both paradigms with a completely open mind. Understand that the rumors of WebForms' demise are greatly exaggerated. So if you really want to convince him of anything, then you're going to have to present a proper and unbiased comparison.

Start with a simple pros and cons list to compare the two paradigms. Make sure you don't skip on anything. If he has pros for WebForms and cons for MVC that you tried to ignore, that'll hurt your case. Evolve that list into some examples, demonstrations, proofs of concepts, etc. Make your argument tactile, give it numbers and tangible values that mean something real to management beyond just "this is a better development strategy." Quantify it.

If you approach this with an argument that says little more than "well, my way is better because it just is" then you're not going to get far. Even if you have a point to make, you have to successfully make that point to him. You have to put it in his language.

This is really less about which development strategy is better and more about communication and clarifying your ideas. After all, if you can't defend your position then from his perspective it's not a good position.

And if you fully clarify and quantify all of this, and it's critical that you keep an open mind about WebForms, then what you've done is given him the information he needs to make an informed decision. That decision may not change. He may still insist on WebForms. But it's his decision. What you're doing here is presenting him with all the pros and cons, all the costs and benefits (both immediate and long-term in terms of re-writing what you already have and ongoing support and all of that). If his decision turns out to be wrong, at least it will have been his informed decision. You won't have kept anything from him.

In the end, he may still insist that you do things the way he understands them. Some managers are like that. But take this as an opportunity for your career to master the art of presenting an argument. It won't be the last time you find yourself doing this.

A2: WebForms was created to make it easy for WinForms developers to move to web. ASP.Net MVC's main benefits are that it separates out the Model (data), View (HTML,CSS,jQuery) and Controller (logic and routing). This allows different people to work on different parts if needed (separation of concerns). It also is much closer to a true web model, designing using HTML directly rather than this being abstracted away by ASP.Net User Controls. Obviously, in MVC, you have the HTML helpers and can make your own custom helper extensions as well as using DisplayFor and EditorFor templates.

The bosses argument is that many developers will know ASP.Net but not MVC, so it will be easier for others to work on it. However, MVC has been out a while now and many keen developers will have already picked this up or can do very quickly. It's a very clean and powerful way to develop web applications very quickly and easily maintainable in my opinion. ASP.Net of course has its advantages too but you asked "what makes MVC superior" so I've just argued a few benefits of MVC over ASP.Net. This is by no means an exhaustive comparison and hopefully others will add their opinions too.

A3: I would search data or survey result showing superiority of MVC projects rather than telling him how good MVC is. MVC is just more productive way of creating & maintaining quality software. One thing I would like to add is that since UI is completely decoupled with biz logic, it is a lot better to automate code production with code generation tools such as T4 and MVC Scaffolding.

7. <https://stackoverflow.com/questions/3369399/mvc-vs-asp-classic/3369492#3369492>

T: MVC vs Asp classic

Q: I've been given the task of designing the architecture of a new web based trading system. I see Scott Gu is hot on the task of pushing out MVC releases, but the more I look at them the less difference I see with Classic ASP. Due to the availability of classic ASP programmers, I'm contemplating using this instead of paying top dollar to programmers which will then need to upskill. Business users just want html output, and they both do that (Classic ASP doesn't have the Script Manager payload, and JQuery integrates with classic.) Anyone else faced this decision, and any thoughts to pros and cons? Thanks.

A1: Honestly I'd say learn more about ASP.NET MVC if you see Classic ASP and MVC as similar beasts. I suppose both have these guys <% %>... I do not miss VB6, MTS and regsvr32.

If business is only concerned with html output, many other platforms also meet this requirement. Why not PHP, cgi, Rails or Django?

Compared with modern technologies, Classic ASP is asking for pain.

A2: Assuming you mean "classic ASP" from 10 years ago....

My concern is with your comment regarding availability of resources. I think you'll find that newer developers coming out of school actually do not know classic ASP as well as they would know ASP.NET WebForms or even MVC. Schools are focusing on dotNet, so ASP.NET and MVC.

I think you'll find ASP.NET still has the most developers. MVC is starting to catch up, but still not totally caught up and I'm not sure if it's mainstream in schools yet.

There are certainly design decisions behind which technology to use as well, such as maintainability. Though really, all of these discussed technologies have a long history of being used in production quality systems for years. So they are all valid choices.

A3: Classic doesn't provide the same level of separation between business logic and presentation markup, resulting in uglier and less maintainable sites. If you are creating a very simple site, then classic may be justifiable, due to not having to include the overhead of MVC (which is fairly small anyway), but small sites have a habit of mutating into larger sites. Any developer who is half decent will get the hang of MVC in a very short time and, to be frank, they ought to be keeping up with new trends anyway.

A4:

to everyone for not turning this thread (yet!!) into a slanging match :-). as noted earlier, the main similarity if you don't examine the actual concepts is really just the <% %> tags. you should really set it up on your machine and run thro a few of the basic illustrative samples to satisfy yourself as to the similarities or otherwise once you get going.

like a few above, i came from the vb6/com background and in my 'classic' asp sites (mainly intranet in those days - 8-10yrs ago) i used com classes and a data layer. When asp.net (v1.0) arrived i was sceptical about the benefits and it was defiantly a year or so before i took the plunge into that. once my feet were wet in the webforms world, i was overjoyed at being able to 'port' my conceptual understanding of classes and BLL/DAL layers over to c#'s framework. my pivotal moment was prolly the publication of marco bellasco's asp.net 2.0 book 'the Beerhouse'. this crystalised everything that i had been (poorly) aiming at in my projects. fast fwd 5 years and the same epiphany moment arrived with both steven sanderson's book as well as the obligatory 'nerd dinner' series. I was a complete convert to mvc (and had been using it after a fashion in php with joomla). here i was able to leverage all the good stuff i'd learned re BLL/DAL (only in this case, the DAL was now a repository layer and the BLL the model).

In a nutshell, it's a very personal decision. all i can say is that having been involved in all the aforementioned technologies in production environments, for me MVC really has been the most productive and conceptually, the simplest to grasp (maybe in part due to my 'path').

your own mileage (or kilometerage :) may of course vary - but in a nutshell, read the pros and cons but ultimately get down and dirty with it and share your guilty secrets with the community once youve uncovered the 'beauties' of mvc'ing ...

good luck

A5: Some things to consider on MVC vs ASP Classic:

Visual Studio - This was one of the greatest reasons to leave classic ASP behind. I give classic asp maintenance projects to people I hate :) Intellisense really speeds up coding.

.NET - CLR Compiled code is going to run faster.

Community Support - This site has few classic-asp tagged questions. Most people have moved on and if you run into issues they may be difficult to resolve.

Separation of Concerns - It's possible to separate classic asp business logic out. But it will be ugly. Unit Testing will also be painful. .NET has many patterns out there to assist you with modern day programming techniques.

However... If:

you're worried about MVC development cost with the developers available to you
you've ruled out asp.net webforms because you dont have control of html

Then I might start considering other alternatives before classic asp. Ruby, Php, Java, Django or maybe Silverlight if you want to stay MS.

A5: Look at the tooling support - ASP.net MVC is all set to go with VS 2010, but ASP classic support is less than stellar. You should also look at time to write the code - if you have a programmer who is up to speed, and you need some simple data entry pages, you can throw together an entity framework DAL, and some simple scaffolded pages in less than a day...

Now, I know that there are few systems that are that simple, but I think that it's very easy to work from this starting point, including simplicity of including AJAX callbacks to controller actions, returning JSON etc.

(I've also yet to come across a large 'classic' ASP site that hasn't turned to spaghetti).

A6: I would go with .net mvc (over webforms and classic asp) particularly since you state that you are looking to build a trading system. This indicates that your site is going to be more than trivial content (read needs databases). This has a few implications:

Security is going to be important. .net in general has more built-in security features. If you need to handle authentication and authorisation there are a lot of advantages to .net. It allows you to use any number of ORMs which provide a number of security benefits not to mention making interfacing with the database much simpler. Classic asp gives you very little assistance so this has added risks particularly in larger sites. When it comes down to it though it is still the developer's job to make sure they build secure apps.

.net MVC makes it much easier to create a more modular design. There are a number of benefits but I think the key one is that MVC is very easy to unit test.

There is also the fact that .net is just a more up-to-date platform. It has better IDE support, debugging tools, profiling tools, testing tools etc.

It is also interesting that you state you can find classic asp programmers. Most people I know and work with try and avoid it like the plague, but I am in Australia :).

At the end of the day though you could use any of these technologies and still get a successful result, the key is to get good developer even if they don't have heaps of experience in .net mvc.

A7: Difference between Asp.Net MVC and Web Forms

Asp.Net Web Forms follow a traditional event-driven development model. Asp.Net MVC is a lightweight and follows the MVC (Model, View, Controller) pattern-based development model. Asp.Net Web Form has server controls. Asp.Net MVC has HTML helpers. Asp.Net Web Form has state management (like as view state, session) techniques. Asp.Net MVC has no automatic state management techniques. Asp.Net Web Form has file-based URLs (means file name exists in the URLs) must have its physical existence. Asp.Net MVC has route-based URLs (means URLs are divided into controllers and actions) and moreover it is based on controller not on physical file. Asp.Net Web Form follows Web Forms Syntax. Asp.Net MVC follows customizable syntax (Razor as default). In Asp.Net Web Form, Web Forms (ASPX) i.e. views are tightly coupled to Code Behind (ASPX.CS) i.e. logic. In Asp.Net MVC, Views and logic are kept separately. Asp.Net Web Form has Master Pages for consistent look and feel. Asp.Net MVC has Layouts for consistent look and feel. Asp.Net Web Form has User Controls for code re-usability. Asp.Net MVC has Partial Views for code re-usability. Asp.Net Web Form has built-in data controls and best for rapid development with powerful data access. Asp.Net MVC is lightweight, provides full control over markup and supports many features that allow fast & agile development. Hence it is best for developing interactive web applications with latest web standards. Asp.Net Web Form is not Open Source. Asp.Net Web MVC is an Open Source.

A8: I think for you Asp .Net 4 is a better option. Unless the project is considerably big and is a public-facing site I don't see a need for Asp .Net MVC. Building an Asp .Net MVC team is a tough task in comparison to Asp .Net 4.

8. <https://stackoverflow.com/questions/3297118/method-including-sqlconnection-good-approach/3297167#3297167>

T: Method including SQL Connection - good approach?

Q: This code is called from an aspx.cs page. Is it a good approach to have the SQL connection stuff and the adapter inside the method? If not, how can that be refactored? Somehow I think this is not good for testing for example

A: No, it is not a good approach to make data access from the page code. Try to make your application in a layered approach N-Tier, or use the MVC Design pattern. Try to separate the Data Access logic and Business logic in your application so it will be easier for code maintainability and readability; you can even use auto-generating tools to increase the code speed and quality by eliminating redundant work. Read more about ORM; it will help you a lot about good coding practices.

9. <https://stackoverflow.com/questions/549887/performance-vs-quality-of-code>

T: Performance vs Quality of Code

Q: Do you think it's worth trading off some performance for code-quality and maintainability? I remember a post by Jeff Atwood that stated that hardware is cheap, developers are not. I think I'd like to change that to "Hardware is cheap, time is not." I've noticed with an MVC project I've been working on lately that sometimes I lose DAYS just trying to squeeze out a little extra performance out of my app and I'm starting to think it's just not worth it. I've just found myself having trouble with designing an ASP.NET MVC application. I love IQueryable to death in the fact that it allows me to append to the query so I can get some fluent code for using it. But being able to do something like that seems to add more responsibility on the controller/BLL.

So what do you think? In the case of web applications would you be ok with trading off some performance for maintainable/cleaner code? Do you think it's worth to prematurely try to optimize everything you can? Because as we've seen you cannot predict all requirements.

A1:

1. Make it work
2. If performance is questionable, profile and identify the problem
3. Fix the problem.
4. Repeat steps 1-4 if necessary
5. ???
6. Profit. Sir Tony Hoare famously said, "We should forget about small efficiencies, say about 97% of the time: premature optimization is the root of all evil."
- 7.

A2: The first part of the quote has been all but forgotten (it doesn't roll off the tongue as easily), and thus many inexperienced engineers don't take performance into consideration during the design phase of a software project. This is almost always a fatal mistake, as later on a badly designed application is very difficult to optimise due to fundamental design flaws. At the same time, there is no point trying to save CPU cycles by using clever tricks when the performance bottlenecks aren't known yet. As to your question, I think a properly designed application that is designed to cope with its particular performance requirements won't need to be coded in an unmaintainable or "unclean" way. It's only when those performance bottlenecks are discovered (e.g. you discover your application spends 90% of its time in 10% of the code) that you might want to consider sparingly using optimisation tricks in small amounts of your code, so that it remains maintainable and easy to understand. The great thing about many Web applications is that performance can be drastically improved using various caching techniques. As you control the server environment (and, like you say, hardware is cheap) you can make sure you cache the hell out of those commonly-used parts of your Web app. This doesn't really make for unmaintainable code if you use an abstraction layer. Facebook is a good example of a Web application that famously exploits caching (memcached) to its advantage. Sir Tony Hoare famously said, "We should forget about small efficiencies, say about 97% of the time: premature optimization is the root of all evil."

A3: I really do not believe this is an either/or. If you write clean, simple code that does all processing only exactly the number of times it should, you will have some of the best performing code you can. It's really that simple.

A4: The obvious answer is it depends. If your app is slow enough that it affects usability significantly, and you have measurements to prove that your optimizations actually help, then sacrificing maintainability can be a reasonable tradeoff. On the other hand, if you haven't measured or the app isn't slow enough to hurt usability, always go for readability, maintainability and flexibility. This just boils down to premature optimization being the root of all evil. Note: Design time algorithmic and architectural optimizations aren't necessarily bad if you know performance is going to matter for your app, but in the case of your question, you clearly appear to be talking about micro-optimization, to which the above applies. Also, in your specific case, if you can't tell whether your app is slow enough to hurt usability then it's premature. If you can then it's not.

A5: Before talking about performance you should really learn about big O notation, you can look that up in any books about algorithms or on wikipedia. Big O notation says something about how much time a function takes. For instance. A list running from 0 to 100 you have O(N). No matter how high number you count to the O notation stays the same. This function has a linear runtime and cannot be improved in any ways. Now if you have a list running from 0 to 100 and for each item in that list you do another list running from 0 to 100 you get O(N^2) which is twice the work and has a much worse runtime than O(N). When writing applications that has to have good performance we talk about getting a good runtime written in O notation. Whether a window uses

<0.1 seconds or >1 second doesn't really matter if they use the same algorithms. That means, the shaving of of seconds you do probably doesn't have a different O notation so you're not really optimizing your code in any way - So for you, writing MVC in asp.net I would recommend you focus on writing clean and readable code instead :). When you have learned about O notation you will be able to know what algorithms to pick (how to sort lists, populate them, retrieve data) in a way that uses the least run time in O notation and this knowledge will probably make your code much faster than shaving seconds off your code writing tight loops ever will do.

A6: All good answers. The choice between speed and clean code is a false dichotomy. I haven't seen you work, but I've watched others, and it's always the same story: "It's not fast enough. I think the problem is in the XXX code. I think I'll tweak that and see if it helps." You don't know the problem is there. You're guessing. Never do anything based on a guess.

(Of course you would never do that, would you? But most people do.) You could profile the code. My favorite method is to just halt it a few times while it's being slow, and ask it what the heck it's doing. It's usually a surprise that one couldn't have guessed.

A7: Neither quality (meaning easy to read) nor performance is the most important - CORRECTNESS is!

A8: Agree with this to an extent. Developer time is costly, and profiling and optimizing code is a very expensive way to get probably not very much performance gain. Having said that it depends on the type of application and the environment you're working in.

If you're working on a web application, then you can make massive improvements by fixing a few simple issues (mainly on the client-side). Things like reducing HTTP requests by concatenating CSS/JS files, building image sprites, etc... will give you huge gains compared to actually profiling code, and are a very good use of developer time.

I don't know that I agree with the 'hardware is cheaper than developers' quote though. Of course hardware can help you scale your application and give it more performance oomph, but the last thing you want to do is rely on beefy hardware. If your software is too tightly coupled to your hardware you lose a lot of flexibility in terms of moving to new data centers, upgrading servers, etc... and not having that flexibility can be very costly in the longer term. Say you decide that the way to scale your application efficiently is to move to Amazon's EC2 infrastructure. If your application requires 32GB of RAM on each server you're going to find a move like this might require a re-write.

A9: This is one of the classic trade offs performance versus supportability. I first came across this trade off when writing COBOL structured code (in the early 1980's). It became clear that by separating everything out into reusable modules created extra branching and stack pointer management and on the early computers this degraded performance. The answer was to group functions together (and duplicate certain functions) in order to reduce the code swapping and stack pointer manipulations that were used to call modules. This caused a supportability issue. Moving on, more recently, I had to de-normalize a data base to create large objects that could be cached. The issue here was reading access rights for roles and responsibilities during navigation around a CRM system. Long story short the normalized version took too long to process and load each screen so 30 years on I am still involved with this classic trade off.

A10: I definitely do value my own time over application performance on the server side. If I notice that my site is not performing well enough on database requests etc, upgrading the server hardware is an alternative solution that could (at least short-term) solve my problem without looking at the code. However, if the app is extremely network-inefficient, I would spend quite some time trying to improve that part. Sending large chunks of data affects my users, no matter what I do with my own server and uplink - and if they don't like the performance, they won't come back. But as several others have said, it is not a matter of either/or - it depends a lot on situation, how heavy the performance issue is, where in the application etc.

A11: Good design often sacrifices some performance for improvement of the overall program. For example, writing you code in layers has a cost, but we do it anyway because it makes changing the code easier over the long term. We use app servers remotely, not because it is the most efficient way, but because it scales. I recall from Code Complete 2, McConnell does give an example where making the code horribly difficult to read was necessary as an optimization. That particular example was an encryption algorithm. The program was made into one method to eliminate the overhead of calling a function. So, there is indeed a time and place for this, but I believe it to be rare. As for solving performance problems, in most cases, I have found performance issues to be either database/IO related or a bug(memory leak). As others have suggested, profiling is the way to go, though it

can still be tricky to track down many bugs. As for the hardware issue, hardware relaxes but does not eliminate the need for optimized code. The faster hardware really just allows us to use less than optimal languages and do really nice GUI stuff.

A12: A standard definition of Quality is "Conformance to client expectations (requirement)". If you have done good requirements gathering, then you have agreed to certain performance criteria. If your application meets this criteria, then you are wasting your, or the client's, time and money trying to do better. Writing loosely coupled, cohesive, and easy to read code just reduces the risk and cost associated with bugs and changes to the requirements. If you are prepared to accept the risk of 'ball of mud' coding, then go ahead. Me, I like to make a profit.

10. <https://stackoverflow.com/questions/2979323/reusability-testability-code-complexity-reduction-and-showing-off-ability-prog>

Q: Reusability, testability, code complexity reduction and showing-off-ability programming importance? There are lots of programming **and architecture patterns**. Patterns allow to make code cleaner, reusable, maintainable, more testable & at last (but not at least) to feel the follower a real cool developer. How do you rank these considerations? What does appeal you most when you decide to apply pattern? I wonder how many times code reusability (especially for MVP, MVC patterns) was important? For example DAL library often shared between projects (it's reusable) but how often controllers/views (abstracted via interfaces) are reused?

A1: Code complexity reduction ranks high, if I keep things simple, I can maintain the project better and work on it faster to add/change features. Reusability is a tool, one that has its uses, but not in every place. I usually refactor for reusability those components that show a clear history of identical use in more than three places. Otherwise, I risk running into the need of specialized behavior in a place or two, and end up splitting a component in a couple of more specialized ones that share a similar structure, but would be hard to understand if kept together. Testability is not something I personally put a lot of energy in. However it derives in many cases from the reduced code complexity: if there are not a lot of dependencies and intricate code paths, there will be less dangers to break tests or make them more difficult to perform. As for showing-off-ability... well... the customer is interested in how well the app performs in terms of what he wants from it, not in terms of how "cool" my code is. 'nuff said

A2: I think you missed the single most important one from your list - more maintainable. Code that is well and consistently structured (as you get with easily reusable code) is much more easily maintained. And as for reusability, then yes, on a number of occasions, usually something like : create a web page to save/update some record. Some months later - we need to expose this as a service for a third party to consume - if your code is structured well, this should be easy and low risk, as you're only adding a new front end.

A3: "Code reusability" as defined in many books is more or less a myth. Try to focus more on easy to read - easy to maintain. Don't start with "reusability" in mind, will be better if you will start to think first on testability and then to reuse something. Is important to deliver, to test, to have clean code, to refactor, to not repeat yourself and less important to build from the start components that can be reused between projects. Whatever is to be reused must be a natural process, more like a discovery: you see a repetition so you build something that can be reused in that specific situation.

A4: I hope most people use patterns to learn how to solve design problems in certain context. All those non-functional requirements you mention can be really important depending on stakeholder needs for a project. As for MVC etc. it is not meant only to be reused between projects, that is often not possible or a good idea. The benefits you get from MVC should be important in the project you use that architecture. You can change independently details in view and models, you can reuse views with controllers for different models, you should be able to change persistence details without affecting your controllers and views. All this is imho very important during development of a single project.

11. <https://stackoverflow.com/questions/18691138/is-mvc-a-design-pattern-only-or-programming-technology/18691287#18691287>

Q: Is MVC a design pattern only or Programming Technology? If I violation the MVC pattern like ASP.Net Form Application then any performance issue arise or not?

A1: MVC is neither a design pattern or a technology. It's a software architecture pattern. See:

<http://en.wikipedia.org/wiki/Model%E2%80%93view%E2%80%93controller>

The difference between a design pattern and a software architecture pattern is that design patterns tend to be simpler and apply to specific components of an application, while architecture patterns are broader and apply to the application as a whole.

In any event, there is also various pieces of technology called MVC, which are based on the MVC pattern. For instance, ASP.NET MVC is the official name for the flavor of MVC created by Microsoft for use in web applications. This is a specific implementation of MVC.

Violation of the MVC pattern has nothing to do with performance, and is largely an issue dealing with maintainability. The MVC pattern stresses separation of concerns to make designing and maintaining your application easier, and making your application less fragile to change.

A2: MVC is just a architecture pattern not a technology, and its goal is separating concerns, you should know something that you can use MVC pattern and Webforms together, and if MVC does not separate Model View and Controller then you are doing something else not MVC.

A3: The background and requirements of your project is VERY important, but you don't mention

12. <https://stackoverflow.com/questions/2267041/what-are-the-performance-implications-of-using-design-patterns-in-php/2267053#2267053>

T: What are the performance implications of using design patterns in PHP?

Q: I know that design-patterns are very useful in creating of big projects. Does anyone have experience in both creating project with normal (OO, procedural) and using design patterns in respect to performance(speed of execution)? I want to create some big project and I am afraid that using design patterns my scripts would run slower. So What is pefrmance of code with desing paterns compare to normal OO programming?

A1: Personally,

I'd program it, and then figure out if there are speed problems/bottlenecks.

Only worry about performance when it becomes a problem.

A2: The objective of design patterns is to solve common problems. These problems may include maintainability (which is what it sounds like you're mostly interested in), as well as performance. Personally, I would favour applying architectural patterns first to make the operations of your application easy to understand. It should then be easier to refactor the existing code to introduce some performance-related patterns, should the performance of your code warrant it.

A3: An old adage about database design can be applied here: "Design for normalization first, denormalize for performance later". In this case, design it right the first time, if you find performance bottlenecks, optimize and break elements of your design on a one off basis then. Another issue, get someone using your application before you start optimizing, otherwise, who really cares?

A4: Some of the reasons design patterns are used is to eliminate code duplication and placing the code in the right spot. Both of these factors adds up to a fast application. Individual techniques such as caching and loading-code-only-when-needed could be easier/faster to apply with design patterns.

That said, maintainability will be much more prominent with some kind of thinking behind the coding applied, which will let you as a programmer focus on the real performance issues.

A5: Rarely code complexity is a factor in total execution speed of a PHP application, usually database interaction and network transfer times are much better candidates for slowness. In any case, develop first and optimize later. You might found out that that kind of optimization is not even necessary.

A6: This depends entirely on what your application is doing and on the details of how you implement the patterns. Design patterns themselves are not really related to performance, but are intended to help you structure your system to aid maintainability.

Besides, performance should not be a concern at this stage; focus on getting the design pinned down first, and if it turns out to be running too slowly, only then should you worry about optimization.

A7: Well I don't have experience with programming using design patterns (only MVC). It is useful for maintainability, but amount of classes/code is greater compare to OO programming. (that is conclusion from my research ,but not from experience). By desing patterns I mean Factory,Decorator, Singleton etc.

13. <https://stackoverflow.com/questions/1866821/is-mvc-a-design-pattern-or-architectural-pattern/9571399#9571399>

T: Is MVC a Design Pattern or Architectural pattern

Q: According to Sun and Msdn it is a design pattern.

According to Wikipedia it is an architectural pattern

In comparison to design patterns, architectural patterns are larger in scale. (Wikipedia - Architectural pattern)
Or it is an architectural pattern that also has a design pattern ?

Which one is true ?

A1: MVC is more of an architectural pattern, but not for complete application. MVC mostly relates to the UI / interaction layer of an application. You're still going to need business logic layer, maybe some service layer and data access layer. That is, if you're into n-tier approach.

A2: Why does one of them have to be true?

Both can be true, depending on point of view.

MVC can be an architecual pattern, if it forms the basis of the application architecture.

It can also be seen as simply a design pattern, an abstract notion that is applicable to any application.

A3: Design patterns say how to write code effectively (considering Code Metrics).

A few benefits:

Easily Maintainable

High Re-usability

Readable because of abstractions

Architectural patterns say how to utilize resources effectively.

Parallel tasks execution like programmers and graphic designers can work parallel.

Multiple technologies can be utilized to build a software.

A4: I know that it's been answered awhile ago, but no one has yet mentioned the book that made MVC famous: Pattern-Oriented Software Architecture (POSA), by Buschmann, et al published in 1996. Though not as widely read as the Design Patterns book, by Gamma, et al, POSA is one of the foundational books used by the patterns community.

Oh, and POSA very clearly identifies MVC as an architectural pattern. My hunch is that MS and Sun are just being sloppy and calling every pattern a "design pattern".

A5: I think both are true. If you're looking at a particular instantiation of MVC in a framework like Ruby on Rails, that instantiation is more of a design pattern. If you look at MVC as a general concept, it's more of an architectural pattern.

A6: If you put ten software architects into a room and have them discuss what the Model-View-Controller pattern is, you will end up with twelve different opinions. ... Some of the purists out there will inevitably have qualms with what I refer to as "MVC". Feel free to leave a flaming comment on the message board at the

bottom of this Web page. I will gladly entertain different perspectives on what MVC means, but keep in mind that I do not care.

A7: MVC always mentioned and introduced as/in presentation layer in software architecture books.

Read these books:

Architecting Microsoft.NET Solutions for the Enterprise (Microsoft press)
Professional ASP.NET design patterns (Wrox)
Enterprise Solutions Patterns Using Microsoft.NET (Microsoft press)
Patterns of Enterprise Application Architecture (Addison Wesley)
A Practical Guide to Enterprise Architecture (Prentice Hall)

14. <https://stackoverflow.com/questions/3226531/avoiding-bad-php-coding/3226557#3226557>

Q: There is a lot of books and tutorials about php that are completely different from each other. How can I choose the right way? Is the only way is test with xdebug or phpUnit or benchmark?

A1: It's also worth mentioning the use of a well defined pattern like MVC and build your project with some Framework like Zend, as this will encourage you to put each piece of code where it belongs.

A2: As code quality/readability/maintainability cannot be "benchmarked", I suggest reading books about proper code structuring and best practices. Maybe Code Complete book from Steve McConnell?

15. <https://stackoverflow.com/questions/31742485/what-is-the-standard-i-should-use-in-mvc-coding/31742915#31742915>

T: What is the standard I should use in MVC coding

Q: Based on the answers mentioned here, I understood that I should put the business logic inside the model itself, while in my program I am using EF directly inside the actions of the controller for example to get the list of cars from the database directly I am doing the following.

what is the impact on my website performance if I will use the mentioned above code inside controller or inside Model?

which method I should use? for example if I want to work with a team, is there a standard I should follow to separate the code, kindly advise

for using the repository pattern: I read that we should not use if as mentioned for example here , i will copy some of what mentioned:

A: The answer to your question is, it does not really affect performance but it will definitely become an issue in terms of maintainability as the application grows bigger. You can adopt the SOLID architecture principles: SOLID architecture principles using simple C# examples. This enables you to develop high quality software.

You can create a multi-layered application:

Interface Layer - MVC application

Business Layer - Class Library with classes with logic

Data Access Layer - Database Contexts and Repositories, unit of work with CRUD operations

Shared layer - Logging, AppSettings, validations, utilities, extensions, constants, enums

Having your application in this structure would require you to consider things like inversion of control, dependency injection and many more to ensure loosely coupled classes, easy unit testing and most of all a solid application.

You can also read this: Implementing the Repository and Unit of Work Patterns in an ASP.NET MVC Application

16. <https://stackoverflow.com/questions/3335578/asp-net-or-php-software-for-real-estate-agencies/3335832#3335832>

Q: Soon I begin create CRM for Real Estate Agencies sphere. In my background 2 years of PHP-programming & then 5 years of ASP.NET (intranet applications). & I think maybe ASP.NET (I write code on C#) have good IDE (VS 2010), but this is monster :) My application will be multiplayer web application for different real estate agencies (it is now fashionable to talk SaaS). Interaction over SSL via web browser. What situation with developing of web applications now? What language prefer for start new project? Pluses & Minuses of each? Or maybe choose another language?

Maybe now exist standards of data structure & exchange in real estate at this moment?

A1: Work in the language you are most comfortable with. All modern programming languages have pros and cons. It's more important that you build a good product than the language used to build it.

A2: Well... if you're getting paid heavily for this, play it safe and go the ASP.NET way. Otherwise, go the PHP way. Why? Because if you can play with it, learning a little bit more of PHP will turn out to be useful, especially because it's not OS-dependant.

A3: I would also heartily recommend C# and .NET over PHP.

My own personal bias is that C# is a vastly better language than PHP but I am sure you have enough experience in each to have your own opinion.

ASP.NET MVC is more maintainable than plain ASP.NET WebForms and it is a lot easier to implement TDD (Test Driven Development) in MVC which (again my opinion) leads to more maintainable and higher quality software. Depending on your experience however, it could be a lot faster to get something up and running in WebForms. You can mix and match to some extent though. It seems common these days to design the main parts of an ASP.NET site in MVC and to build the administration screens in WebForms.

You could also use System.Web.Routing in WebForms at first and migrate over to MVC over time although again this might be difficult depending on your experience.

One thing, you do not have to deploy on Microsoft Windows. The Mono project supports ASP.NET projects on Linux very well. If someone tells you otherwise, I doubt they have tried it. If you go this route, you could also consider an Open Source database like MySQL.

MySQL can handle very large web loads with high reliability. Again, I doubt the naysayers have much direct experience with it. There are other DB options on Linux of course.

Deploy on Windows if you want. I just wanted to say that the .NET/PHP decision does not limit your OS platform decision as some suggest.

A4: I'd suggest creating it in ASP.NET MVC. Why? Well, you've been developing ASP.NET and C# for longer than PHP and are familiar with the tools. I'd suggest MVC over web-forms as it makes it easier to separate concerns in the 'layers' of your app, making it easier to maintain and develop (especially with a "monster" application!).

A5: In this situation, I would suggest building the site in ASP.NET (MVC or WebForms would work) simply because the tools are better suited to larger projects and it's where you have the most experience.

Depending on the technologies used, this may limit your platform choices. If you build a basic .NET site and build your data access layer yourself, you can get away with running your .NET site on Linux/Apache/Mono/DB of your choice.

If you decide to go with technologies like LINQ to SQL (or LINQ to Entities) for Data Access or WCF Services to provide a backend for your site, you'll probably want to stick to Windows Server/MS SQL Server for Enterprise Level performance/reliability.

A6: That being said, it seems most real estate scripts are written in php, especially for non-enterprise products.

17. <https://stackoverflow.com/questions/20854041/refactoring-re-engineering-a-large-system/20857399#20857399>
Q: I am currently in the process of re-engineering a system which is written in struts 1.3 / PostgreSQL and Hibernate. The system is architecture'd as an MVC system with presentation logic in JSP's / Actions having View Logic and EJB's having Business logic. They have used Hibernate as a mapping layer, but some areas still use JDBC functions which have large number of business logic written inside them Or is to start from the DB, refactor the DB then come up the stack? Is start at the enterprise business logic layer and refactor the business logic? Where should I start and what should my approach be. I am now going through Martin Fowler's books and lot of articles on refactoring and re-engineering. But I would really appreciate some guidance.

A: First question would be "what is the purpose of refactoring?". Have you reached the point where the maintainability of the application is unmanageable, and fixing one bug simply exposes 3 others? Do you want to extend the application, and have you found it too expensive? Is application performance suffering?

I ask this because with such a large project, it's important to make sure your approach solves the actual problem you face. For instance, if you decide to start writing unit tests for the entire application, it may not help you with performance issues until much later. If you move the business logic out of the view layer, it may not help much with adding new features.

Next question is "is there a logical structure to the application, either in the technology solution or the business domain?". You've got a horizontal partitioning from the MVC architecture - is there a vertical partitioning? Again, as Namal Dinesh Ubhayawa suggests, picking a manageable, self-contained subset of the application, and working through that module top to bottom will quickly show whether you're on the right track.

Once you've agreed the module you're going to work on, create a release plan. Set yourself a target, and use whatever development process you've got to work towards that target. Make the target as specific as you can: The team will release a new version of the product information module by 15 February. The release will meet our quality criteria of 0 P1 defects, < 5 P2 defects, and < 15 lower priority defects. Unit test coverage will be x, code review coverage will be y. No methods will have a cyclomatic complexity > z. There will be no business logic in the view layer, and the data model will be normalized to 3rd normal form".

18. <https://stackoverflow.com/questions/2025206/asp-net-application-webcam-capture>

T: ASP.NET Application Webcam Capture

Q: Ok, so I have seen a ton of stuff on capturing an image from a web cam but I want to capture video. I want to be able to control quality, length and size of file that will be transferred. It is part of an ASP.NET MVC C# web application and would appreciate any guidance in finding info on this topic, as well as any comments on efficiency , security, etc.

A: For security reasons, linking to external hardware devices is not a capability that is permitted by most browsers. You will need to use a technology like Flash or ActiveX that has a binary presence on the client's computer and can bypass the browser security model; ASP.NET MVC all by itself won't cut it.

19. <https://stackoverflow.com/questions/11689156/how-to-take-userid-or-email-input-and-validate-in-servlet>

T: How to take use rid or email input and validate in servlet

Q: My question is simple. In some websites it is seen one can enter the site providing his/her email-id or userid and password(i.e already registered with the site). Now in MVC structure we use servlet as DECISION CONTROLLER. So after taking the input in servlet, we can compare them with userid or email-id column of user table. So to take input we can write in servlet: String input=request.getParameter("inputfield"); After taking the input what should be the way to check ,if the given input is email-id or userid? Should we compare the String input with each value of both the userid and emailid column of user table? If that is the only way the program quality will be very low and security can be exploited.

20. <https://stackoverflow.com/questions/5580123/asp-net-and-mvc-security>

T: asp.net and mvc, security?

Q: The company has a website that is driven with asp.net webforms. They would like to move over to MVC. So we have decided to create a new sub domain for the MVC page and then piece by piece convert the asp.net to

mvc. How can i setup the security (selfmade authentication) to overlap from the webforms page to the mvc page. What i want to do is to move the user from asp.net webforms over to mvc when they are accessing some code that has been rewritten. Then when they are using some other tools on the website they should be ported back to the webforms site. I dont want to validate the user between the move from the asp.net webforms to mvc and back. That should all happen automatically. Can i configure the sessions to stay intact when moving over to the new mvc subdomain? So the mvc should be able to access the same sessions that was created on the webforms site.

A: Try this page <http://www.packtpub.com/article/mixing-asp.net-webforms-and-asp.net-mvc> It shows how to use webforms inside of an ASP.NET MVC site. You want it the other way round, but I think you can get the results you want by putting the existing webforms application into a new ASP.NET MVC application. The article shows how you can access the same session variables from both parts, which I think enables your security implementation.

21. <https://stackoverflow.com/questions/27180161/mvc-security-and-access-control>

T: mvc security and access control

Q: I am new to MVC and I want to know how security and access control is handled within MVC. My case is, let's say I am managing an website where user can post a note that is not accessible by other user unless permission is given to do so. My database is currently structured as below.

Let's then say I have below URL and which will only be accessible by users with UserID 3 and 1 according to the owns note table.

/Note/Edit/1

What is the best practice to implement this kind of restriction ?

I can simply look up the table in the Edit Action and redirect to other page if user doesn't have access. But my problem is then when I implement new Delete action, or whatever actions in the future, I need to place the same code at the start of each action. Is this only way to implement this ?

Thanks in advance...

22. <https://stackoverflow.com/questions/12980904/good-java-mvc-security-framework>

T: Good Java MVC security framework [closed]

Q: Can anyone recommend me a good authentication security framework that allows the user to be authenticated by an email address as the user name, and allows the user to have a separate screen name?

A: MVC design pattern is completely unrelated to application security.

23. <https://stackoverflow.com/questions/13544238/why-do-my-azure-sites-keep-going-down>

T: Why do my Azure sites keep going down?

Q: I am testing Microsoft's Azure cloud platform and am hosting two very low-requirement websites. One is a simple single form MVC website that simply accepts some input from the user, performs some calculations, and spits out an output. The second is similar, but it performs a simple query against an Azure SQL Server instance. Both websites go down constantly. What appears to be happening is that if I don't hit the website for awhile (maybe an hour or so) the GET request simply fails. Nothing is ever returned from the server. If I wait a minute or two and try again, the website works perfectly. Anyone know what's happening or how I can fix it? I obviously cannot host websites on this platform if the reliability is this low.

24. <https://stackoverflow.com/questions/13109263/what-was-mvc-invented-for/13109595#13109595>

T: What was MVC invented for?

Q: I am new in web development, and read some wiki and discussions about MVC. However, the more I read, the more confusion I have about its design purpose. I just want to know why is this design pattern invented? And what problem is it used to solve?

A1: The goal of the MVC paradigm is in essence to ensure a form of separation of code. The problem that often arises when developing code is that the code is written in a succession, where each part follows another and where each part is directly dependent upon what the other parts are doing. When working with a large project, maintaining and further developing the code can quickly become an issue. You could therefore argue, in a simplified manner, that what the MVC paradigm tries to do is to ensure that you separate business logic (e.g. the code that performs) from the presentation logic (the code that shows the results). But those two parts need to communicate with each other, which is what the controller is responsible for. This allows for a clear structure of code where the different parts are more decoupled, meaning less dependent upon each other. The separation also means that you work in a much more modular way, where each part interacts with the others through an interface (some defined functions and variables that are used to call upon other parts) so that you can change the underlying functionality without having to change other parts of your code, as long as your interface remains the same. So the problem it tries to solve is to avoid having a code base that is so entangled that you can't change or add anything without breaking the code, meaning you have to modify the code in all sorts of places beyond where you made your original changes.

A2: To some degree it's a solution in search of a problem.

As a rather ancient programmer I'm well aware of the benefits of "separation of concerns", but (in my not-so-humble opinion) MVC doesn't do this very well, especially when implemented "cook-book" fashion. Very often it just leads to a proliferation of modules, with three separate modules for every function, and no common code or common theme to tie things together and accomplish the real goal: minimize complexity and maximize reliability/maintainability.

"Classical" MVC is especially inappropriate in your typical phone GUI app, where, eg, management of a database table may be intimately connected to management of a corresponding table view. Spreading the logic out among three different modules only makes things more complicated and harder to maintain.

What does often work well is to think about your data and understand what sorts of updates and queries will be required, then build a "wrapper" for the database (or whatever data storage you use), to "abstract" it and minimize the interactions between the DB and the rest of the system. But planning this is hard, and a significant amount of trial and error is often required -- definitely not cook-book.

Similarly you can sometimes abstract other areas, but abstracting, say, a GUI interface is often too difficult to be worthwhile -- don't just write "wrappers" to say you did it.

Keep in mind that the authors of databases, GUI systems, app flow control mechanisms, etc, have already put considerable effort (sometimes too much) into abstracting those interfaces, so your further "abstraction" is often little more than an extra layer of calls (especially if you take the cook-book approach).

A3: Model view controller was created to separate concerns in code instead of creating a hodge podge all in a single blob. (Spaghetti code) the view code is merely presentation logic, the model is your objects representing your domain and the controller handle negotiating business logic and integrations to services on the backend.

25. <https://stackoverflow.com/questions/25779199/when-is-the-mono-implementation-of-mvc-5-expected-to-come-out>

T: When is the mono implementation of mvc 5 expected to come out?

Q: Currently I am trying to figure out the architecture for a product revamp. The current project is in Asp.Net Webforms 4.0 but I am leaning heavily towards MVC 5 now. Problem is that a few customers (around 10%) do not want to get stuck with Windows Server licensing but our dev team/environment is .Net/Windows based. I was wondering if I could build it in MVC 5 leveraging the latest features like scaffolding, filtering, etc and also be able to port it to Linux based platform through Mono.

Does it sound realistic ? I wanted to know about the timelines for a stable implementation of MVC 5 in Mono so that I can know whether I can depend on Mono when my team would be working on portability 2-4 months down the line. Otherwise MVC 5 may be a dealbreaker for us. I went through the Mono site and it links to StackOverflow for any questions ... so here I am

A1: MVC 5 will likely never be 100% stable/supported on Mono, as it builds upon System.Web which Microsoft never open-sourced and is difficult to recreate in Mono. edit this may change now that the sources for System.Web have been made open source.

MVC 6 (and all the other stuff from ASP.NET "vNext") is a complete rewrite to get rid of System.Web and will support Mono out of the box, as Microsoft actively tests on it.

See <http://www.asp.net/vnext>, <https://github.com/aspnet/Home> and <https://github.com/aspnet/Mvc>.

My advice would be to keep an eye on ASP.NET "vNext" (it is in development stage right now, but will be the future of ASP.NET for the next decade) if you want to have proper Mono support. You can also start with MVC 5 now, but be aware that there will be breaking changes by the time you upgrade to MVC6.

A2: You could also try Nancyfx, which is a MVC framework that has been built from the start to work with .net and mono.

I currently use it on a project. I develop on windows and .net and then publish(copy files) to Ubuntu and mono. Its very seamless.

Nancy's hosting support is very broad also.

Hosting Nancy with ASP.NET

Hosting Nancy with WCF

Hosting Nancy with Azure

Hosting Nancy with OWIN

Hosting Nancy with Umbraco

Hosting Nancy with Nginx on Ubuntu

Hosting Nancy with FastCgi

Self Hosting Nancy

26. <https://stackoverflow.com/questions/41526029/net-mvc-application-into-an-n-tier-application>

T: NET MVC application into an N Tier application

Q: In either .NET MVC 5 or a .NET Core MVC application, is it possible to split your Models into a Data Transport Layer, your business logic into a Business Logic Layer and your Db Contexts into a Data Access Layer? I essentially would want the main project to really only have controllers that call to the BLL, and display the results in the view. That way there is portability with my application if I wanted to exchange the main project, which is essentially just a presentation layer. I know I am going to be needing this kind of architecture as I am building an application that will share a lot of the same business logic between the two applications. What ways can I still get access to helpful features like scaffolding a model into views/controller, and still maintain that portability? Is there a way to do such a thing?

Please note, that this project may be on a short budget, so it is pretty essential to be able to maintain the scaffolding tooling.

27. <https://stackoverflow.com/questions/10518507/php-mvc-framework-maximum-6-includes-per-action>

T: PHP - MVC Framework - Maximum 6 includes per action

Q: I'm developing a small PHP-MVC framework which's main principle is simplicity of use and debug and also portability, performance (above all) and ultra-easy learning curve. In my framework, the router and the controller are in the same file, because I don't really use a router, I simply parse actions from the _GET and _POST So my idea is to try to, no matter what action is being called, never (or almost never) do more than 6 includes (include()). The idea of this is to sustain readability and performance at their best. What you guys think? Do you think it's a good idea or not?

In my framework, the router and the controller are in the same file, because I don't really use a router, I simply parse actions from the _GET and _POST So my idea is to try to, no matter what action is being called, never (or almost never) do more than 6 includes (include()). The idea of this is to sustain readability and performance at their best.

What you guys think? Do you think it's a good idea or not?

A1: many includes are no problem, at least not with opcode caching extensions like xcache or apc. they cache the classes in memory and hold them for later usage (nearly instant).

you should plan the class interaction with something like uml and prefer single responsibility of classes and methods over using less of them.

if you like mvc you might want to look at h-mvc as it enables hierarchical controller calls using mvc. also you should try to decouple the view from the template engine.

A2: The point of using includes in the first place is to narrow down what you need so you don't wind up running code or defining functions you won't be using at all. Many lightweight frameworks out there build on this idea: "use only as needed". Of course if your framework only requires 6 files, sure it cleans up the code a bit but then you run into other problems such as loading time, functionality, usefulness, reusability, memory, readability, debugging, maintainable... It's just not practical in my opinion to force yourself down to 6 files only.

28. <https://stackoverflow.com/questions/498536/is-mvc-good-for-mobile-device/537733#537733>

T: Is MVC good for mobile device?

Q: Is it good for develop MVC Framework by using J2ME (Resource,Speed,Performance,...)?

A: Yes, MVC eases the design process and promotes portability. Check out PureMVC . The J2ME version is in alpha. Nokia is using it.

29. <https://stackoverflow.com/questions/30991580/mvc-plugging-a-c-model-into-a-web-based-view>

T: MVC: Plugging a C++ Model into a Web-based View

Q: I am writing a tool using MVC where the model is written in C++, controller in JavaScript/jQuery and the view in HTML/CSS. The reason the model is in C++ is for eventual portability to a thick client from the "speed build" on web.

Issue

My major roadblock at this point is connecting my C++ model to the HTML form that is currently collecting input data from the user.

I have looked into Emscripten for compiling the C++ directly into JavaScript, but I don't like the idea of having my underlying model be visible to the end user in any form. This is due to the model being hooked up to a MySQL server handling a lot of sensitive data. I want to minimize risk of the end user accidentally (or purposely) messing with the function call invoking the model.

I have done quite a bit of research on PHP/C++ linking, but all the resources I could find have been severely outdated and/or convoluted.

I'd ideally like to have the data pushed to the server using a POST method before invoking the model so I can have maximum control over input validation both on the end user and server side.

I've also thought about using PHP to push to the MySQL server then having the C++ pull down from the server, but this seems a little obfuscated and raises the issue of when/how to wake the C++ up.

Question

Is there a good way to maintain security of my model (have it run entirely server-side behind a POST method) as well as the understandability of how this was implemented? I am a temp employee and my project will pass to other hands for the port to a thick client from web.

Speed is also a concern, but I'm assuming (or hoping) that the only bottleneck will be the pipe/script between the POST to the server and the C++ since most of the heavy-lifting will be occurring in the model.

A1: What about not putting any business logic in your model and instead break the model up into an Entity and Service?

You could then use emscripten on the Entity while your Service holds all of your MySql connection logic.

30. <https://stackoverflow.com/questions/32709169/htaccess-configuration-adding-two-forward-slashes>

T: htaccess Configuration adding two forward slashes

Q: I am running a custom PHP MVC system and I am handling some of the normal .htaccess functions inside my PHP to ensure portability of the site but I have run into problems with, guess what? Portability!

Everything works fine except the home page, somewhere two forward slashes are being added to the domain name, but I don't believe that it can be attributed to my .htaccess Apache directives.

I'm adding the base to the url like

To see what's happening exactly, the reference site is Entourage Media.

Can anybody please help me understand this problem?

31. <https://stackoverflow.com/questions/315782/develop-app-to-run-natively-or-go-cross-platform/315801#315801>

T: Develop app to run natively or go cross platform?

Q: What's your opinion on whether one should write an application for a specific platform or use a cross platform approach and reach more potential clients?

It would be a GUI based application and I'm thinking of using Java.

Most of the applications that I've used built on Java don't run as smooth as the native applications on the respective platforms.

The two platforms I'm thinking of are windows and macs.

If I was creating the app just for my own use, and I had to choose one system, I would choose to focus on the mac. I would like to hear your thoughts.

A: I would use Qt and yes, definitely target Cross Platform...

The major reason isn't in fact what you think it is (being cross platform by itself) but actually that by targeting multiple platforms your code by some freaking weird magical reasons tends to end up with far better code quality. I've seen this happen countless times in my own projects. Every time I add a new platform the quality of the code increases and the code becomes more clean...

Also every serious app should have as few "dependencies" as possible, being cross platform means you have less dependencies... ;)

Then as a "bonus" you get to your app to run on multiple platforms...

A2: Cross platform development, in general, is a bit overrated as an artform. Java is the leading technology here, but even in this case, most Java programmers don't really go cross platform. There are a few spectacular examples of tools like Vuze and LimeWire and JRipper which work pretty well just about anywhere, but these are exceptions, statistically speaking. Most Java apps, especially of the corporate variety, are coded with one platform in mind, and they never really move around.

If you want to go Mac and Windows, consider spending time in the Limewire and Vuze codebase. Both of these apps work extremely well on both platforms.

You will definitely need two builds. One build probably won't do.

A3: Requirements, requirements, requirements.

In all seriousness, "it depends" is the right answer.

Truly cross platform is hard work; Working where you/your users are familiar is worth something. Solving the problem in an effective manner is really the highest priority.

A4: I suggest to develop it first for the platform you feel comfortable with, and where you can make use of all platform gimmicks; in this case, this would be OS X.

Later, if your app is successful for the Mac, look at porting options. It's IMO not worth to put effort into porting until it is certain that there would be significant interest in the app in the first place.

A5: In this day and age, is there really a good reason to write native code?

Yes. The languages and libraries available do not allow excellent programming to be done well. At best they allow one to write code that works ok across platforms, but never excel.

Pick one and focus on it. Focus on that audience (you'll find the audiences are different in their tastes and desires anyway).

Once you've got an app people are clamoring for on the other side, and just before someone makes a competitor, evaluate the cost/benefit to porting your finely tuned and well designed product over.

If you try to 'serve two masters' you'll make design decisions based on what's easiest for both platforms, and that's not a good design process.

A6: If your app uses an MVC design, you can write portable model classes using C++, and native controller and view classes for each platform you want to support. That gives you the best of both worlds - portability where that's practical, and a native interface for which your users will thank you.

A7: IMHO, this discussion should be answer by the customer needs.

Most of the time IT provide solution, the way the solution is build is only a detail for the customer.

However making the code reusable could be useful in case your first choice of development environment was wrong.

many other criteria may come into the thinking. for instance if your software is for health care you may want to support for 10 years, then you have to select an OS supported for more than 10 years (forget windows and mac). etc.

A8: I agree with your observation about Java applications versus native applications, although I'm sure that an experienced Java programmer could probably make it work.

The bottom line is that the programming APIs for both Mac and Windows are the best tools to use for building interfaces on their respective systems. If you want your app to run smoothly on a particular system, you should use that system's API.

If it is absolutely essential to have a cross-platform implementation, consider writing all of the core functionality (non user-interface portion) for your program in a library that can be compiled for both systems (c++ is an obvious choice), and then build a nice user interface for each target system that can make calls to the common library.

A9: Depends on how much time you wish to spend on the application. Fastest way is Java, otherwise you can build your model with C++ and do separate GUI code using MFC and Cocoa.

A10: Make it a web app ? Otherwise Java i guess. It depends of many things, type of your app, target etc.

A11: It really depends on who your users will be. Don't go cross-platform just because you can. There needs to be a real need regardless of the tool. And testing is going to eat up quite a bit of time. You'll still need to thoroughly test on both platforms.

I use REALbasic to create a wide variety of cross-platform desktop applications from a single code base and it has worked well for me and my clients.

A12: I have had good luck with cross platform Java using SWT. This will give you a nice native-look on any OS, and there aren't a whole lot of problems out there that require any JNI code. With any luck, you should be able to distribute the exact same codebase to both targets, and it should just work.

Having said that, you should evaluate whether or not you really need the cross platform functionality. At the very least, it will require you to test the GUI layer of your app on each OS (testing layouts, presentation, etc). With a large app, this becomes cumbersome very quickly.

In either case, choosing a cross-platform language from the start will give you flexibility in the future. If you were to write native code from the start, it would be non-trivial to port the code to another platform. It would likely be accompanied by several bugs, and would also require a port of all the test code to the new platform. You would run into synchronization issues with any new features, bug fixes, etc. With Java, you can write JUnit tests which will run in both OS's, and any bugs or new features will be propagated to both versions automatically.

It really does depend on your specific application. If you are anticipating a user base on both OS's, then that should dictate your language choice.

A13: It is possible to get a nice looking Java app to run on Windows, Linux and Java - look at SBCommander for example - and note that you can run it and look at the UI even if you don't have the hardware that it's supposed to control.

On the other hand, one thing I've found very hard to do is to write a cross-platform app that looks and behaves like a native app on each platform; there are just too many different assumptions about how an application should behave.

A14: Why don't you consider Web Application.

You can build rich UI Web site running in browser which runs everywhere and all platforms, If you are familiar with Java, you can try GWT for the 'Weblication' Check out the demo page of GWT.

A15: Quite often I find PC developers attempt to capitalize on the Mac market (some do successfully). In turn, they development the application in the described above "cross-platform" architecture (Java, or some Qt framework, etc...) The result is usually, a hideous looking application with poor OS integration support and the community backlash commences in the reviews.

My advice, port it. Do a good job, understand your market before dumping your cross-platform product in your carpet bomb marketing approach.

32. <https://stackoverflow.com/questions/27111298/how-to-use-asp-net-identity-on-wcf-service-in-asp-net-mvc-project>

T: How to use ASP.Net Identity on WCF Service in ASP.Net MVC project.

Q: I'm having all kinds of trouble understanding this. Every article I read seems to have some unmentioned prerequisite amount of knowledge. I have written a WCF service that was initially designed to be an intranet service. Now we are moving this service to a cloud hosting solution and it needs to only let authorized users call its methods. I've since created an ASP.Net MVC 5 website for support purposes. The idea for this is that support staff will login to the mvc site with seeded credentials and add users as they sign up for the service. At the moment, users should not need to enter username or password anywhere. The service client will have username and password knowledge via local settings or configuration file or something and the authorization will be invisible to users. The MVC project seems to be working fine after some changes to the out-of-the-box flow.

The database (remote) is created and being populated with new registered user information. Because the WCF service is in a different project, and to keep a level of portability I have referenced that project in the MVC project. I then added a "wrapper" wcf service to the MVC project that I intend to be the forward facing door to the existing WCF project. In this wrapper wcf service is where the authentication should happen. I don't understand how to tie the ASP.Net Identity authorization used in the new MVC project into the wrapper wcf service. How can I make the wrapping service authorize user credentials against the identity database created and populated using the MVC site?

33. <https://stackoverflow.com/questions/10722169/sip-api-as-webservice>

T: SIP API as webservice

Q: I'm currently in an early stage of my internship at a company which offer VoIP solutions. I'm basically here to create a custom SIP-client App for iPhone. I told them however, if I were to set up the MVC pattern correctly and more efficient in terms of portability, there would be minimal code to write when porting to different platforms.

I've chose to go with MonoTouch C#.NET, for high portability and productivity (learning Objective-C is too steep for my timeframe + memory management too time consuming). To create even more portability I've been thinking of exposing a C# SIP library as webservice, so when porting to Android there's even less hooking up to different APIs. Also, MonoTouch for compile reasons does not allow usage of Dynamic Libraries.

My app would communicate to the SIP webservice and the webservice in turn to the SIP server.

SIP is very familiel to HTTP, but could this solution work? As I'll be facing Realtime Transport Protocol aswell.

Kind regards

A: As far as I know, it won't work because, as you mentionned, you will face RTP. You'll probably get a lot of lag in your conversations. Also, you'll have to figure out how you are going to stream the data between the clients and the server.

However, to really know if this can be done would be to do a few prototypes to test these kind of issues.

34. <https://stackoverflow.com/questions/3319378/getting-started-with-repository-pattern>

T: Getting Started with Repository Pattern

Q: I'm trying to get started with the repository pattern and ASP.NET MVC, and I can't help but believe I'm missing something. Forgive me if this is a stupid question, but it seems to me like an implementation violates DRY exponentially. For example, in my (admittedly novice) understanding in order to implement this, I would have to:

Create my database model (Currently using Linq to Sql)

Create a IRepository for each concept (table or group of related tables)

Create an implementation for each IRepository Do we return L2S objects or some sort of DTO?

Create viewmodels which either are containers or copies of the data

Use some method of DI (Windsor or Unity?) on the controllers

While I realize scalability and portability come at an expense, it just feels like I'm missing something?

A1: I tried to implement the Repository Pattern in LINQ 2 SQL and it doesn't work very well, mainly because L2S doesn't use POCOs and you have to map to DTOs all the time as you mention. Although you could use something like AutoMapper, L2S just isn't a very good fit for the Repository Pattern.

If you're going to use the Repository Pattern (and I would recommend it), try a different data access technology such as NHibernate or Entity Framework 4.0's POCO support.

Also you wouldn't create a Repository for each and every table, you create a Repository per Domain Aggregate, and use the Repository to access the Aggregate's Root entity only. For instance, if you have an e-commerce app, with Order and OrderItem entities, an Order has one-or-many OrderItems. These 2 entities are part of a single Aggregate, and the Order entity is the Aggregate Root. You'd only create an OrderRepository in this case, NOT an OrderItemRepository as well. If you want to add new OrderItems you'd do so by getting a reference to the Order entity, then adding the new OrderItem to the Order's Items collection, then saving the Order using your OrderRepository. This technique is called Domain Driven Design, and it's a very powerful paradigm to use if you have a complex Domain Model and business rules in your application. But it can be over kill in simple applications, so you have to ask yourself does the complexity of your Domain Model warrant using this approach.

In terms is adhering to DRY, normally I create a base Repository class that has common methods for Save, Delete, FetchById, that sort of thing. As long as my Repository classes implement this base class (OrderRepository, ProductRepository etc.) then they get these methods for free and the code is DRY. This was easy to do in NHibernate because of POCO support, but impossible to do in Linq 2 SQL.

Don't worry too much about sending your Domain Models directly to the view, most dedicated ViewModels look almost identical to the Domain Model anyway, so what's the point. Although I tend to avoid using the DM for posting data back to the server because of under/overposting security concerns.

If you follow this POCO approach (and ditch LINQ 2 SQL, honestly!!), you end up with only one class (your POCO entity) instead of 3 (L2S class, DTO and ViewModel).

It is possible to implement the Repository Pattern badly, so tread carefully, read a few tutorials, blog posts books etc. (I recommend Steven Sanderson's book, especially look at the Pre-Requisites chapter) But once mastered, it becomes a very powerful way to organise the complexity of hydrating Model objects to and from a data-store. And if you use Repository interfaces (IOrderRepository etc.) and have them injected via an IOC Container, you also gain the benefits of maintainability and unit testability.

A2: This has been brought up before, at first glance certain aspects of properly separating concerns does seem to violate DRY.

As you've mentioned MVC have you read Steve Sanderson's Pro ASP.NET MVC 2 Framework book? It spends a great deal of time explaining why using the repository pattern is a good idea.

You might find that, for the projects you're working on, it isn't appropriate, that's okay. Don't use it and see if you come across problems that this could have addressed. You don't need to be a developer for long to realise how crucial it is to keep different parts of your application as loosely coupled as possible.

35. <https://stackoverflow.com/questions/43646189/spring-form-tag-doesnt-allow-context-relative-actions>

T: Spring form tag doesn't allow context relative actions

Q: I recently had to port a smallish Spring MVC webapp from a legacy box it was running on, and I had to fix a small number of portability issues with it.

36. <https://stackoverflow.com/questions/862003/mvc-in-a-google-app-engine-java-world/5780606#5780606>

T: MVC in a Google App Engine Java world

A: Play Framework would fit the bill. It's a modern MVC framework for Java and has a Google App Engine module to provide compatibility. See <http://www.playframework.org/modules/gae>.

Another benefit to using Play would be portability. You can deploy Play using its built-in webserver (optionally behind apache for caching, load-balancing, etc) or you can bundle as a .war file for deployment to the many Java application servers (Glassfish, Tomcat, ...).

37. <https://stackoverflow.com/questions/32045431/controller-in-mvc-design-pattern/32045910#32045910>

T: Controller in MVC design pattern

Q: I want to ask that in MVC why do we need controller.why don't we just directly connect model and view.what would be the problem if we don't have controller ?

- A: MVC is a Software Architectural Design Pattern and by dividing your code it makes it more readable, maintainable and portable.
38. <https://stackoverflow.com/questions/252514/create-a-cross-platform-windows-mac-os-x-application/252558#252558>

T: Create a cross platform Windows, Mac OS X application.

A: It's good that you're thinking of portability early on - it's vastly more difficult to "bolt it on" after the fact. There are various cross-platform kits available, but IMHO all of them fall a bit short of providing a "native" look and feel on all the supported platforms. On the Mac (what I use), proponents of such kits always want to mention that they're using native controls. That's a good start, but it's not the whole journey. Other issues addressed by Apple's Human Interface Guidelines include how the controls should be arranged, how button labels should be phrased, what standard shortcut keys should be used, etc.

Even Microsoft had to learn the hard way about the dangers of trying to write a cross-platform GUI, with the ill-fated Word 6.0 for Mac. IMHO, a better approach is to use an MVC design, with the model layer written in standard, portable C++, and the view and controller layers using the native toolkit for each platform. For the Mac version, Carbon and C++ throughout used to be an interesting option that is now not supported anymore, so you would want to use Cocoa, using Objective-C in the view and Objective-C++ in your controllers to bridge the language gap. Your Windows version could likewise compile your model as "managed C++", and use any .NET language for controllers and views.

39. <https://stackoverflow.com/questions/5109471/suggestions-on-portlet-development-approach-on-liferay/5111163#5111163>
- Q: We are in the phase of evaluating some of the frameworks for portlet development. As of now I know of below 3 options. I would like to know your experiences with them and others
- Struts 2
Spring Portlet MVC
Liferay 6.x MVC Framework
- Please try to share Pros/Cons in following areas along with what you think is important
Speed of development Maintenance. Ease of development with Geo Distributed teams
Please suggest any other frameworks which can be used as alternative with some pros.
40. <https://stackoverflow.com/questions/12412281/where-can-i-find-reusable-asp-net-mvc-ui-components>

T: Where can I find reusable ASP.NET MVC UI components?

Q: I'm new to MVC and am still adjusting to the drastic switch from WebForms. I was a bit happy when I found that the idea of ready-made components is not totally gone when I found <http://nuget.org/packages/TinyMCE.JQuery>, a nuget package that installs an HTML editor component such that it just takes the addition of a UIHint attribute to use it.

- My question is where do I go to find more things like this which will help me get closer to the level of efficiency I got used to with WebForms/AjaxToolkit (not withstanding my obvious need to keep learning MVC best practices)?

41. <https://stackoverflow.com/questions/39327239/php-mvc-requesting-data-from-another-model>

T: PHP MVC Requesting data from another model

Q: This is really a question about MVC standards and efficiency.

I have a User Controller, and want to retrieve data from my Session model. There's 2 ways I can go about doing this:

I can request the data directly from the Session model from within the User Controller. (UserController ---> SessionModel) OR I can ask the SessionController to ask the SessionModel for the data. (UserController ---> SessionController ---> SessionModel).

Both ways would seemingly work, and I'm not sure if either way is an 'incorrect' way of doing what I want. However, the second option seems somewhat inefficient and pointless. It just seems to be adding another layer in order to retrieve the data. However, I'm not sure if the first option goes against the rules of MVC as per say.

Any advice on this would be much appreciated.

42. <https://stackoverflow.com/questions/33720675/are-there-automatic-field-naming-transformations-conventions-in-asp-net-mvc>

T: Are there automatic field naming transformations (conventions) in ASP.NET MVC?

Q: I am developing an ASP.NET MVC application with SQL Server. I do my best to write good code by using built in elegance and efficiency. However, in the database I prefer to further naming in underscore_case, like id_item_something. On the C# code side, everything is CamelCase, like IdItemSomething. Are there some magic transformation that could be configured for not having to write a lot of ...ToTable().Property(...).HasColumnName(...)? Is the DefaultControllerFactory the right place to look at? I have seen such transformations in the JavaScript-jQuery-CSS domain ("background-color" is addressed by "backgroundColor"), and in ASP.NET there is at least the PluralizingTableNameConvention.

43. <https://stackoverflow.com/questions/4975642/mvc-architecture-decision-how-to-re-factor-existing-approach-into-controllers>

T: MVC architecture decision - how to re-factor existing approach into controllers/views and database access.

Q: Consider the following scenario:

Page written in classic ASP or PHP, which is rendering a data report (series of HTML tables for simplicity). There is one main database query and then multiple sub queries as the page renders. The report is split into sub panels, which correlate to a sub query. Therefore: Main database query. Loop over result. For each row, execute sub query and render report panel.

How would you architect a similar report using the MVC pattern?

This can be split into two parts:

Efficiency at database level of multiple queries, which are dependent on values from an outer query.

If all data was processed and prepared in the controller, would this also be deemed inefficient if looping within the controller and then again in a view to render. Could sub controllers be used or sub panels, which encapsulate smaller sections of logic i.e. loading data and rendering report panel.

44. <https://stackoverflow.com/questions/735681/what-is-a-good-balance-in-an-mvc-model-to-have-efficient-data-access>

T: What is a good balance in an MVC model to have efficient data access?

45. <https://stackoverflow.com/questions/21656849/consecutive-daily-user-visits>

T: Consecutive daily user visits

Q: I have an Asp.Net MVC 5 website in which I'm trying to get the number of consecutive days users have visited my website. StackOverflow has this and it's reported on open your profile However, I want to track the users which have checked the Remember Me checkbox to stay logged in. How can I do this? Note: One thing that came to my mind is to create a global attribute and do this for every action (if(User.Identity.IsAuthenticated)) but I don't think that's a good idea because I have to load the user info for every single request and run the check. Efficiency is very important here.

46. <https://stackoverflow.com/questions/2074053/refactoring-an-algorithm>

T: Refactoring an algorithm

Q: I'm trying to re-implement ASP.NET MVC routing rules in C++ for my own MVC application.....

I would love for any suggestions for improvements, including in formatting and code structure but mainly in runtime efficiency.

47. <https://stackoverflow.com/questions/25114707/how-to-use-authorize-attribute-in-project-which-using-mvc-portable-areas>

T: How to use [Authorize] attribute in project which using MVC Portable Areas

Q: My project using MVC Portable Areas, its contain 2 projects, one is the main, and the other is Account project. In AccountController, I use [Authorize] attribute to redirect user to Login page, but I always receive "You don't have permission to access this directory". Any solution for me?

48. <https://stackoverflow.com/questions/28021807/onion-vs-n-layered-architecture>

T: Onion vs. N-Layered Architecture

Q: One thing beforehand: I arrive from an N-layered background. I have now spent quite a bit time getting my head around Onion Architecture and related Domain Driven concepts such as Hexagonal Architecture reading resources like Jeff Palermo's series of blog posts, Seemann's contribution from a DI-perspective, "Onion-izing your architecture", and "The clean architecture".

What all of these articles have in common is that they claim the following points:

Focus is kept around the domain model of the business use case

Looser coupling between layers by emphasizing the Dependency Inversion Principle

Increased independence of external infrastructures such as frameworks, data persistence, UI

Better testability / maintainability

49. <https://stackoverflow.com/questions/22546361/how-can-this-layered-architecture-be-improved>

T: How can this layered architecture be improved?

Q: My issue with this architecture is if I want to add new functionality like getMostRecentOrder() to a module that depends on our Common project, I have to create 4 methods instead of 1. Also we have another layer for one of our applications that abstracts Spring as engineers don't want/need to know about it which creates 5 methods total.

Has anyone followed a similar layered architecture like this and was able to resolve or find a better solution?

The architect that I work with likes this structure but I am starting to really dislike it as it is tedious for me to add all these methods just to get data out and it seems like I am writing a lot of duplicate code with just data type changes because of the layers that are in place.

The architect wants our BOs to be generic like WeatherBO that has all the business logic for weather, EventBO for all the logic for events, etc. My issue with that is our BOs are starting to be 1000 lines of code and I feel depressed when we have large classes.

Can anyone provide some insights on some successful Java layered architectures that is simple (3 layer vs my 4 or 5 layer), maintainable, flexible, scalable, etc (basically a developer's number 1 dream haha)?

50. <https://stackoverflow.com/questions/17613530/rest-app-architecture/17614050#17614050>

A: Better create a pure REST service and consume it from both the client. It will provide a clean layered architecture as you are not mixing service with client in one app. By having a common service separately you would have : Separation of concern, Clean Architecture, Proper Layering, Readability and better Maintainability.

51. <https://stackoverflow.com/questions/6607468/web-application-program-design-architecture/6607561#6607561>

T: Web application / program design architecture

Q: The architecture depends on what kind of project you need to create, complexity of project and business logic, scalability, maintainability, any way you should implement your project in the way that you can easily change your code and the tiers and classes should be much more decoupled you should use ASP.NET MVC for application layer, and I suggest to use IoC-containers for dependency injection, you can start with 3 layer architecture with Repositories data access layer, Services classes business logic layer, ASP.NET MVC

application layer and another thing you should use ORM like NHibernate or Entity Framework. If you have a complex domain you should look at the DDD.

52. <https://stackoverflow.com/questions/573201/whats-the-best-way-to-structure-a-project/573256#573256>

T: What's the best way to structure a project?

A: I'm currently working on front-end web application that has a 3-tiered architecture:

Client tier (the browser)

Application tier (Java EE application server, where the application will live)

Backend tier (mainframe and legacy apps, various databases)

It has a layered architecture, and the layers in the Application tier are

Presentation layer: generates the UI that will be used in the Client tier

Application layer: the equivalent of use cases, contains application logic

Service layer: maps domain logic and data from Backend tier onto a Java model

Integration layer: communicates with the Backend tier and contains gateways for JMS, email, ... and DAOs and other stuff

This is just an example project structure, and the end result will depend on the type of application. You can read more in my answer to this question on the division and naming strategy for packages.

You can add/swap/remove layers as you see fit. In a SOA for example, you can layer a Webservice layer on top of the Application layer or Service layer, so that the ESB (Enterprise Service Bus) can connect to your application or services. If any of this is impossible or seems very difficult, you don't have an optimal architecture and design.

When thinking about the structure of your project and to allow scenarios like the one above, some important properties of your modules and components you want are:

Testability

Reusability

Maintainability

You can achieve this by designing for low coupling and high cohesion. Choosing a layered architecture by grouping modules by the level of functionality/abstraction is a good start. Within each layer grouping further by functionality helps as well. Letting each more specific layer only depend on interfaces of a more general layer reduces coupling too.

53. <https://stackoverflow.com/questions/16937221/bll-dal-obj-and-3-layer-architecture/16937537#16937537>

Q: My question is about 3 layer architecture.

A: From MSDN Article

The main benefits of the N-tier/3-tier architectural style are:

Maintainability. Because each tier is independent of the other tiers, updates or changes can be carried out without affecting the application as a whole.

Scalability. Because tiers are based on the deployment of layers, scaling out an application is reasonably straightforward.

Flexibility. Because each tier can be managed or scaled independently, flexibility is increased.

Availability. Applications can exploit the modular architecture of enabling systems using easily scalable components, which increases availability.

You have tight coupled layers. Try to make them loose coupled.

To start with, following visual studio solution template may help you out.

54. <https://stackoverflow.com/questions/36365580/yellow-warning-when-referencing-another-project-in-an-azure-webjob/36367130#36367130>

Q: I have a WebAPI running on Azure WebApps developed with EF Code First. Now I need WebJobs for some scheduling tasks which should refer to the same DB and Models. I tried adding reference of the WebAPI project but that marks the DLL as yellow exclamation. I'm unable to get how should I proceed. Can you please guide me a bit?

A: My advice is to modularize your solution and move all your Data Access related classes (DbContext, entities) inside another project which will be referenced by both your Web API and WebJobs projects.

This is a common approach for improving the maintainability of the code and enforce basic software engineering principles like separation of concerns, and is obtained by dividing your application into different functional layers (a.k.a. multi-layered architecture).

55. <https://stackoverflow.com/questions/14502181/how-to-pass-datareader-value-from-dal-to-presentation-layer/14502370#14502370>

T: How to pass datareader value from DAL to presentation layer.

A: Well, the basic idea of a layered architecture is to decouple the different components for several reasons. Some reasons are testability, maintainability, extensibility but there are many more.

56. <https://stackoverflow.com/questions/39638085/what-is-the-difference-between-a-layer-and-a-component/39639775#39639775>

Q: What is the difference between a layer and a component?

A: Layers and Componentization are 2 design approaches followed with an intent of architectural concerns. If the architecture/design enforces the need to attain reusability, extensibility, modularity & maintainability kind of features, Layers would help you.

If your application is not too complex with no scope for customizations and extensibility, you may choose to code everything in few components. Ultimately, it is strategic architectural & design need, which normally makes you to orchestrate with Layers & components.

57. <https://stackoverflow.com/questions/2689576/is-n-tier-software-design-a-subset-of-soa/2689597#2689597>

A: Is n-tier software design a subset of SOA?

Q: SOA is a design strategy for an enterprise. There is lots written about what it is elsewhere, however it decides how systems interact using services.

N-tier software architecture is application specific. It assists maintainability and scalability by separating layers of code.

58. <https://stackoverflow.com/questions/2199176/explain-the-different-tiers-of-2-tier-3-tier-architecture/3251982#3251982>

T: Explain the different tiers of 2 tier & 3 tier architecture?

Q: I am not able to understand which elements are called as first tier, second tier & third tier & where they reside. Can they reside on same machine or different machine. Which tier reside on which machine? How we can identify a particular application as a 2 tier application or 3 tier application. Please explain with example.

A: Tiers are nothing but the separation of concerns and in general the presentation layer (the forms or pages that is visible to the user) is separated from the data tier (the class or file interact with the database). This separation is done in order to improve the maintainability, scalability, re-usability, flexibility and performance as well.

59. <https://stackoverflow.com/questions/33370946/in-n-tier-architecture-which-layer-asks-a-security-layer-to-authenticate-a-login>

A: My question comes from using the first window which is the login window which asks for a user account and password. Once the button at login has been pressed should the Presentation Layer ask the Security Layer to authenticate or should the Presentation Layer Ask the Business Layer which in turn asks the Security Layer?

60. <https://stackoverflow.com/questions/44689082/is-vpc-enabled-lambda-architecture-can-be-any-better>

Q: Our architecture is a FAAS approach, where our entire backend is on Lambdas. The persistence layer is a managed Cloud Mongo Cluster, so called Atlas. Lambdas in the VPC talk to mongo cluster using a peered VPC connection.

I need a VPC enabled Lambda, because Lambda talks to mongo cluster using the VPC Peering connection. I need a NAT gateway because resources inside Lambda has to talk with external internet resources. Here is my VPC-Lambda-Mongo architecture:

Security and Safety is very important, Do you suggest any better architecture than this? I would be happy to hear it.

61. <https://stackoverflow.com/questions/73538/do-you-know-any-examples-of-a-pac-design-pattern>

T: Do you know any examples of a PAC design pattern?

Q: Can anyone point to any websites or web applications that are using the Presentation-Abstraction-Control design pattern rather than MVC? Desktop applications are easy to find like this (e.g.; GIMP) but I'm looking for something on the web.

Please check the answer and comments of my previous question in order to get a better understanding of my situation. If I use Google DataStore on AppEngine, my application will be tightly coupled and hence loose portability.

62. <https://stackoverflow.com/questions/15633110/how-to-build-a-cloud-application-and-keep-portability-intact>

Q: I'm working on Android and will be using backend which will reside in the cloud. I need client-cloud communication. How do I build an application maintaining portability. What design patterns, architectural patterns should I be using?

Should I use a broker pattern? I'm perplexed.

A1: Google AppEngine provides JPA based interfaces for its datastore. As long as you are writing your code using JPA APIs, it will be easy to port the same to other datastores (Hibernate for example also implements JPA).

I would ensure that the vendor specific code doesn't percolate beyond a thin layer that sits just above the vendor's APIs. That would ensure that when I have to move to a different vendor, I know exactly which part of code would be impacted.

A2: In order to maintain portability for my application, I've chosen Restlet, which offers Restful web apis, over endpoints. Restlet would help me to communicate between server and client.

Moreover, it would not get my application locked in to a particular vendor.

A3: It u really want to avoid portability issues use google cloud sql instead. If u use the datastore unless its a trivial strucfure you sill not be able to trivially port it eve if you use pure jpa/jdo, because those were really not meant for nosql. Google has particularifies with indexes etc. Of course sql is more expensive and has size limits

63. <https://stackoverflow.com/questions/4564477/dry-vs-security-and-maintainability-with-mvc-and-view-models>

T: DRY vs Security and Maintainability with MVC and View Models

Q: I like to strive for DRY, and obviously it's not always possible. However, I have to scratch my head over a concept that seems pretty common in MVC, that of the "View Model".

The View Model is designed to only pass the minimum amount of information to the view, for both security, maintainability, and testing concerns. I get that. It makes sense.

However, from a DRY perspective, a View Model is simply duplicating data you already have. The View Model may be temporary, and used only as a DTO, but you're basically maintaing two different versions of the same model which seems to violate the DRY principal.

Do View Models violate DRY? Are they a necessary evil? Do they do more good than bad?

A1: This has been brought up time and time again. Not only is it a pretty substantial dupe but the answer is subjective and argumentative. ViewModels are a response to DDD and the concept of persistence ignorance.

To say not using ViewModels is bad means ignoring that Django and Rails and most PHP ORM/MVC frameworks don't care at all about those concepts. Do you want somebody to tell you all those other languages and frameworks are "doing it wrong?".

Whether or not you want to use ViewModels is 100% dependent on what architecture styles you are going for and what the goals of the application are.

This is like asking is dragging and dropping GridViews in a WebForm app appropriate? Depends on a lot of things.

There is also a misconception about DRY that you have here. Do Proxy classes from a WCF service violate DRY? Does the ViewModel contain logic? The primary goal of DRY is to not have duplicated logic with a meaningful purpose. Do a couple of DTOs that share object shapres violate that?

The DDD principal of bounded contexts would make for a good read too. If a ShoppingCart object needs to function differently in a warehouse vs ecommerce website setting does that mean you to share the types? What happens when the only shared functionality is totaling a price (price + tax + shipping)? Do you create a base class just for that therefore increasing coupling? What are the tradeoffs in time/cost/maintenance for being 100% DRY for a simple method like GetTotal(). Does violating DRY when it makes sense actually decreasing the complexity and overall cost of maintaining your codebase?

I'm sorry for answering with so many questions but hopefully now you can see the nuances and intricacies of the question you asked. ;)

A2: One could also note that not using view models would be a violation of the single responsibility principle -- your entity should not be polluted with UI concerns.

I also think the real value of view models doesn't necessarily become apparent in version 1.0 of your application. You will thank yourself when working on version 2.0 when you completely re-think how your back-end works but you don't have to carry those changes out to the view layer.

64. <https://stackoverflow.com/questions/27195486/most-maintainable-way-to-handle-hiding-data-from-different-roles-mvc>

T: Most maintainable way to handle hiding data from different roles MVC

Q: Currently I'm working on a project at work that has about 13 controllers, all have Index, Summary(Table view that goes to index), Create, Details, Edit, and Delete views. Each of these controllers have their own ViewModels.

I recently joined the team and have changed this copy-paste project into a highly maintainable project with inheritance and interfaces.

Problem:

I just started working on the views creating HTML helpers and things of that sort to make the views more maintainable.

All of our controller actions are using the [Authorize(Roles = "...")] attribute. The Index Views are in this style of setup (each list item makes use of each of the ViewModel's properties):

Filter Section

Table Header

Table Contents

Table Footer

Everyone else's initial thought was to just put if (User.IsInRole(...)) in every spot applicable i.e. if (User.IsInRole(...)) { @Html.DisplayFor(SomePropertyInFilterSection) } and 3 more following the pattern if (User.IsInRole(...)) { @Html.DisplayFor(SamePropertyInTableHeader) }. I think this is a massive clutter though and have started looking to make it cleaner (4 if statements to hide a 'single' piece of data seemed silly. I think this is a massive clutter and there should be a much simpler way to have one single check for all of these if-statements (as they're checking the same thing but are in different locations).

Options:

The options that I see:

Do the if-statements in every place.

Have two separate views and check before leaving the controller.

Add css-classes to each piece of data and have a flag on the Master-ViewModel (this is the ViewModel all ViewModels inherit from as they all share 2-3 properties) and have a JavaScript hide/remove those elements appropriately.

From my understanding security shouldn't be an issue since the data isn't sensitive (at the moment) and any links that might get clicked (maliciously or unintentionally) that shouldn't will have the [Authorize] attribute to fix that.

Question:

What would be the most maintainable way to achieve this?

The way I see my options above at the moment:

Way too full of clutter.

Solves the If-Statement clutter but adds an extra view that needs maintained and if one thing changes in one the other is probably going to need changed as well.

May become an issue if we decide to add sensitive data we do not wish those without correct authorization to see.

Are there any options that takes the best of both #2 and #3?

A1: I don't believe that there is a "right" answer. A lot of people will type in caps that you shouldn't even consider putting an if statement inside a view. However we need to remember that as professional developers we're getting paid for shipping products not following dogmas.

My suggestion would be use what's best on a case by case scenario for each view. Is the logic simple? have it inside a view. Does it start to clutter up? Make separate views. Is most of the logic in just one place? Make partial views. Doing this on a case by case scenario will also allow you to figure out what works best for your project.

A2: I ended up making some HTML-Helpers to aid this process.

```
public static MvcHtmlString IfRole(this MvcHtmlString content, HtmlHelper html, Role role)
{
    return      html.ViewContext.HttpContext.User.IsInRole(Roles.ToString(role))      ?      content      :
MvcHtmlString.Create(String.Empty);
}
```

Which made all of these 4 line sections:

```
@if (User.IsInRole(Role.ToString(Role.MyRole))
{
    @Html.TextBoxFor....)
}
```

One line:

```
@Html.TextBoxFor(...).IfRole(Html, Role.MyRole)
```

Additionally I came up with Helpers to abstract away as much content as possible (Buttons, Links, etc) so they all became one line. Some repeated 'control-like' html patterns became helpers as well.

The main thing that will help me is something I'm still considering. I was thinking of creating a function/interface on all ViewModels that returned a Dictionary<String, Object> of all its properties. Then have an HtmlHelper for Filter section, Table Header, etc. to use that data to construct the data. (The reason I haven't done it and I'm only considering it is it would make unique looking pages a bit of work. Though I think in the end I'm going to do it and add optional Dictionary<String, String> parameter to add HtmlAttributes).

I hope this is helpful to someone in the future, it took me (unreasonably) a long while to come up with and I might not have come to this conclusion without Mihai-Andrei Dinculescu's thoughts.

However I would like to advise against having this logic JS or CSS based. It's not only about security, but you will also end up sending (sometimes a lot) of HTML just to have it hidden on browser. And when you will decide that your data is actually sensitive, there's a high chance that you will not be able to secure it 100%.

65. <https://stackoverflow.com/questions/5010570/optional-route-parameters-and-action-selection/5013249#5013249>

T: Optional route parameters and action selection

Q: I use the default route definition:

{controller}/{action}/{id}

where id = UrlParameter.Optional. As much as I understand it this means when id is not being part of the URL this route value will not exists in the RouteValues dictionary.

So this also seems perfectly possible (both GET):

```
public ActionResult Index() { ... } // handle URLs: controller/action  
public ActionResult Index(int id) { ... } // handle URLs: controller/action/id
```

When id is missing the first action would be executed, but when id is present, the second one would execute. Fine, but it doesn't work. It can't resolve actions.

How can I accomplish this?

I'm thinking of writing a custom action method selector attribute like:

[RequiresRouteValue(string valueName)]

This would make it possible to use this kind of action methods. But is this the only way of doing it? Is there something built-in I can hang on to?

A1: Well from the exception that action can't be determined is pretty clear that actions are resolved first then data binder comes into play and examines action's parameters and tries to data bind values to them. Makes perfect sense.

This makes perfect sense. There would be no point in first trying to data bind values to all possible types and see what we get and then look for an appropriate action. That would be next to impossible.

So. Since action selection is the problem here I guess the best (and only) way to solve this (if I don't want to use a multifaceted single action method) is to write a custom action method selector attribute.

You can read all the details and get the code on my blog:

Improving Asp.net MVC maintainability and RESTful conformance.

66. <https://stackoverflow.com/questions/25546284/how-to-decide-when-to-use-ajax-vs-javascript-for-maintainability>

T: How to decide when to use Ajax vs Javascript for maintainability.

Q: During ASP.Net development i am often unsure weather i should be performing some functionality using an ajax request vs handling it all on the client with JavaScript. I often will want to use Jquery ajax functions in order to speed development up and improve maintainability even though i can achieve the same result without contacting the server.

Here is one example. In my MVC view i need to update a partial view in response to a button click. Here is a simplified version of my partial view.

I am torn on which will be better maintainability wise, as with the ajax way i don't have to write html in JavaScript pages and i think it will be clearer and more readable when revisiting the code. However i am then using a unnecessary request to the server when i could it handle all on the client.

So my question is should i always be doing everything on the client if possible even at the result of maintainability. Any feedback on my example is much appreciated as well.

A1: I recommend you to use AJAX for operations, which require some background calculations on the server or to retrieve some DB data from the server. For GUI generation I would use JS, as it is quite quick, thanks to V8.

If you need to generate GUI by embedding some server data into it and this page has complex layout, I would use server side template engine.

A2: In the example you've given, I would recommend the JS approach to control the availability of the edit and delete buttons. Or possibly a combination of the two.

When you make an Ajax call it creates a background request that causes some HTTP traffic. Unless there's some processing needed on the server to fulfil the request, then there is not much use sending that request to the server.

From looking at your code then the action you want to perform is to add two anchors to the page. This can be done easily with JS. You could even combine the two by including a partial view on your page that contains the elements you wish to include, wrapped in some markup to hide them.

You could create a partial view with the button markup.

Conclusion: If an event/action only affects what the user can see on the UI (i.e. controlling visibility and initiating animations) then you would probably only want to use JS/jQuery. If there's something more happening like server processing or fetching data from DB required then consider using Ajax.

In your example it seemed like the choice was between adding the elements dynamically to the page with JS or executing an Controller method via Ajax to get the elements as a partial view. I hope this answer provides a good solution for you.

67. <https://stackoverflow.com/questions/43991787/asp-net-mvc-reuse-code-between-different-website>

T: ASP.NET MVC reuse code between different website

Q: I have two asp.net mvc website, they have the same page to update account data.

How to separate the repeated code(controller, *.cshtml, *.js, *.css... etc) for better maintainability? I don't want to modify code from one website and copy it to the other.

I have tried creating new website project only contains account pages, but the static files(*.js, *.css) can't be reused in this way.

68. <https://stackoverflow.com/questions/18199174/angular-js-and-asp-net-mvc-4>

T: Angular.js and ASP.NET MVC 4 [closed]

Q: I have an ASP.NET MVC 4 project and I'm stuck on an architectural decision on which JavaScript framework or library to use Angular.js or Knock.js. I am currently leaning towards using Angular.js over Knockout.js, but don't want to find out midway during project development I made a mistake.

Here is some background:

We need two-way model data binding

A1: my 2 cents worth.

preamble - i have worked with both angular and knockout. I'm on my 3rd non trivial front end built with a MVVM/MVC lib.

I started with knockout because its MVVM is very similar to the wpf/silverlight mechanics. And it works well. The tutorials and documentation are top notch. All your coders will be able to work with knockout.js within days or if they have used mvvm under .net, then within hours.

However, these days I am using angular and will probably stick with it for the following reasons.

angular is a complete framework - knockout is really about just the 2 way binding. you still need other libraries like backbone.js/jquery to do the rest of your work.

angular has dependency injection. which is perfect for adding

mocking for testing as well as giving structure to your code.

angular treats normal JS variables as observables within its \$scope object. that means you dont have to declare them in a special way

I'm not an angular fanboy, i still think they could move more over to the MVVM architecture instead of the "funky" MVVM/MVC hybrid architecture they currently have.

The biggest problem with angular is the documentation. Compared to knockout, it is woeful. It will add additional time and cost to getting your coders up to speed. Once they are there however, it is currently the best choice IMHO.

We need the ability to test views. I want to be able to do end to end unit testing. Also, we are using continuous integration.

"Save Changes" functionality. i.e. if a user makes changes on a page we need the ability to detect any changes and prompt the user to save their changes before they navigate away from the page

"Notifications" functionality. i.e. user will be logged on approximately 8 hours and will need to be notified and updated of changes made by other users (errors, data status changes and the like)

We need to "future proof" our application. Currently the business unit hasn't decided if we will need to support mobile devices, but I know it's just a matter of time.

Our team consists of developers with varying experience levels from very junior to senior developers.

Currently our models are complicated and may get even more so

We need to also consider RAD, code reuse, and maintainability

I have read the excellent answer here and watched Scott Allen's interview about Angular here

Since we are unable to change from our current ASP.NET MVC 4 architecture to use something on the server side like Web API I have some concerns in trying to implement Angular.js with MVC 4. Will this cause us to have two models one on the server and one on the client?

I am not looking for a "which is better" discussion about Angular and Knockout because I think they both have their pros and cons. I am looking for actual code on implementing a JavaScript framework or library in an ASP.NET MVC 4 application. I need a solution that I can live with 2+ years from now :)

Any ideas or suggestions? Maybe the answer is not Knock or Angular, but some other JavaScript framework?

A2: Glad to see this questions was of interest to the community ;) Just for completeness here's what I ended up doing:

I did go with AngularJS and ASP.NET MVC 4 and was glad that I did. Although, Angular has a steep learning curve but its worth it because of the power of directives.

We need two-way model data binding - On occassion I needed to set some initial values coming from the MVC controller. I used the ng-init attribute to accomplish this.

We need the ability to test views - I followed the AngularJS docs for testing

"Save Changes" functionality - I implemented this using a directive in Angular

"Notifications" functionality - I implemented this using toastr.js and and directives (schweet)

We need to "future proof" our application - I don't know Google's plans for AngularJS, but after working with AngularJS I can't see it going anywhere anytime soon and expected it to become more widely adopted :)

A3: I don't have a lot of input on AngularJs, but want to provide some thoughts on Knockout.

Knockout is primarily a data-binding library to connect views to view model, but doesn't really provide a lot of capabilities beyond that. I wouldn't recommend using knockout alone as the main library to build a complex client-based web site.

You didn't mention whether you're implementing spa-like functionality (i.e. hash-tag navigation) or whether you're primarily using MVC server-side views (e.g. Razor). If you're just looking for quick data-binding on a per-page level, I would even reconsider that. To me, both of these (angular or knockout) are designed to enhance the client-side development experience - not so much a server-side approach such as MVC.

If you're considering an SPA approach, even in part, you'll likely want some framework that provides some level of control over the view activation life cycle.

As far as data-binding power and reliability, I believe in Knockout. I have been using it extensively, and have grown quite fond of it. If you like the feel of knockout, you may want to look into Durandal. Durandal is a decent framework is able to meet the needs of many "spa" web projects. It's a client-side framework built on top of several proven libraries, including Knockout. It's a little (lot) more light-weight than Angular, and possibly easier to user.

We are building a fairly large ASP.Net MVC web site using Durandal with Knockout in conjunction with an additional facade to tighten things up from a development standpoint, and the integration with ASP.Net MVC is straight-forward. I don't recommend trying to use the server-side knockout stuff that's out there; I just find that to limit the real power of the MVVM pattern.

69. <https://stackoverflow.com/questions/3150008/which-mvc-flavor-is-more-widely-accepted>

T: Which MVC flavor is more widely accepted?

Q: I notice 2 distinct "flavors" of MVC:

1) "Original" MVC where the Model talks directly to the View 2) "Apple Cocoa" MVC where the Controller uses the Mediator pattern and Model and View never communicate directly

From link text:

The goal of MVC is, by decoupling models and views, to reduce the complexity in architectural design and to increase flexibility and maintainability of code.

That makes great sense to me. However with #1, as shown on wikipedia, you have a link between Model and View and therefore they seem quite coupled to me. It seems like "original" MVC does not solve it's goal.

In contrast, #2 to me very clearly results in a generic View that only knows how to display and input data via UI, a Model that does not care at all about how it is represented, and a Controller that knows about both and becomes the only potentially un-reusable code. It achieves the MVC goal.

This is good for me because I'm working in Cocoa which "Believes in" #2, and I'm working in plain C++ which I can make believe in anything. But which of these MVC flavors will I find out in the wild more? For instance, Ruby on Rails, Struts, PureMVC.. these "use MVC" but would I expect to see #1 or #2 there?

EDIT: Sounds like #2 is the more accepted one, so does any modern approach use #1, if so then what?

A1: I'm not sure what's more universally accepted, but most people see Rails as being pretty much the 'spec' for MVC, and in Rails the model and view never (almost never) talk directly. The controller does all the finding and sending of model data to the view.

A2: In asp.net Mvc the #2 approach is taken: the controller reads and writes from/to the model, sends and receives data to/from the views. Views and models never talk directly.

70. <https://stackoverflow.com/questions/4159622/why-is-using-if-else-blocks-inside-views-dreaded-mvc>

T: why is using if-else blocks inside views dreaded? – MVC.

Q: What areas get affected by it?

code readability? maintainability? performance? security? any other?

my views have been using something like

```
if(Model.Showthis) {<div id = "showthis">...</div>} }
```

and does doing something like the following have security implications? --

```
<%if      (HttpContext.Current.User.Identity.IsAuthenticated      &&      item.Poster.UserName      ==  
HttpContext.Current.User.Identity.Name)%>  
  
<%{ %>  
  
...  
  
<%}%>
```

yes I read "if" considered harmful in ASP.NET MVC View (.aspx) files? too, but it didn't exactly specify what areas get affected by it. I mean I wanted to make sure there are no security and performance implications, which the link didn't answer exactly.

A1: I don't see an issue with it as long as the branching logic is purely for UI concerns. With that in mind I would change your second if to:

```
<%if (item.Poster.UserName == Model.CurrentUserName)%>  
  
<%{ %>  
  
...  
  
<%}%>
```

And set your model up so that the CurrentUserName property looks like this:

```
public string CurrentUserName  
{  
    get  
    {  
        return HttpContext.Current.User.Identity.IsAuthenticated  
            ? HttpContext.Current.User.Identity.Name  
            : String.Empty;  
    }  
}
```

Or even better if you're going to be checking author against current user a lot in your system, offload that property to a helper class that can be reused from multiple models. Basically I wanted to get the implementation detail of what the current user's name is out of the view.

A2: I think the stigma persists from the transition from ASP to ASP.NET Forms. MVC is a different beast. With MVC3 and Razor it should help break the stigma and allow for more readable, easier to write Views.

That said, Domain and Business logic should never be in your template. But I see no problem, and frequently make use of conditional statements and loops to render UI in my Views.

A3: There's nothing wrong with if else statements in your view template. What you want to avoid is business or model logic in side your view template. If the conditional is directly related to user interface, then it belongs in the view.

Yes, it can be a bit difficult to read because of the mix of HTML and C#, but so long as your view logic is in your view, and your model logic is in your model, you are properly maintaining separation of concerns.

With your second sample; it might make more sense to only have your Poster available to the View if the correct user is logged in in the first place; this seems like more of a Controller thing than a View thing to me.

A lot of people see if statements in the View and cringe, because it reminds them of classic ASP. But the problem with classic ASP was never that there was code and HTML in the same place; it was that there was business logic and presentation logic in the same place.

A4: Why are they bad?

As many people have already suggested it's because it can be a warning sign that business logic is leaking into your views which is a bad thing. Or that you are trying to do too much in your view. Often it's easier to setup the necessary data in your controller and just pass everything required (including any computed values) and have your view render it straight out. The flatter and simpler your view model is the better.

I don't think there is anything wrong with using if/else's for the true purpose of conditionally rendering UI. For example, if a user is logged in render this partial if they aren't than render something else.

I think a lot people get taken back and draw a hard and fast 'it's bad practice' because it can easily lead to tag soup. This phenomena has already been highlighted as a carry over from the asp.net webforms engine. Whilst still a good thing to be aware of, it is likely less of an issue with the razor engine as it's much cleaner and requires less syntax to achieve the same thing. The automatic switching in and out of C#/VB code to html and back is very simple with only an @ required to re-enter a code block. I don't think this will create tag soup in the

same way that angled brackets did <% %>. The amount of noise in the latter was what most people objected to (and rightly so).

Lastly, circumstances depending, if you find you are starting to get a lot of if/else logic in your view sometimes it is cleaner to put that into a HTML helper. I can't find the reference but I remember Rob Connery once saying that if you find yourself starting to write if statements in your view than it's a candidate for a html helper.

Is there performance or security concerns?

I don't think there is going to be any noticeable performance differences or security concerns with what you are asking. But considering an authentication check like that is likely to be used in multiple views I would put it into a Html helper.

A5: If-else blocks are not bad specifically. Code in views is bad because you are mixing HTML markup with code. ASP.NET MVC is bad for separating static page design from dynamic UI code. Web Forms is better at separating static and programmatic UI elements.

71. <https://stackoverflow.com/questions/639622/separation-of-concerns-mvc-why>

T: Separation of concerns; MVC; why?

Q: I'm currently reading up on OO before I embark upon my next major project. To give you some quick background, I'm a PHP developer, working on web applications.

One area that particularly interests me is the User Interface; specifically how to build this and connect it to my OO "model".

I've been doing some reading on this area. One of my favourites is this: Building user interfaces for object-oriented systems

"All objects must provide their own UI"

Thinking about my problem, I can see this working well. I build my "user" object to represent someone who has logged into my website, for example. One of my methods is then "display_yourself" or similar. I can use this throughout my code. Perhaps to start with this will just be their name. Later, if I need to adjust to show their name+small avatar, I can just update this one method and hey-presto, my app is updated. Or if I need to make their name a link to their profile, hey-presto I can update again easily from one place.

In terms of an OO system; I think this approach works well. Looking on other StackOverflow threads, I found this under "Separation of Concerns": Soc

"In computer science, separation of concerns (SoC) is the process of breaking a computer program into distinct features that overlap in functionality as little as possible. A concern is any piece of interest or focus in a program. Typically, concerns are synonymous with features or behaviors. Progress towards SoC is traditionally achieved through modularity and encapsulation, with the help of information hiding."

To my mind I have achieved this. My user object hides all its information. I don't have any places in my code where I say \$user->get_user_name() before I display it.

However, this seems to go against what other people seem to think of as "best practice".

To quote the "selected" (green one) answer from the same question:

"The separation of concerns is keeping the code for each of these concerns separate. Changing the interface should not require changing the business logic code, and vice versa. Model-View-Controller (MVC) design pattern is an excellent example of separating these concerns for better software maintainability."

Why does this make for better software maintainability? Surely with MVC, my View has to know an awful lot about the Model? Read the JavaWorld article for a detailed discussion on this point: Building user interfaces for object-oriented systems

Anyway... getting to the actual point, finally!

1. Can anyone recommend any books that discuss this in detail? I don't want an MVC book; I'm not sold on MVC. I want a book that discusses OO / UI, the potential issues, potential solutions etc.. (maybe including MVC) Arthur Riel's Object-Oriented Design Heuristics

touches on it (and is an excellent book as well!), but I want something that goes into more detail.

2. Can anyone put forward an argument that is as well-explained as Allen Holub's JavaWorld article that explains why MVC is a good idea?

Many thanks for anyone who can help me reach a conclusion on this.

A1: This is a failure in how OOP is often taught, using examples like rectangle.draw() and dinosaur.show() that make absolutely no sense.

You're almost answering your own question when you talk about having a user class that displays itself.
"Later, if I need to adjust to show their name+small avatar, I can just update this one method and hey-presto, my app is updated."

Think about just that little piece for moment. Now take a look at Stack Overflow and notice all of the places that your username appears. Does it look the same in each case? No, at the top you've just got an envelope next to your username followed by your reputation and badges. In a question thread you've got your avatar followed by your username with your reputation and badges below it. Do you think that there is a user object with methods like getUserNameWithAvatarInFrontOfItAndReputationAndBadgesUnderneath() ? Nah.

An object is concerned with the data it represents and methods that act on that data. Your user object will probably have firstName and lastName members, and the necessary getters to retrieve those pieces. It might also have a convenience method like toString() (in Java terms) that would return the user's name in a common format, like the first name followed by a space and then the last name. Aside from that, the user object shouldn't do much else. It is up to the client to decide what it wants to do with the object.

Take the example that you've given us with the user object, and then think about how you would do the following if you built a "UI" into it:

Create a CSV export showing all users, ordered by last name. E.g. Lastname, Firstname.

Provide both a heavyweight GUI and a Web-based interface to work with the user object.

Show an avatar next to the username in one place, but only show the username in another.

Provide an RSS list of users.

Show the username bold in one place, italicized in another, and as a hyperlink in yet another place.

Show the user's middle initial where appropriate.

If you think about these requirements, they all boil down to providing a user object that is only concerned with the data that it should be concerned with. It shouldn't try to be all things to everyone, it should just provide a means to get at user data. It is up to each of the many views you will create to decide how it wants to display the user data.

Your idea about updating code in one place to update your views in many places is a good one. This is still possible without mucking with things at a too low of a level. You could certainly create widget-like classes that would encapsulate your various common views of "stuff", and use them throughout your view code.

A2: Here's the approach I take when creating websites in PHP using an MVC/separation of concerns pattern:

The framework I use has three basic pieces:

Models - PHP Classes. I add methods to them to fetch and save data. Each model represents a distinct type of entity in the system: users, pages, blog posts

Views - Smarty templates. This is where the html lives.

Controllers - PHP classes. These are the brains of the application. Typically urls in the site invoke methods of the class. example.com/user/show/1 would invoke the \$user_controller->show(1) method. The controller fetches data out of the model and gives it to the view.

Each of these pieces has a specific job or "concern". The model's job is to provide a clean interface to the data. Typically the site's data is stored in a SQL database. I add methods to the model for fetching data out and saving data in.

The view's job is to display data. All HTML markup goes in the view. Logic to handle zebra-striping for a table of data goes in the view. Code to handle the format that a date should be displayed in goes in the view. I like using Smarty templates for views because it offers some nice features to handle things like that.

The controller's job is to act as an intermediary between the user, the model, and the view.

Let's look at an example of how these come together and where the benefits lie:

Imagine a simple blog site. The main piece of data is a post. Also, imagine that the site keeps track of the number of times a post is viewed. We'll create a SQL table for that:

This snippet is pretty straightforward and works well if:

It is the only place you want to show the most popular posts

You never want to change how it looks

You never decide to change what a "popular post" is

Imagine that you want to show the 10 most popular posts on the home page and the 5 most popular in a sidebar on subpages. You now need to either duplicate the code above, or put it in an include file with logic to check where it is being displayed.

What if you want to update the markup for the home page to add a "new-post" class to posts that were created today?

Suppose you decide that a post is popular because it has a lot of comments, not hits. The database will change to reflect this. Now, every place in your application that shows popular posts must be updated to reflect the new logic.

You are starting to see a snowball of complexity form. It's easy to see how things can become increasingly difficult to maintain over the course of a project. Also, consider the complexity when multiple developers are working on a project. Should the designer have to consult with the database developer when adding a class to the output?

Taking an MVC approach and enforcing a separation of concerns within your application can mitigate these issues. Ideally we want to separate it out into three areas:

data logic

application logic

and display logic

A3: The problem with the idea that all your objects know how to display themselves is that each object can only be displayed in one way. What happens if you want to provide a detail view of a user, and a summary view. What happens if you want to display a view that merges a number of objects (users and their associated addresses for example). If you seperate your business objects (users) from the things that know how to display them then you have no more code to write, you just seperate it into different places.

This makes software more maintainable because if a user object is behaving incorrectly, you know it is the user, if it is not displaying properly, you know it is the view. In the situation where you need to provide a new interface to your application (say you decide to provide a new look and feel for mobile browsers), then you dont need to change your user object at all, you add a new object that knows how to render the user object for a mobile browser.

SOLID principles provide some good reasoning for this, here is a relatively concise look at these. I am afraid that I dont have a book to hand that sums it up well, but experience has taught me that it is easier to write new code than it is to update old code, and so designs that favour small modular classes that plug together to achieve what is needed, while harder to design up front, are far easier to maintain in the long run. It is great to be able to write a new renderer for a user object, without ever having to delve into the internals of that object.

A4: Can anyone put forward an argument [...] that explains why MVC is a good idea?

It keeps you sane by helping you remember what your code does because they are isolated from each other.

A5: I don't know any good books on the MVC subject, but from my own experience. In web development for example, many times you work with designers and sometimes dbas. Separating the logic from the presentation allows you to work with people with different skill sets better because the designer doesn't need to much about coding and vice versa. Also, for the concept of DRY, you can make your code less repetitive and easier to maintain. Your code will be more reusable and make your job a lot easier. It will also make you a better developer because you will become more organized and think of programming in a different way. So even if you have to work on something that is not MVC, you might have a different approach to architecting the project because you understand the MVC concepts.

I guess the tradeoff with a lot of MVC frameworks for large sites is that it may not be fast enough to handle the load.

A6: Consider the amount of code that would go into that single class, if you want to expose the same info not only as Html on the UI, but as part of an RSS, a JSON, a rest service with XML, [insert something else].

It is a leaky abstraction, meaning it tries to give you the sense that it will be the only piece that will ever know that data, but that can't be entirely truth. Lets say you want to provide a service that will integrate with several external third parties. You will have a really hard time forcing them to use your specific language to integrate with your service (as it is The class the only piece that can ever the data it is using), or if in the other hand you expose some of its data you are not hiding the data from those third parties systems.

Update 1: I gave an overall look at the whole article, and being an old article (99), it isn't really about MVC as we know it today vs. object oriented, nor has arguments that are against the SRP.

You could perfectly be in line with what he said, and handle the above scenario I mentioned with specific classes responsible to translate the object's public contract to the different formats: the main concern was that we didn't have a clear place to handle the changes and also that we didn't want the information to be repeated all over. So, on the html case, you could perfectly have a control that renders the info, or a class that transform it to html or [insert reuse mechanism here].

Btw, I had a flash back with the RMI bit. Anyway, in that example you can see he is tied to a communication mechanism. That said, each method call is remotely handled. I think he was also really concerned on developers having code that instead of getting a single object and operating on the info returned, had lots of small Get calls to get tons of different pieces of information.

Ps. I suggest you read info about DDD and Solid, which as I said for the SRP I wouldn't say it is the type of things the author was complaning about.

A7: My 2c.. another thing you could do besides what was said is to use Decorators of your User objects. This way, you could decorate the user differently depending on the context. So you'd end up with WebUser.class, CVSUser.class, RSSUser.class, etc.

I don't really do it this way, and it could get messy, but it helps in avoiding the client code from having to pull a lot of info out of your User. It might be something interesting to look into ;-)

72. <https://stackoverflow.com/questions/7150945/migrating-to-mvc-possible-new-approach-for-handling-css-image-requests>

T: Migrating to Mvc, possible new approach for handling css/image requests?

Q: Our current asp.net web forms software maintains a handler that writes css and images to the context.

So you get a nice group of the resources as well as easy urls and more maintainability like so:

```
<link style="text/css" href="css.axd?prod=filename" />

```

I'm curious if there are any approaches with Mvc that have more advantages using a controller ... can it even be done?? Based on my cursory research and understanding of Mvc, it seems like this is doable.

Thanks

EDIT: The goal here is to create a similar mechanism (regardless of implementation) that makes our Views clean and more maintainable when requesting images and css.

The implementation needs to also take into account that theming needs to be addressed on-demand as well (which is what our handler does as well).

A1: Your actions can FileContentResult or so (return File(...) overloads), so essentially yes - you can implement this behavior in controllers and actions.

But pay careful attention to performance. Every "regular" resource served by the server (CSS, JS etc.) is cached by default in several tiers, both at the server side and the client side. When applying these server-side call, you eliminate this nice default cache and you must apply it yourself in code or so.

73. <https://stackoverflow.com/questions/3186124/should-asp-net-mvc-apps-be-more-link-driven>

T: Should ASP.Net MVC apps be more link-driven?

Q: Strange question, I know, but one thing I seem to be feeling with ASP.Net MVC is that it's smoother and more logical to try and avoid form-submissions unless totally necessary (especially if you have more than 1 on a single view).

As an example, you have a list of items and you can sort the items, to me it seems to be a more 'fitting' implementation to have a handful of links that filter the list rather than say, a drop-down with a submit button next to it?

Is it just me or does anyone else feel that you need to run with a certain approach in order for ASP.Net MVC to achieve perhaps better maintainability?

A1: With links users will benefit from seeing sorting in URL, being able to change it in URL, bookmark to specific sorting, and so on. They won't see "Data will be sent again" dialog box.

However, the post can create the correct url and redirect there, following the PRG (post/redirect/get) principle, allowing to use combo/submit without their drawbacks.

74. <https://stackoverflow.com/questions/13366799/combining-require-js-backbone-js-and-a-server-side-mvc-framework>

T: Combining Require.js, Backbone.js and a server side MVC framework

Q: We're actually planning a really complex web application. At least for my own standards. In the past we have always been using a combination of a server side MVC Framework (Codeigniter) and client side functionality (jQuery and plugins). We have simply written inline javascript code in our views. This worked as expected, but of course with several disadvantages:

no caching

duplicated js code

maintainability issues

...

My main goal now is to organize the client side code in an efficient and easily maintainable way. But I want to stay with the server side MVC because of the existing know how and some existing interfaces. Furthermore I want to reduce complex DOM manipulation with jQuery and "spaghetti code".

Now I thought about a combination of Backbone.js and Require.js but I really can't find a tutorial or any solid description about how to combine them with a server side MVC. Is it even recommended?

In my old apps I got a file structure like this:

application (CodeIgniter)

assets

js

css

imgs

Are there any ideas or best practices?

A1: I think Backbone is a good choice, and Require is not mandatory here.

Require will just help you organize your source code and maybe improve performance. I think you can start right away with Backbone, which will be the thing you are going to use most, and add Require later.

Regarding Backbone, yes it's easy to use to use its Model with an existing MVC application, provided it returns JSON. To load your existing data you will want to use the fetch method combined to url to adapt to your existing code, or your own method.

Generally, think about which models are displayed in which views. Backbone helps you think this way : I'm displaying Models represented as JSON data in Views which are made by HTML.

Also, for the view layer, it's very easy to reuse your existing HTML, because views are not tied to anything, no JavaScript templating or nothing.

A2: To add to mexique1's advice, it might be worth looking at the backbone-boilerplate project. It should provide you best-practice solutions for many of the problems you're currently considering, such as the combination of require and backbone, the organisation of the client-side of your project, and the reduction of complex DOM manipulation (see templating).

The challenge, as you anticipate, will most likely be in combining the boilerplate approach with the approach you're used to. However, it will almost certainly be worth the effort since it should provide you a solid foundation for this and future projects.

75. <https://stackoverflow.com/questions/308325/when-and-why-should-i-consider-asp-net-mvc>

T: When and why should I consider asp.net MVC?

Q: I've noticed a lot of talk about asp.net MVC lately, but I haven't come across a clear or compelling description of when, where or why I would want to use it over WebForms.

Let's say I wanted to build a small web application that allows a person to advertise some items online. The website will have 4 use cases:

Search adverts

View listings

View item

Place an advert

Let's assume:

I'm not particularly interested in unit testing my controller. The page will either render the list of items correctly, or it won't.

I am interested in more control over the HTML markup.

I'm not interested in using the latest buzz technology just for the sake of it.

I am interested in using the tool that is best suited to the job in terms of productivity, performance, maintainability & simplicity of the end solution.

I don't want to have to work around a bunch of nuances to get something simple to work.

So, my questions are thus:

What are the fundamental differences between the two models?

In which scenario is one better than the other?

What are the gotchas with asp.net MVC (I'm aware of the gotchas with WebForms)

For our sample app, what would I gain by using asp.net MVC instead of WebForms?

For our sample app, what would I lose by using asp.net MVC instead of WebForms?

Is it feasible to mix and match models within the same small application?

Thanks to anyone who spends the time to contribute an answer.

A1: What are the fundamental differences between the two models?

WebForms try to mimic WinForms development by allowing you to reuse lots of pre-made controls, and by faking web application state via the hidden _VIEWSTATE mechanism.

MVC is a pattern designed to help you separate your data (Model), business logic (Controller) and presentation (View). It adheres more to the true nature of the web : RESTful URLs, stateless.

In which scenario is one better than the other?

In my opinion, for an intranet application making heavy usage of controls, WebForms can be useful at reducing development time, because thanks to the designer you can create your UI very quickly and let the framework manage the app's state automatically.

For any other project, especially a public website, even a small one, I think MVC is the way to go.

What are the gotchas with asp.net MVC (I'm aware of the gotchas with WebForms)

I'd say there is some learning curve to fully understand the MVC pattern and its power. Also, since the framework is still in BETA you can expect the API to experience some minor changes before release.

Since JavaScript is not hidden from you in MVC, it would also require some time to learn if you're not familiar with it. jQuery greatly simplifies this though.

For our sample app, what would I gain by using asp.net MVC instead of WebForms?

You'd gain better control over HTML markup and Javascript behavior, a cleaner separation of concerns and some easily testable codebase (even if you don't seem interested in unit testing it).

For our sample app, what would I lose by using asp.net MVC instead of WebForms?

You'd lose the 'drag and drop' quick way of building your pages and the application state management.

Is it feasible to mix and match models within the same small application?

In some ways, yes it seems.

I'd recommend watching this talk by Phil Haack, who gives a good overview of the framework and invites Jeff Atwood to talk about how he built StackOverflow with it.

He explains how SO is using some WebForms controls for CAPTCHAs which render themselves into the view.

A2: The primary difference is that MVC is more like "regular" web development that the rest of the programming world uses, whereas standard ASP.NET was designed to make it brain-dead easy for Windows developers to become web developers. I learned web programming by learning Ruby on Rails, and MVC seems like it is becoming the .NET version of Rails.

MVC is much more oriented around standards compliance, unobtrusive javascript, and separation of concerns than regular ASP.NET. You'll need to understand how HTML and CSS work together. You'll learn a LOT more javascript as you master MVC. One of the biggest advantages of MVC to me is that you can use jQuery to do some amazing AJAX stuff easier and BETTER than you can in regular ASP.NET.

If you're just now learning web development then I strongly encourage you to learn MVC. You'll be able to transfer at least some of your new skills to other frameworks in the future.

If you're looking for which to learn to quickly get a web development job, then I'll have to strongly suggest ASP.NET.

Once MVC is RTM'd I think we will see a slow and steady adoption curve and as it matures MVC may become the primary framework for creating websites with ASP.NET. I hope so at least!

A3: The biggest difference between ASPNET MVC and is WebForms is the lifecycle of an page, no difficult(unnecessary) postbacks, clean coding, enz.

There are no rules for that

???

REST-full website, Separation of logic

Design-time support, can't use third-party webcontrols

Please don't mix it together. If you really want to use the WebForms model you could use the MVP pattern, Billy McCafferty wrote excellent articles on that design pattern

I'm redesigning some of my applications from the MVP-pattern to MVC-pattern, not because MVC is better but I would like to use the newest techniques offered by MS(pattern itself is quite old).

76. <https://stackoverflow.com/questions/589488/mvp-mvc-vs-traditional-n-tier-approach-for-winform-apps>

T: MVP/MVC vs traditional n-tier approach for winform apps

Q: We have a large suite of apps, most are C# 1.1, but at least 10 major ones are in VB6. We are undertaking a project to bring up the VB6 apps to .NET 3.5.

All the c# 1.1 apps are written using a traditional n-Tier approach. There isn't really any architecture/separation to the UI layer. Most of the code just responds to events and goes from there. I would say that from the point of maintainability, it's been pretty good and it's easy to follow code and come up to speed on new apps.

As we are porting VB6 apps, the initial thinking was that we should stick to the existing pattern (e.g. n-Tier). I am wondering, whether it's worth it breaking the pattern and doing VB6 apps using teh MVP/MVC pattern? Are MVC/MVP winform apps really easier to maintain? I worked on a MVC-based project and did not feel that it was easier to maintain at all, but that's just one project.

What are some of the experiences and advice out there?

A1: Dude, if something works for you, you guys are comfortable with it, and your team is up to specs with it. Why do you need to change?

MVC/MVP sounds good... Then why am I still working on n-Tier myself?

I think before you commit resources to actual development on this new way of programming... You should consider if it works for YOUR team.

A2: If you are porting the VB6 apps vs. a full rewrite, I'd suggest to focus on your Pri 1 goal - to get asap to the .Net world. Just doing this would have quite a lot of benefits for your org.

Once you are there, you can evaluate whether it's benefitial to you to invest into rearchitecting these apps. If you are doing full rewrite, I'd say take the plunge and go for MVP/MVVM patterned WPF apps. WPF will give you nicer visuals. The MVP/MVVM pattern will give you unit testability for all layers, including the visual. I also assume that these apps are related, so chances are you might be able to actually reuse your models and views. (though, I might be wrong here)

A3: It moves a thin layer of code you still probably have on the UI. I say thin, because from your description you probably have plenty of code elsewhere. What this gives you is the ability to unit test that thin layer of code. Update 1: I don't recommend to re architect while doing the upgrade, the extra effort is best expend on getting automated tests (unit/integration/system) - since you will have to be testing the upgrade works anyway. Once you have the tests in place, you can make gradual changes to the application with the comfort of having tests to back the changes.

A4: "Change - that activity we engage in to give the allusion of progress." - Dilbert

Seriously though, just getting your development environment and deployment platforms up to .NET 3.51 is a big step in and of itself. I would recommend that things like security reviews and code walkthroughs should probably come before re-archecting the application.

MVC and MVVM are excellent paradimes, particulary in terms of testability. Don't forget about them, but perhaps you should consider a pilot project before full scale adoption?

A5: MVC in particular does not exclude n-Tier architecture.

We also have ASP.NET 1.1 business application, and I find it a real nightmare to maintain. When event handlers do whatever they like, maybe tweak other controls, maybe call something in business logic, maybe talk directly to the database, it is only by chance that software works at all.

With MVC if used correctly you can see the way the data flows from the database to your UI and backwards. It makes it easier to track the errors if you got the unexpected behaviour.

At least, it is so with my own little project.

I'll make the point once again: whatever pattern you use, stick to the clear n-Tier architecture. 2-Tier or 3-Tier, just don't mess everything into a big interconnected ball.

77. <https://stackoverflow.com/questions/44234883/xamarin-forms-and-mvvm-code-behind-is-view-model/44235150#44235150>

T: Xamarin Forms and MVVM - Code behind is View-Model?

Q: I acknowledge the pattern for MVVM (Model, View, ViewModel) as having the 'model' (piece of data), view (interface), and.viewmodel (logic between data and interface).

With Xamarin forms, there is the Page.Xaml, and Page.Xaml.cs.

If my entire interface is coded in xaml with no GUI written in the code behind file..

Does this mean that the Page.xaml.cs to a xamarin forms page is the ViewModel?

My current structure is as follows..

Page (GUI)

Page Code behind (stores a reference to the object we are working with, if any. Also has logic for updating fields based on values in the model etc.)

The model itself (fields and any methods to manipulate the model)

A1: No.

The relatively easy way to determine this is: can the code be tested in a unit test?

The code behind in a Page.xaml.cs requires the page to be instantiated in order to be tested. The resulting complexity and dependencies make it impossible to call it a unit (isolated) test.

One of the goals of MVVM is improving the testability of the code. Code behind is hard to test.

Business logic belongs in the ViewModel and Model. The code behind 'finds' its ViewModel in its DataContext and should only propagate values through bindings and execute commands on the ViewModels. There should be no business logic because it cannot be tested.

Code-behind should only be concerned with display logic and user interaction (drag drop, click, sort, etc.) in most cases this logic will already be available in existing controls and might be configured through XAML.

A2: MVVM is Model View ViewModel. MVVM is software architecture pattern which helps to decouple the view, data, and business logic. Any architecture pattern helps to provide better maintainability, testability to your code. Now your question "Does this mean that the Page.xaml.cs to a Xamarin Forms page are the ViewModel" is not. It is not ViewModel.

To get more information use this (https://developer.xamarin.com/guides/xamarin-forms/xaml/xaml-basics/data_bindings_to_mvvm/).

78. <https://stackoverflow.com/questions/2267041/what-are-the-performance-implications-of-using-design-patterns-in-php/2267053#2267053>

T: What are the performance implications of using design patterns in PHP?

Q: I know that design-patterns are very useful in creating of big projects. Does anyone have experience in both creating project with normal (OO, procedural) and using design patterns in respect to performance(speed of execution)? I want to create some big project and I am afraid that using design patterns my scripts would run slower. So What is pefrmance of code with desing paterns compare to normal OO programming?

A1: Personally,

I'd program it, and then figure out if there are speed problems/bottlenecks.

Only worry about performance when it becomes a problem.

A2: The objective of design patterns is to solve common problems. These problems may include maintainability (which is what it sounds like you're mostly interested in), as well as performance.

Personally, I would favour applying architectural patterns first to make the operations of your application easy to understand. It should then be easier to refactor the existing code to introduce some performance-related patterns, should the performance of your code warrant it.

A3: An old adage about database design can be applied here: "Design for normalization first, denormalize for performance later". In this case, design it right the first time, if you find performance bottlenecks, optimize and break elements of your design on a one off basis then. Another issue, get someone using your application before you start optimizing, otherwise, who really cares?

A4: Some of the reasons design patterns are used is to eliminate code duplication and placing the code in the right spot. Both of these factors adds up to a fast application. Individual techniques such as caching and loading-code-only-when-needed could be easier/faster to apply with design patterns.

That said, maintainability will be much more prominent with some kind of thinking behind the coding applied, which will let you as a programmer focus on the real performance issues.

A5: Rarely code complexity is a factor in total execution speed of a PHP application, usually database interaction and network transfer times are much better candidates for slowness.

In any case, develop first and optimize later. You might found out that that kind of optimization is not even necessary.

A6: Well I don't have experience with programming using design patterns (only MVC). It is useful for maintainability, but amount of classes/code is greater compare to OO programming. (that is conclusion from my research ,but not from experience). By desing patterns I mean Factory,Decorator, Singleton etc.

I don't want to be in a situation that my code is well maintained but run slowly. Ex. Many ORM solutions are well maintained but much slower than simple query request coding.

A7: This depends entirely on what your application is doing and on the details of how you implement the patterns. Design patterns themselves are not really related to performance, but are intended to help you structure your system to aid maintainability.

Besides, performance should not be a concern at this stage; focus on getting the design pinned down first, and if it turns out to be running too slowly, only then should you worry about optimization.

79. <https://stackoverflow.com/questions/5298303/is-it-worth-setting-up-ioc-for-non-mvc-projects-in-.net/5299121#5299121>

T: Is it worth setting up IoC for non-MVC projects in .Net?

Q: Everywhere I look for information on Windsor or Spring.net its always in reference to MVC. Is there any point trying to implement it for web forms projects or wcf?

A1: It just so happens that the nature of an ASP.NET MVC web application lends itself extremely well to IoC because of the way it handles requests. You can say that the startup-request-response lifecycle of a web application, and the way ASP.NET MVC handles those things, correspond directly to what Krzysztof Koźmic calls The Three Calls Pattern and what Mark Seemann calls Register Resolve Release pattern.

There are ways, however, to follow this pattern even in application that do not directly lend themselves to it - e.g. in WinForms apps, Windows services etc.

<shameless_plug>

I wrote a blog post about Castle Windsor's TypedFactoryFacility that is a feature of Windsor that allows the container to be called, truly IoC style, without your code knowing it.

The typed factory facility makes Windsor capable of dynamically implementing interfaces, like e.g. ISomeFactory, delegating calls to the container's Resolve method underneath, thus allowing your code to depend only on the ISomeFactory interface.

</shameless_plug>

A2: Inversion of Control (a.k.a. Dependency Injection or Third-party Connect) is just a way to enable loose coupling.

As far as I have been able to identify, there are only two ways to enable loose coupling: IoC or Service Location (which is an anti-pattern). If you want to enable loose coupling in any application, IoC is the way to do it.

Loose coupling gives you a lot of benefits:

Testability

Late binding

Reduced complexity (SOLID)/better maintainability

Extensibility

Parallel development

It isn't tied to any specific architecture, pattern or type of application.

80. <https://stackoverflow.com/questions/24646706/wpf-mvvm-architecture-visual-studio-solution-and-projects>

T: WPF - MVVM Architecture (Visual Studio Solution and Projects)

Q: I'm working on a Window-App WPF project in MVVM pattern. At the moment, the app is a bit simple (can't really explain the nature of the product), but eventually it is expected to grow into a more complex app.

The wpf winapp has a local database and also connects to a REST service.

Development Time is not really the top concern; but maintainability, and testability.

Will use an IOC container and DI

Planning to do 1 ViewModel is to 1 View

I don't want to use any WPF/MVVM frameworks, as this is my first time in WPF-MVVM app (just like first time coding in bare DOM javascript even if there's jquery).

I decided to use multiple projects, and here's what I came up so far:

Product.Windows.Common (Utils, Logging, Helpers, etc.)

Product.Windows.Entities (Database and REST entities)

Product.Windows.Contracts (All Interfaces will reside in this namespace/project)

Product.Windows.Data (for local Database)

Product.Windows.ServiceClients (for REST client)

Product.Windows.App (the main WPF project, contains the Views/XAML)

Product.Windows.Models (INPCChanged)

Product.Windows.ViewModels (INPCChanged and ICommand)

Product.Windows.Tests (Unit Tests)

I just want to ask:

Is this architecture a bit over-kill?

Do I need to create a Product.Windows.Business for the business logic? Or should I just put business logic in the ViewModels?

81. <https://stackoverflow.com/questions/11649347/what-happens-if-a-proper-design-has-been-not-followed-for-an-enterprise-application#11649492#11649492>

T: What happens if a proper design has been not followed for an enterprise application?

Q: I've been outsourced for an ASP.Net project of another organization to build a large enterprise application. Currently almost 80% of the work has been completed. I found that the developers did not implemented any architecture in this application. All the work is done in the code behind file (*.aspx.cs). Even the database calls, sql scripts, etc. are on the code behind file. The entire solution has only one project, which is a Website. All the coding, .aspx file etc. comes under it. I know that the maintainability , catering to change requests, etc. of this project will be a nightmare.

But I would like know about the impact for the functionality of this project once the no of users increased from hundreds to thousands and more.

Will it be an issue, for not having a Data access layer and maintaining db connections in a once single place?

What will be the overall impact of the project from the functionality wise due to not implementing proper system architecture?

I need some hard point to convince them to go for a proper system architecture, which may be a whole system rewrite. So would be grateful if you are able to share your expertise of this matter. Thanks.

A1: Even though, this is very broad question...

I think there are well known reason behind using a kind of an architecture to application developments.

Basically using architecture will reduce the complexity of an application. This can be done by using following best practices, design patterns and which brings us the flexibility and high usability.

Since you mention that code been done in code behind files we can guarantee that it's violating one of the key design principles like Separation of concerns and DRY (Don't repeat yourself). That is only a single factor. There can be many.

I think you might gain a good idea if you could read this article about Software Architecture and Design Also another good one about Motivating Software Architecture.

A2: There is only two kinds of software, software that works and software that does not. The customers/users do not care what goes on behind the scenes.

Maintaining software is a real reason for concern, however you can have maintainable spaghetti code, but it's highly un-likeley in the enterprise.

Proper architecture is specific to your software solution regarding goals for maintainability, scalability and extensibility. There are trad-offs in architectural goals that often conflict.

There's no single answer, just patterns that solve common problems.

82. <https://stackoverflow.com/questions/21276014/asp-mvc-5-attribute-routing-vs-convention-based-routing>

T: ASP MVC 5 Attribute routing VS. Convention-based routing

Q: ASP MVC 5 has a new Routing called attribute routing. The way I see it, the routes are now scattered on every controller unlike with the convention-based that there is single location RouteConfig.cs where you can check your routes, which also serves as documentation of your sites routes in some way.

My question is it better to use Attribute routing over the convention-based routing in terms of readability and maintainability? And can someone suggest how to design routes for better maintainability and readability.

A: To address your first question, scattering the routes has a number of advantages:

It puts the route information adjacent to the controller action that implements that route. This helps in debugging and troubleshooting, as well as providing an ability to quickly search for route information in your solution.

It reduces risk in the process of making changes to routes. In RouteConfig.cs or WebApiConfig.cs (in the case of Web API solutions), the possibility exists to inadvertently change the wrong route or otherwise adversely affect other parts of your application.

You may also want to include acceptable HTTP methods, permitted user types and registration priorities, which if included with the attribute-based routes, put all of that information together in one place.

This post provided inspiration and reinforcement for me on the above, and goes into more detail:

A2: you can Unit Test your'e routes when using conventional routing, and you also have a "seperation of concerns".

That cant be said about Attribute Routing.

For a large project I would go with conventional, for a small project attribute routing is more than fine.

A3: I think from a maintaibnability and readability perspective, if you have a project that fits well with convention based routing then go with that. It's a lot simper to have a few routes in your config file than to decorate every controller.

BUT ...

In my experience convention based routing is too simplistic and often breaks down on projects that are large or more complex. What often happens is that you start with the default {controller}/{action}/{id} route. But then you decide you need some more routes because you need a deeper hierarchy so start adding routes. Something like this: /company/5/employee/7/edit. Then you have to be careful about what order you put your routes in so

that the correct route is found. Once you start adding custom routes you might find that more than one route matches a specific request, so you add some route constraints. As your project gets larger and/or more complicated your route config grows in size and complexity making it error prone and difficult to maintain.

Attribute routing gives you more control over your routes because you can map specific controllers and actions to specific routes and not worry that the wrong route will be matched. Further, since routes are in close proximity to controllers troubleshooting routes is much easier.

TL;DR: At a certain point routes become more difficult to maintain regardless of whether you use convention based routing or attribute routing. Attribute routing is all about having control over your routes and avoiding routing errors.

Another alternative that looks promising is MvcCodeRouting which is namespace based routing

83. <https://stackoverflow.com/questions/589488/mvp-mvc-vs-traditional-n-tier-approach-for-winform-apps>

T: **MVP/MVC vs traditional n-tier approach for winform apps**

Q: We have a large suite of apps, most are C# 1.1, but at least 10 major ones are in VB6. We are undertaking a project to bring up the VB6 apps to .NET 3.5.

All the c# 1.1 apps are written using a traditional n-Tier approach. There isn't really any architecture/separation to the UI layer. Most of the code just responds to events and goes from there. I would say that from the point of maintainability, it's been pretty good and it's easy to follow code and come up to speed on new apps.

As we are porting VB6 apps, the initial thinking was that we should stick to the existing pattern (e.g. n-Tier).

I am wondering, whether it's worth it breaking the pattern and doing VB6 apps using teh MVP/MVC pattern? Are MVC/MVP winform apps really easier to maintain? I worked on a MVC-based project and did not feel that it was easier to maintain at all, but that's just one project.

What are some of the experiences and advice out there?

A1: Dude, if something works for you, you guys are comfortable with it, and your team is up to specs with it. Why do you need to change?

MVC/MVP sounds good... Then why am I still working on n-Tier myself?

I think before you commit resources to actual development on this new way of programming... You should consider if it works for YOUR team.

A2: If you are porting the VB6 apps vs. a full rewrite, I'd suggest to focus on your Pri 1 goal - to get asap to the .Net world. Just doing this would have quite a lot of benefits for your org.

Once you are there, you can evaluate whether it's beneficial to you to invest into rearchitecting these apps.

If you are doing full rewrite, I'd say take the plunge and go for MVP/MVVM patterned WPF apps. WPF will give you nicer visuals. The MVP/MVVM pattern will give you unit testability for all layers, including the visual. I also assume that these apps are related, so chances are you might be able to actually reuse your models and views. (though, I might be wrong here)

A3: It moves a thin layer of code you still probably have on the UI. I say thin, because from your description you probably have plenty of code elsewhere. What this gives you is the ability to unit test that thin layer of code.

Update 1: I don't recommend to re architect while doing the upgrade, the extra effort is best expend on getting automated tests (unit/integration/system) - since you will have to be testing the upgrade works anyway. Once you have the tests in place, you can make gradual changes to the application with the comfort of having tests to back the changes.

A4: "Change - that activity we engage in to give the allusion of progress." - Dilbert

Seriously though, just getting your development environment and deployment platforms up to .NET 3.51 is a big step in and of itself. I would recommend that things like security reviews and code walkthroughs should probably come before re-archecting the application.

MVC and MVVM are excellent paradigms, particularly in terms of testability. Don't forget about them, but perhaps you should consider a pilot project before full scale adoption?

A5: MVC in particular does not exclude n-Tier architecture.

We also have ASP.NET 1.1 business application, and I find it a real nightmare to maintain. When event handlers do whatever they like, maybe tweak other controls, maybe call something in business logic, maybe talk directly to the database, it is only by chance that software works at all.

With MVC if used correctly you can see the way the data flows from the database to your UI and backwards. It makes it easier to track the errors if you got the unexpected behaviour.

At least, it is so with my own little project.

I'll make the point once again: whatever pattern you use, stick to the clear n-Tier architecture. 2-Tier or 3-Tier, just don't mess everything into a big interconnected ball.

84. <https://stackoverflow.com/questions/30726714/what-is-the-value-of-multiple-hybris-extensions>

T: What is the value of multiple Hybris extensions?

Q: This is a question about web based software architecture. I am a Hybris newbie, but as I understand it, you can create a full Spring MVC app in one Hybris extension. What is the value of breaking out components of that app into multiple Hybris extensions? Are there web app features or architectural value (e.g. maintainability, extensibility, performance, etc...) that you can only realize by using multiple extensions?

A1:

So Hybris is based on the concept of being flexible and modular, allowing new functionality to be plugged in where needed via extensions. An extension is an encapsulated piece of the Hybris Suite that can contain whatever you need it to contain, I.E. storefront, hMC, backoffice, etc. By default extensions are completely independent, however you can create dependencies between extensions no problem.

Say you're building an application that you want to have a section in the hMC, a frontend and some functionality in the backoffice too. In general you would have 4 extensions here:

a core extension for the model, services, interceptors, etc

hMC extension

frontend extension, pluggable frontend

backoffice extension

The real value of extensions is they allow hybris to be flexible and modular allowing for easy migration from one version of hybris to another.

<https://stackoverflow.com/questions/13044937/best-way-to-organize-architect-a-web-site>

T: Best way to organize/architect a web site

Q: I have to take a key decision about our web site organization/architecture.

Here is my context. Our main web site will be available in different countries. Even if the Business is nearly the same, there are some region-specific features. Of course it concerns translations, but also master/layouts and business process. These difference are because of different legislations. At the beginning we will have 4 or 5 derivations, but the target could be 20.

A simple comparison could be Stackoverflow and the Stack Exchange Network. Main features are quite the same between website, but there are site-specific business rules.

To my mind, there are basically two possible approaches :

Having a single web site that manage region/country-specific features. The will keep core features on the same site, but will involve coupling between all regions. There is also a risk of "IF" in the code. Devs & Maintainability is optimal (unique fix for all) but risky (could break others). A way to do this is a combinaison of portable areas and a custom view engine (generic view template in parent folder and derivation in a sub folder)

Having one web site per region/country There will be a common web site that will be implemented. There will have some common components but each web site will have its own lifecycle; Devs & Maintainability is easier but costly (if there are many derivations)

Please Note, another impact of this organization is deployment and availability.

What is the best way to organize this ?

Edit : We already have some experiences in MVC and as a general guideline, we are aware of MVC Best Practices : thin controllers, DI, ViewModels, Action Filters, ...

86. <https://stackoverflow.com/questions/1863220/how-is-mvc-more-convenient/1863311#1863311>

T: How is MVC more convenient?

Q: I have a large website that I have time to convert to a nice custom-framework that I can build to my needs. I want to build my own, and not use something like Smarty because I'd like to...

know how all the guts of it work

cut any and all bloat

learn it, just for kicks

But, after building it in different ways, several times...I keep feeling that for the amount of "convenience" it offers, the code becomes increasingly unflexible, attempting to keep track of files becomes triple as hard (especially if you are the lone developer on the project), and there isn't even any real awesome documentation out there.

At this point, I really need convincing...how is this going to change my life, again?

A1: This has been answered already, but to put a finer point on it, I think the single attribute that encompasses when to/not MVC is scalability:

MVC allows clear separation of duties (ie, front-end vs. database coders).

MVC is a pattern that enforces uniform coding habits.

Maintainability is increased as it's easier for a new project member (who understands MVC) to grok the codebase.

If you are the sole owner of the code and don't foresee other people joining anytime soon, then you should not need it.

A2: It can be difficult (sometimes impossible) To convert an existing project to some new pattern/framework. It also depends on how you are implementing an MVC framework.

You say that keeping track of files is hard. While you may end up with more files, they shouldn't be hard to keep track of if you have a good organization and naming system, i.e. keeping models, views, and controllers in 3 separate folders, or have some kind of naming convention that tells you what is what

I also don't understand why you see the code as more 'unflexible'. Having code properly separated into Models, Views, and Controllers is that it is more modular, and it can prevent code duplication.

The most important thing about having this separation of concerns is Maintenance. One of the biggest benefits of an MVC framework is that it is easier to pick out what code is misbehaving and fix it. The separation of concerns = a separation of problems & bugs.

A3: The greatest thing about MVC is that it's really just a concept. How you implement it is up to you as long as you follow the standard of separating duties.

I've written a few different MVC code bases based on what needs to happen in the project. One code base has a service layer to further separate "business logic" from the controller and views. Another one separated CLI controllers from web controllers.

This is just how I look at and use MVC. I suggest finding some credible documents or blog posts online about MVC.

A4: It is probably most convenient in the sense that it is an accepted pattern, and other people drifting in and out of your project will understand it. The big thing about Design Patterns, the book, was not that the patterns were new, but that they all suddenly had accepted names.

If you are and will be the sole updater, it may be no big deal.

87. <https://stackoverflow.com/questions/1654762/what-is-an-mvc-framework-and-why-is-it-necessary-useful/1655485#1655485>

T: What is an MVC framework and why is it necessary/useful?

Q: I know that an MVC framework allows you to separate business logic, data base access and presentation, but why do we need a framework to do this.

Can't we just keep our classes separated, perhaps using different packages/folders for the model, view and controller classes?

A1: An MVC framework is a framework written to split up the business logic, database access and presentation.

This is very useful in most web applications, and now lately into software/desktop applications.

This is due to the fact that following the MVC model, your code will be much clearer, cleaner and you keep your application DRY (Do not Repeat Yourself).

You can write your own classes and separate them into Model, View and Control. But again, you will need a framework to help you in accomplishing certain tasks. Like a List control in ASP.NET, or PHP framework being able to help you translate text between languages and so on. (Oh why reinvent the wheel?!)

A2: It's not, but sometimes it's a necessary evil.

Take your case for an example, although code behind seems to have a better separation of concern, but the problem with it is that it may not separate out the concerns as clearly as you wish. Usually when we do the code behind stuff we are not building the apps in MVC framework. The code behind code is also not easy to maintain and test anyway, at least when compare to MVC.

If you are building ASP.NET MVC apps then I think you are surely stuck with inline code. But building in MVC pattern is the best way to go about in terms of maintainability and testability.

To sum: inline code is not a good practice, but it's a necessary evil.

88. <https://stackoverflow.com/questions/25477321/how-about-an-mvc-style-structure-in-an-classic-asp-app/25478506#25478506>

T: How About an MVC Style Structure in an Classic ASP App?

Q: I have a classic ASP app that is just starting to undergo transformation into MVC. As that might take a while, I am thinking of applying some MVC-style logic to key parts of the existing code to make day to day maintenance easier.

Firstly I plan to create a 'view' - an include file that is iterated through with every record of a GetRows().

Secondly I plan to create a 'model' - a simple property driven class to display the item. For example a BusinessProfile class might have properties such as BusinessName, Address, PhoneNumber, and YearsInBusiness.

Finally I plan to create a 'controller' class that will grab the data (using the GetRows() method), perform any calculations required and populate the 'model'.

Is such a task worth doing?

Might such an approach would cause a big performance hit in a classic asp app? Right now most of the html is being written directly to the response stream and I understand that this is an efficient way of working in ASP.

I did find an article here which indicates the approach I'm taking, but I won't be going that far in mimicking MVC (no url changes or route data to consider).

A1: Of course there will be a difference in performance in Classic ASP using an MVC structure. It's simply just more work for it to do. However, the trade-off is maintainability, depending on how big the application is, and you have to think it's worth it. I would think it is since Classic ASP is 'spaghetti code'.

To be honest, I would learn C# Asp.Net MVC5 instead. Great tutorials online to learn to do this type of stuff pretty quickly--Developing in general is quicker in C#/Net than in classic ASP when considering all the built in functionality offered, which helps make up for most of the time taken to learn .net. It's also worth using the effort to learn .net MVC rather than rebuilding or building a new Classic ASP application, because if you knew ASP.Net MVC, you surely wouldn't be going this route. (I am a Classic ASP Developer)

89. <https://stackoverflow.com/questions/2246251/how-do-i-improve-asp-net-mvc-application-performance>

T&Q: How do you improve your ASP.NET MVC application performance?

A: A compiled list of possible sources of improvement are below:

General

- Make use of a profiler to discover memory leaks and performance problems in your application. personally I suggest [dotTrace](#)
- Run your site in Release mode, not Debug mode, when in production, and also during performance profiling. Release mode is much faster. Debug mode can hide performance problems in your own code.

Caching

- Use `CompiledQuery.Compile()` recursively avoiding recompilation of your query expressions
- Cache not-prone-to-change content using `OutputCacheAttribute` to save unnecessary and action executions
- Use cookies for frequently accessed non sensitive information
- Utilize [ETags](#) and expiration - Write your custom `ActionResult` methods if necessary
- Consider using the `RouteName` to organize your routes and then use it to generate your links, and try not to use the expression tree based `ActionLink` method.
- Consider implementing a route resolution caching strategy
- Put repetitive code inside your `PartialViews`, avoid render it xxxx times: if you end up calling the same partial 300 times in the same view, probably there is something wrong with that. [Explanation And Benchmarks](#)

Routing

- Use `Url.RouteUrl("User", new { username = "joeuser" })` to specify routes. [ASP.NET MVC Perfomance by Rudi Benkovic](#)
- Cache route resolving using this helper `UrlHelperCached` [ASP.NET MVC Perfomance by Rudi Benkovic](#)

Security

- Use Forms Authentication, Keep your frequently accessed sensitive data in the authentication ticket

DAL

- When accessing data via LINQ [rely on IQueryable](#)
- [Leverage the Repository pattern](#)
- Profile your queries i.e. [Uber Profiler](#)
- Consider second level cache for your queries and add them an scope and a timeout i.e. [NHibernate Second Cache](#)

Load balancing

- Utilize reverse proxies, to spread the client load across your app instance. (Stack Overflow uses [HAProxy \(MSDN\)](#)).
- Use [Asynchronous Controllers](#) to implement actions that depend on external resources processing.

Client side

- Optimize your client side, use a tool like [YSlow](#) for suggestions to improve performance
- Use AJAX to update components of your UI, avoid a whole page update when possible.
- Consider implement a pub-sub architecture -i.e. Comet- for content delivery against reload based in timeouts.
- Move charting and graph generation logic to the client side if possible. Graph generation is a expensive activity. Deferring to the client side your server from an unnecessary burden, and allows you to work with graphs locally without make a new request (i.e. Flex charting, [jqbargraph](#), [MoreJqueryCharts](#)).
- Use CDN's for scripts and media content to improve loading on the client side (i.e. [Google CDN](#))
- Minify [-Compile-](#) your JavaScript in order to improve your script size
- Keep cookie size small, since cookies are sent to the server on every request.

- Consider using [DNS and Link Prefetching](#) when possible.

A2: The basic suggestion is to follow [REST principles](#) and the following points ties some of these principals to the ASP.NET MVC framework:

1. Make your controllers [stateless](#) - this is more of a '*Web* performance / scalability' suggestion (as opposed to micro/machine level performance) and a major design decision that would affect your applications future - especially in case it becomes popular or if you need some fault tolerance for example.
 - Do not use Sessions
 - Do not use tempdata - which uses sessions
 - Do not try to 'cache' everything 'prematurely'.
2. Use [Forms Authentication](#)
 - Keep your frequently accessed sensitive data in the authentication ticket
3. Use cookies for frequently accessed non sensitive information
4. Make your [resources cachable](#) on the web
 - [Utilize ETags](#)
 - Use expiration
 - Write your custom ActionResult classes if necessary
 - Utilize [reverse proxies](#)
5. Compile your JavaScript. [There is Closure compiler library](#) to do it as well (sure [there are others, just search for 'JavaScript compiler'](#) too)
6. Use CDNs (Content Delivery Network) - especially for your large media files and so on.
7. Consider different types of storage for your data, for example, files, key/value stores, etc. - not only SQL Server
8. Last but not least, test your web site for performance

90. <https://stackoverflow.com/questions/3013166/asp-net-mvc-application-performance-profiling>

T: ASP.NET MVC Application performance profiling

Q: How are people currently profiling the performance of their ASP.NET MVC applications?

I'd be most interested in simple and free approaches.

A1: Glimpse is a helpful tool. It provides many detailed information and has support for EF and both Asp.net webforms and MVC. Hope this helps someone.

A2: If you're serious about performance profiling then you might need to spend some money. I've spent a lot of time using Redgate's ANTS profiler and it has helped me find some very unusual aspects of my code that have caused performance problems.

Mike's suggested technique is good, and I've used that too, but if you really want to dig into the hot spots and how those hot spots were called then tools like dotTrace and ANTS are very good. Personally I prefer ANTS but dotTrace will do the job too.

91. <https://stackoverflow.com/questions/652818/securing-an-asp-net-mvc-site>

T: Securing an ASP.Net MVC Site

Q: As a relative newcomer to both web and MVC, I am looking for a good summary of security best practices that I should implement.

The site will be public facing with "moderately sensitive data" (meaning we can't get sued, but probably wouldn't make many friends if the data got out!) and will have the following security steps taken: a: Forms/membership authentication and authorization b: Parameterized queries to prevent sql injection. c: Automatic timeout with x min of inactivity c: SSL for client to server encryption

What else do you recommend?

*Securing IIS and the network don't fall under my domain, so I'm more interested in the things I need to do to the software.

- A1: If you are using cookies to recognize users, be sure to use an arbitrary token (such as a [GUID](#)) to store on the client for identification. I've seen too many websites that store my email address or username in my cookie... just have to change it to another!
- Write your software so that it can run under [medium trust](#).

A2: If you are new to web development you should be aware of [cross site scripting \(XSS\)](#). You can use `Http.Encode` helper method to protect against this in ASP.NET MVC.

A3: Make sure you prevent out of order requests. Ensure client is authenticated before allowing to see sensitive data, or in some cases, make sure the client has come through the correct channel, before allowing a data manipulation. For example, only allow adding an item to your cart if the request came from the product details page. If you don't check, any one can mess around with the action. The URL would be like `http://server/cart/add/XYZ123` and anyone could just tweak the 'id' parameter.

A3: Maybe you should choose methods that can be invoke from outside or not. For example be careful make a method like delete any tables like `http://yourhost.com/edit/deletealltable`. Make sure you design your class and methods well. And give attributes `[NonAction]` for preventing public method being invoke.

Make sure you display data (especially sensitive) as you need with minimum fancy design and use client script as long as needed.

Remove any unused trash files like unused files in your solution folder.

Check and double check and validate any input control like textbox. I just can give something in the textbox to hack your system.

If you use mix between MVC and regular ASP.NET, please remove any dependency between them.

A4: Be sure you cover the basics thoroughly, independently of ASP.NET. Make sure your DBMS has a separate user with the minimal required privileges (e.g., CRUD and executing sprocs from specified databases) set up to access the database from the web application. Parameterizing queries is an excellent idea, but **ALWAYS SCRUB YOUR INPUT ANYWAY**: it is not a complete defense against sql injection.

Keep your design clean and easy to understand. Document whatever you do clearly, especially on the database side. It would be very bad if all your good work were destroyed by two programmers months or years later--one who didn't realize, say, that the database user for the web application (now accessing a database on a different server) shouldn't have root privileges, and another who added a control that didn't cleanse input properly. There's only so much that can be done about this sort of thing, but designing for the possibility that fools will be maintaining your code isn't so that coders will think you're sweet--it's so that fools won't put you out of business.

92. <https://stackoverflow.com/questions/467117/how-to-implement-security-in-a-gui-application/467169#467169>

T: How to implement security in a GUI application?

Q: I'm writing a GUI application that will have a user log in feature. Each user will belong to (at least one, possibly more than one) group and each group will have attributes indicating if certain rights are allowed or not allowed. The list of rights will cover things like editing things from the past, printing, deleting data, etc. Lots of different actions can be handled by the same right (printing can be initiated both from the menu and from the toolbar, for example).

My question is: what is the best way to implement this security system? Should every action have a Boolean isSecurable attribute and list of rights required? How should the checking be done, by a central structure, or should each action check for the required rights itself?

I'm aiming for correctness here. I know I can hack together a working system quickly but I'd like to have something that won't cause problems down the road. I'm sorry for the verbose explanation but I'm not even sure what to call what I'm looking for.

Edit: This isn't really GUI-specific, I think, but I've researched quite a bit for info on this and most of the stuff I find is for web applications, or general "secure programming" tips.

A1: "BCS" is correct that the security checks should not be tied to the GUI, that should be tied to the underlying actions/operations/methods you're invoking. In an MVC framework, that would be in the Model, or elsewhere, in the actions invoked by the Model.

If the dispatching of your actions is certain to pass through some common mechanism (e.g. all share a certain base class), then putting the security checks there is a good way to cover all the bases.

One additional thought: What you describe as groups may or may not be "roles" in security terminology.

A2: I'd go with something like an MVC system and put none of the security stuff in the GUI code. Make it a part of the model so that it doesn't matter how the user triggers an action, the same security code path gets run.

I've never done much GUI and even less security stuff but one approach would be to have a secure proxy object that keeps track of who is logged in and only forwards requests that are permitted in the current context.

If you want a fun project, that proxy object would be a good candidate for generated code.

A3: If you will be writing a .NET application you could consider using the membership provider infrastructure. You can even use this approach to implement authentication for both web and desktop clients as described in this MSDN magazine article.

93. <https://stackoverflow.com/questions/1356102/role-based-security-asp-net-mvc>

T: Role based security asp.net mvc

Q: I'm interested in knowing what are the best practices for using role based security in MVC:

how to secure your actions and make them accessible by specific roles only?

94. <https://stackoverflow.com/questions/3334349/could-i-make-dynamic-render-rely-user-permissions-in-mvc-2>

T: Could I make dynamic render rely User Permissions in MVC 2?

Q: I make security system in mvc application. In MVC it must be done by AuthorizeAttribute and roles string via actions methods.

Could i make this stuff: instead of action resolve I want to make view where html parts are hidden depend on current user permission set (For example: save button are not visible if user not Administrator).

A1: Brian - i don't think this is a good idea to 'hide' the admin parts. you basically then just expose to logic to anyone opening the html in 'view source' mode. it would be better to have an admin view and a 'normal' view and just do a case statement in the controller action to deliver the appropriate view where required (still not the best option, but far better than hiding fields). better still, have a master view that contains partialviews which are only rendered if it's the correct user type etc..

just my 'view' on the topic.. jim

A2: Thanks to all for your answers. I see that view dynamic render is a bad practice in mvc applications. I'm used to think that there can be some libraries or templates.

BTW When i told to my PM that a string with roles is a common pattern he said "Hard code!!!!". Now I'm designing some WCF service with will be an "Application Authoriser"))).

95. <https://stackoverflow.com/questions/5767582/security-system-design-in-mvc-application>

T: Security system design in MVC application

Q: Which design approach can be used, already exists or new ones to implement security system in MVC web-application?

Possibly there are patterns, best practices, e.g. in some popular languages, e.g. Java, .Net or whatsoever? On which level is it better to implement it: model or controller or something between them?

I faced that primitive approach results in spreading security checks among many controllers or models depending on implementation, mixing with code of levels. But it is not obvious for me in which way to design security in better way.

I have an MVC application. I need flexible system of access rights. I have a hierarchy of categories and entities in categories. Some users can edit/view/add/remove one or set of categories, other users - other categories. It is also required that depending on user role some fields of model should not be retrieved from DB (null should be returned) Admins should be able to assign different access rights.

A: You should be using .Net's built in membership providers. By default a new MVC 3 Internet Application Visual Studio project template will give you basic login code. Clicking on the 'manage' your site button from within visual studio will give you the web interface to manage the users and roles. Create your users/roles, then define [Authorize(Roles="Admin,Users")] on your Controller class definition or on your method definitions. DO NOT define URL access as was done in Asp.Net Web Form applications as there are multiple URLs that could map to a single place. Use the Authorize attribute instead.

Also check my response here: [What features do I need to have before I open an ASP.Net app onto the internet?](#) In addition make sure you use Html.AntiForgeryToken in your views and [ValidateAntiForgeryToken] on your [HttpPost] controller methods (ie any methods you post back to)

96. <https://stackoverflow.com/questions/38299539/asp-net-web-forms-and-asp-net-mvc-security>

T: ASP.net Web Forms and Asp.net MVC Security

Q: First of all I know this is a very popular topic nowadays, and this question is asked many and many times.

But here I'm not asking which is better, since it's very clear that asp.net MVC is better than web forms.

The question here is, what to do with our already written asp.net web form it's neither small nor big, we can call it of medium size.

Is it really deserve to completely rewrite such application with asp.net MVC? The main thing we are concentrating on is Security.

So if MVC is better than web forms in terms of Performance a little bit only, it would'nt be a big matter. But if it is better than web forms in terms of security, even a little bit, it's really very important for us.

So that's what I want to know: what are the security advantages of wasting a lot of time and money to rewrite an already written web forms application with MVC?

A1: Wasting "a lot of time and money" on rewriting well-done web forms code in MVC makes no sense whatsoever. To rewrite any code, you need a compelling reason.

Who said that MVC was "clearly better than web forms"? It is neither better in performance nor in security. What it's better in thought, is design.

MVC's design encourages the developers to leave the business logic out of the presentation. Although you can also move the logic out of the presentation in web forms too, its design does not encourage that because it takes much more efforts. The other way is also true, some developers still add logic to the view in MVC which defeats the purpose. Another issue is that MVC does nothing to also encourage the separation of business and data layer leaving that entirely up to the developers, so some developers keep all the logic in the controllers.

The separation of logic from the presentation makes the code much easier to test and much easier to divide between the UI designers and app developers.

All of that is very important to most projects, but not enough reason to rewrite code that's doing its job with no major issues. For new projects, it's definitely worth the consideration.

There are some other advantages to MVC, but in my opinion the above two are the most important. Also there are some advantages to web forms and they can be faster to develop certain app with, so we cannot say that MVC is absolutely better than web forms, although the advantages of MVC outweigh the advantages of web forms for most projects (not all), in my opinion.

A2: if we leave the many advantages that MVC have over the web forms and the the control that you have over the application and talk about the Business part. The question should be changed to these two:

1.Do you want an future proof application which is using much more stable framework over which the developers can have full control?

2.Do you want this application just to run till it can?

if your application is going to evolve and will have new versions, functionalities and etc. Then yes you should. However if you have static application that will not have big changes (maybe some minor upgrades and bug fixes) then the investment is not worthy.

the security is not the question because the same security can be achieved by both technologies.

97. <https://stackoverflow.com/questions/6607468/web-application-program-design-architecture/6607561#6607561>

T: Web application/program design architecture

Q: we are planning to upgrade our web site and use the N-TIER design. i have read this article which is quite good in my opinion.

My questions are:

- 1) is this architecture still valid for designing an application ?
- 2) should we use other architecture like the onion , 3 layer , ddd and so on?
- 3) in the Service Layers the article suggest that we divide the data messages and the commands, is the best implementation is to create two services one for data and one for commands ?

A1: The architecture depends on what kind of project you need to create, complexity of project and business logic, scalability, maintainability, any way you should implement your project in the way that you can easily change your code and the tiers and classes should be much more decoupled you should use ASP.NET MVC for application layer, and I suggest to use IoC-containers for dependency injection, you can start with 3 layer architecture with Repositories data access layer, Services classes business logic layer, ASP.NET MVC application layer and another thing you should use ORM like Nhibernate or Entity Framework If you have a complex domain you should look at the DDD

A2:

1. Yes this article is still a good article
2. This really depends on your technical and functional requirements. You can not start with an architecture and assume the implementation will fit any application.

2 see 2

A3: It really depends on the applications requirements.

I tend to prefer the 4 tier design in that i have:

Data access
Entities
Facades
UI

However i have worked with developers who prefer to use pure business objects. That is the objects themselves arent truely representations of the records in the data store and they themselves contain all functionality necessary to perform the actions they need to perform. This includes data access. One example of this is approach is CSLA.NET.

I do feel this discussion is a bottomless pit of opinions based on upon experience though :)

98. <https://stackoverflow.com/questions/227919/using-mvc-how-should-one-handle-communication-between-views-between-models/227959#227959>

T: Using MVC, how should one handle communication between Views? Between Models?

Q: Question number three in my quest to properly understand MVC before I implement it:

I have two cases in mind:

The primary application window needs to launch the preferences window. (One View invoking another View.)

The primary Model for an application needs to access a property in the preferences Model. (One Model accessing another Model.)

These questions are related in that they both involve communication across Model-View-Controller triplets, a topic that I haven't found much discussion of in my Googling.

The obvious way to fix this is to wrap everything in a top-level "application" object that handles transactions between Models and allows Controllers to invoke one another's methods. I have seen this implemented, but I'm not convinced its a good idea. I can also see possibilities involving Controllers observing more than one Model and responding to more than one View, but this seems like its going to become very cluttered and difficult to follow.

Suggestions on how best to implement this sort of cross-talk? I feel like its a very obvious question, but I've been unable to find a well-documented solution.

On a broader note, if anyone has a link that shows typical approaches to these sorts of MVC issues, I would love to see it. I haven't had much luck finding solid, non-trivial references. Examples in Python would be lovely, but I'll gladly read anything.

A: You may want to consider looking up the Front Controller design pattern.

The Front Controller pattern defines a single component that is responsible for processing application requests. A front controller centralizes functions such as view selection, security, and templating, and applies them consistently across all pages or views. Consequently, when the behavior of these functions need to change, only a small part of the application needs to be changed: the controller and its helper classes.

This way all requests from the view goes to the FrontController who then decides which specific action (controller) to invoke. Sometimes, it could forward straight to another view as in your first case.

There is no problem with multiple objects in the model talking to each other. In fact that will be very common. The way I see it, all the objects in the Model act like one component to represent the data and operations on the data.

[This](#) article might help. And [this](#) one.

99. <https://stackoverflow.com/questions/13708707/a-lightweight-php-frameworks-that-provides-http-router-and-access-control>

T: A lightweight PHP frameworks that provides HTTP router and Access Control [closed]

Q: As you know some well-known PHP frameworks have provide front-controller pattern and access control mechanism. Also there are some micro framework that provide front-controller pattern.

I have surveyed some such frameworks and yet could not make a decision, My concerns is:

Stability

Stability

Stability

Performance

Security

I do not expect any thing more form my core framework, I will use pure PHP or I may use specific module from various frameworks.

Currently I have experience in ZF 1.x, ZF 2.x, Phalcon frameworks. And I also read Lithium docs, but I found no one suitable for my project.

Also as per this, this and this pages ZF, Symfony, CakePHP, FuelPHP are not efficient frameworks (fat frameworks).

A1: In my opinion (because that's all that any answer could be here) the best, lightest weight framework is [Kohana](#). It is very minimal and can integrate with whatever third party libraries you use (including ZF).

100.<https://stackoverflow.com/questions/2539522/how-to-build-n-layered-web-architecture-with-php/2539971#2539971>

T: How to build n-layered web architecture with PHP?

Q: I'm dealing with the 3-tier architecture PHP website.

Now I need to redesign it to support distributed n-tier architecture. After long hours of research i came to this solution: business logic should be separated into presentation and purely business logic tier to allow for n-layer architecture (user-interface,presentation tier,b.logic and data tier). I have decided to use PHP just for the presentation. In the business logic I want to use J2EE implementation technology instead of implementing it in PHP because J2EE can provide much more essential container services which are essential for business logic, its robustness, maintainability and different critical business operations.

From your professional point of view, does it sound like a good way of redesigning the original website to allow for n-tier architecture considering the specifics of the website and the criticality of its operations?

A1: Everything you want to do is possible with Zend Framework. It follows an MVC architecture and has things like the Zend_Soap component for your services. There is no reason to build some multi-language application when you can keep it all within PHP. Why do you want to use Java so badly?

A2: From your description I understand the existing application runs on a LAMP stack. PHP integrates nicely into the LAMP stack and scales well with it. Why do you want to migrate this to a Java ecosystem? Reimplementing the business logic in Java means you throw away the essential working part of the existing app. If there already is a working business layer and DAL, why start from scratch again? Wouldn't refactoring be the smarter (and cheaper) alternative?

In addition, you claim J2EE will provide much better robustness and maintainability. How so? Maintainability is mainly a matter of code architecture and coding style. I am not aware of any pattern in Fowler's PoEAA that cannot be implemented in PHP as well. PHP also provides mature frameworks for UnitTesting, Continuous Integration, ORM, Dependency Injection, Message Queues, Webservices, Deployment, etc. to support your application development.

Sure, Java is compiled and supports multithreading and has a history in enterprise software architecture and I am not denying that it has language features PHP doesn't have. But the question is, do you need them for this project? And let's not forget that a programming language does nothing on its own. It's the developer who creates the application and J2EE Spaghetti code is still Spaghetti Code.

101. <https://stackoverflow.com/questions/2913317/net-web-architecture-literature>

T: .Net web architecture literature

Q: Can somebody please advise a very advanced book on the architecture of the web application development, preferably in .Net

I'm interested in patterns and designs, code security and re-usability

I have studied a variety of books, but they all seem to be for beginner/intermediate levels.

A1: Look here at the microsoft patterns and practices. This should help you out. Home

They have best practices for the Architecture, Security, Logging as well as Software factories which put there best practices into use.

102.<https://stackoverflow.com/questions/3182196/what-topics-fall-under-architecture/3183588#3183588>

T: What topics fall under architecture?

Q: I am an experienced coder. During the time I learnt C#, I followed a set of topics eg serialisation, exception handling, graphics, etc.

However, what topics are there in architecture and software design?

My list contains the concept of roundtrips, tiers, layering, is there anything else?

A1: At the architectural level we are concerned about:

- Services
- Components
- Security
- Infrastructure
- Backward/forward compatibility (migration, dual phase, etc)
- Scalability
- Reliability
- Federation
- Standards (not necessarily industry standards, just consistency)

Architecture is just as much about non-technical communication and business strategy as it is about anything technical. Architects are responsible for translating business goals into systems, which are implemented by developers and technicians.

As far as your existing list - "tiers" is a high-level development concept, while I would consider "roundtrips" relatively low-level. At an architectural level, and even a high-level software design level, "roundtrips" is an implementation detail of the communication between systems, and is not very interesting until it starts impacting one of the areas listed above. I'm not sure what you mean by "layering".

A2: Although the list is exhaustive, I tried to cover most basic points:

- [Functional requirements](#)
- [Non-functional requirements](#)
- [Architectural patterns](#)
- [Architecture models](#)
- [Design patterns](#)
- [Anti-patterns](#)
- [Application security](#)

103. <https://stackoverflow.com/questions/3551903/how-do-you-start-a-software-architecture-discussion/3552142#3552142>

T: How do you start a software architecture discussion

Q: I work for an organization that is pretty much a start-up within a large corporation. The team has several database engineers, and a few software engineers (in the data mining field). We're growing at a fast rate, which puts the need to have an overall architecture strategy or technology roadmap (or compass) for the next few years. As a software engineer, I've been assigned the task to start off on bi-monthly meetings to lead that discussion. So, my question is, how do you kick-off your role as an architect? how do you start off an organization-wide architecture discussion? I started reading the book "97 Things Every Software Architect Should Know", but I'd like to hear more from your experiences. So, as an architect, how did you start?

1. A1: Find out who's on your team
2. Find out what they're interested in at the level of systems analysis
3. Find out who knows people in the wider corporation
4. Find out what's in use in the wider corporation

5. Find out what people have used before in your particular division
6. Take all of the above information and use it to start talking about Now, Soon, and Eventually. Pay particular attention to how you connect with the outside world both in terms of outside the division and outside the corporation.

Do not start talking about architecture until you know what you're starting with. Do not start a discussion about architecture until everyone else does, too

A2: Your question is a hard one because it touches on many areas: process, leadership, and software design (or architecture). I'm going to assume you have a standard process already, but if you don't then try one of the Agile processes. I'll talk about leadership and software architecture.

Leadership. Fred Brooks' great book, *The Mythical Man-Month*, talks about having a technical leader the way a surgical team has a leader. Personally, I like more collaboration than I see with doctors, so let's treat Brooks's surgical team as an extreme. Still, you need someone to technically coordinate who is doing what, things like allocating people to work in different parts of the system, deciding what the hardest (riskiest) parts are (so that they don't get deferred until they're expensive to change/fix), and make choices when the team disagrees. This kind of technical leadership is needed whether you are building software, cars, or pogo sticks.

Architecture/Design. The standard mantra is that "Every system has an architecture" but the corollary is that not every architecture is deliberately chosen. You may implicitly copy the architecture from your last project, say a 3-tier system. Or it may be pre-decided once you know you're using a framework like EJB. At the beginning of a project, you'll be making architectural decisions and some will be hard to change later. How will you persist data? Will you use a framework (eg Spring, EJB, RoR)? Will you process data incrementally or in batch?

Pretty much any architecture can be forced to meet your requirements. For example, you could use RoR to build an thermostat. But you'll have an easier time when your architecture is a good fit for the requirements. Sometimes you'll have requirements, such as low user interface latency, that can be helped out by a wise architecture choice, like using AJAX. So the beginning of your project is an opportunity to think about these things and get them right. (And this doesn't mean you go up to the mountain, think hard, then dictate your answers to the team -- here again I favor collaboration).

Don't be afraid to think about architecture up front, especially about ways it can help you avoid difficulties, but also don't try to decide everything in advance. You'll have trouble if one part of your team started using Ruby on Rails while another part started using EJB -- so make some technical decisions, the ones that are forced on you and the ones that will address your biggest risks.

One last thing: Early architecture discussions are a blessing and a curse. They are a blessing in that they get ideas out early and allow you to choose your design rather than blunder into it. But they are a curse in that everyone will have opinions, and it can be difficult to get them all pointed in the same direction (ie back to the need for technical leadership).

I recommend Chapter 12 of *Applied Software Architecture* for guidance on your question. The list of headings gives a good idea of its advice: Creating a vision, the architect as key technical consultant, the architect makes decisions, the architect coaches, the architect coordinates, the architect implements, the architect advocates. The 97 Things book you mention is more of a collection of pearls of wisdom rather than a cohesive guide to architecture.

A3: I haven't personally had this experience, but here's a few hints:

- Get training, and get the people which will be in these discussions trained in the subject. You'll have a more meaningful time.
- Have an initial draft to be improved based on other people's ideas. It's much easier to start from a draft than to start from scratch

- Have someone closely working with you on this (analogous to pair programming). Two minds working for one hour usually provide better output than one mind working for an hour when it comes to intellectually intense activities.

A4: This is less from experience and more from practical thinking. First of all it's difficult to define software architecture - a great reference to start is always '[design patterns explained](#)' as this takes a non-software approach to understanding architecture.

Start looking at specific core issues of architecture such as

- Commonality and variability
- separation of concerns
- aggregation over abstraction

Architecture is not about removing complexity rather it's about managing it. So start by understanding the issues that comprise complexity in the context of your project

A5: Focus on the non-functional requirements, and from there try to pick an architectural pattern. A software quality analysis will be helpful. I would then embellish on the pattern and describe it to the team, based on the levels of granularity they're interested in.

104. <https://stackoverflow.com/questions/3422640/what-are-some-architectural-issues-you-have-faced-in-cloud-focused-designs>

T: What are some architectural issues you have faced in cloud-focused designs?

Q: When you decided to deploy a cloud setup what are the architectural/implementation issues you have faced and how did you resolve them?

Some examples include:

- (architectural) design patterns when you plan to move your existing application in to cloud
- what non-functional requirements should be give priority?
- how do you overcome the cloud overhead ? (because of virtualization - like resource metering, etc)

A1: The biggest issue I faced, were local fallbacks. In a typical cloud scenario you are moving your resources that once lived in a traditional data storage (database, filesystem, etc) to something behind an API, that you can't easily replicate locally. For our application we moved a few typical queues from MySQL to [Amazon's SQS](#). Problems:

1. Currently Amazon charges \$0.01 per 10,000 SQS request, a cost that might seem extremely small, but there's absolutely no reason to pay when developing locally (or for your test server, assuming you have a separate one).
2. If you don't have a local queue fallback, you need a separate queue per development / testing environment. You really don't want messages from different queues getting mixed up.
3. There isn't a simple way to emulate SQS locally for our environment (that I know of).

Architecturally, I dealt with the transition to SQS with simple [adapters](#):

- An abstract adapter that did most of the work, with abstract functions for the storage specific stuff,
- A SQS adapter that inherited the abstract adapter, and utilized the SQS SDK,
- A MySQL adapter that was more or less exactly what we had before,
- A [factory method](#) that created Queue models, decided what adapter to use, fed it to the models.

The same architecture (more or less) worked pretty nicely when we moved our images to [S3](#), with a filesystem local fallback. Simple, small and easy enough to explain, and, more importantly, it works. If you are migrating an application to the cloud, chances are you'll be writing quite a few adapters for your back end services, other than having a simple fallback mechanism, you don't want to be vendor locked to a specific service.

Obviously if you are building an application with the cloud in mind, you may not necessarily need local fallbacks, especially if your platform has an easy way of emulating the cloud environment. Something like [Stratosphere](#), if you are developing on .Net / Mono or if you are targeting Amazon's services. But if you

have a mature application, you already have an infrastructure set up locally, keep using it makes a bit more sense.

The cloud "overhead" is not really something you need to worry about if you are using the cloud as a fancy data store. But if you are looking for cloud computing, then there's no answer, it always depends on what you are doing exactly.

A few relevant questions:

- [What should I do to scale out an high-traffic website?](#)
- [What are common pitfalls of Cloud Development that you have run into?](#)
- [Are there any examples of implementing and effectively responding to a “Chaos Monkey”?](#)

105. <https://stackoverflow.com/questions/5170092/how-to-identify-abstraction-and-scope-for-architecture-and-design-respectively/5175642#5175642>

T: How to identify abstraction and scope for architecture and design respectively?

Q: I am in the architecture phase of my project. My challenge is that I am unable to maintain a certain level of abstraction at present. I often creep into areas that we generally address as part of design.

I don't know where to stop thinking & elaborating ... therefore I end up articulating very fine details of the solution which will directly be usable to the programmers. In the process I am losing the big picture (vision) and stretching time exclusively dedicate for the purpose of architecture.

Are there any ways / methodologies / approaches that can be used to restrict myself within boundaries of architecture while I am addressing it and likewise for design when I am in design phase?

A1: Take a step back - you're at the architecture phase, so what are the deliverables that this phase needs to produce? Do you know who the stakeholders are in your project that you need to deliver to? - what they need / expect? The point I want to make is that if you haven't clearly identified what it is you need to do - it won't get done (regardless of what method you use).

Restrictions / Keeping yourself on target

A good architecture will go through 3 levels, and these are a good basis for an approach:

- High-level direction: do whatever it takes to verify (and be able to justify) a given direction. What sort of system do we build? A desktop system that is used by staff ion the office or one that can be used by remote users anywhere in the country-side?
- Logical options: stay completely away from implementation details, focus instead on identifying the major components that you'll need. We need to store data, we need to authenticate users against this existing external service, we need to provide a UI.
- Physical options: this is where you get into the detail of spelling out what is to be used. To jump back into an IT metaphor: are we using an entity mapping framework, rolling our own or re-using a pre-built in-house one?

For all of these you should be able to find reference architectures or "prior art" of some kind which backs up your approach.

Inputs into these 3 steps can be considerable, and should include:

- The context (everything about the environment the solution needs to work in): size of user population, distribution, technical maturity (both of the users and the staff who will support it), data sensitivity, nature of the business and how the system relates to that - does the system handle real-tine medical records (matter of life and death) or is it a wiki?
- Non-Functional Requirements (a): Identify the top 3 in order of priority as this will be a key guide for making architectural decisions. Is performance the most important? Or security? Availability? These will be driven by the context.

- Non-Functional requirements (b): these will also be driven by the context but they also provide (hopefully testable) marks that you need to hit: how fast, how available how usable, how it handles DR.

Outputs you should be able to provide (so think about how you can do these) include:

- Some sort of Solution Architecture Definition. usually is a formal doc but might not need to be. It should include information that addresses the "views" relevant to the solution / problem / context: the logical view of system components including external interfaces and systems you interact with, a physical view of where the components of the system will be deployed, if you're writing software you'll also need to describe how that software is divided up into physical packages that can be deployed, security, data and so on.
- A Decisions Register: this will be a living register that you add to throughout the life of the project. Use it to explain why certain decisions were made. This both protects you if you're challenged at any point, and will help you / others in 6 months time when an issue comes up and you need to remember **why** you did what you did.

Details & Design

Design is where you get into detailed specifics, this could include patterns to be used at the object level, and so on. This is the time and place where you might find yourself providing reference implementations: this is how we need to structure our services, etc.

A2: I am afraid the only real answer is practice; practice; practice. However, I found that when considering distribution of topics between the different areas, it is useful to continually remind yourself of three things.

Firstly, try to keep in mind, all the time, what level of task you are currently working on. When considering any part of the architecture/design, keep saying (to yourself) - is this an appropriate topic for THIS task. (As an example, the project I am currently working on, requires the specification of a parser parser. This is essential to the architecture, but I failed to remember for a long time that the output of the program was a parser, rather than the description of the grammar.)

Secondly, simplify. I have found that both good design and good architecture tend to be simple - they tend to lead to an "aha" moment - it is obvious that this is the way to go. This does mean (particularly when working on architecture) to be prepared to reorganise things; to remove things from the architecture - into a "good idea fragment" location, so that you can go back to them. Remember also that if you have the appropriate level of abstraction, then even a very simple system description will have substantial depth.

Thirdly, keep track of your thinking, your ideas, your proposals. This need not be very elaborate - I use a textual diary format, timestamping entries as I make them. I capture things that seem to be significant at the time. I don't go back to it a lot, but I do go back, particularly if there is a break in my thinking. This tool is for my own personal use - it is not something that I make available to others.

Finally, delving too deep into design when working on architecture, may well be part of the process. One needs to really understand the implications and requirements you are trying to satisfy, and sometimes the only way to do this is to go deep. Just remember to surface yourself, be prepared to park elsewhere the results of going deep, and integrate the results of your investigations into your architecture - at an appropriate level of abstraction of course.

EDIT:

As far as tooling goes, I have found tools to aid thinking of most assistance. Mind mapping software such as [Mind Manager](#); UML tools such as you mention; whiteboard type tools, where items can be placed and moved around and amended with the same facility as a whiteboard; and (if in corporate environment) brainstorming meeting software. I can't give references to these latter tools, because my knowledge is severely out of date. Also, putting all your notes under version control, separated by task into different projects can be of help.

As part of the project I mentioned originally, I am trying to develop a number of tools which will aid in this sort of process. The tools will be integrated by reference to a models of the architectural, design, and build processes. However, this is a recreational project with a sole developer, myself, and I am not yet at a point where I can provide tools.

106. <https://stackoverflow.com/questions/44687444/why-is-it-recommended-using-design-pattern-in-a-web-or-app-project/44687548#44687548>

T: why is it recommended using design pattern in a web or app project?

Q: why is it recommended using design pattern in a web or app project ? i only use only MVC.

it depends of type project for using a design pattern? or it depends of Project team?

Sorry for the novice question

A1: First of all MVC is also a design pattern. A design pattern is nothing but standard ways of solving common problem. The rationale behind using it is :

1. You avoid the mistakes people make in a new approach.
2. It is a widely acceptable methodology . Hence, fully tested and limitations are known without doing much deep diving.
3. Saves time because of 1st and 2.

There are lot of design pattern. Some applies to low level designing(Singleton pattern, Decorator etc. the list is huge) when you implement or to a class diagram or use case analysis. Some applies to Design high level architecture of system. By applying the patterns in this case you will achieve scalability , security and other non-functional requirements of your website/app. For example it has become a heavily used approach to horizontally scale the system of cheaper machine and put load balancer.

These two pattern LLD and HLD pattern for project type and requirements.

The other kind of pattern is going for a scrum model which usually depends on the team strategies.

107. <https://stackoverflow.com/questions/3992476/top-level-requirements-for-scalable-web-solutions-for-windows-net/4023804#4023804>

T: Top level requirements for scalable web solutions for Windows/.NET

Q: I have been building applications / web apps for some time, and I guess most of what I have built has been based upon simple principles, i.e. try to keep things loosely coupled, use industry standard techniques and so on.

I try to follow as many tech blogs I can about architectures, and how sites can scale (Facebook and the like).

Right now I am trying to gauge the requirements / components / tools for building a highly available site using .NET/C# running on Windows 2008 R2. As mentioned in the title, I am just trying to get a top level/30,000ft view of what the "parts" would be. For instance, I am (for arguments sake) not worried if I will be using SQL 2008 or mySQL for the datastore, and if mongoDB etc plays a part.

I guess what has prompted me to add this question is that I have been writing a few web apps which have run fine, but handle no where near the amount of users/actions as some of the social based websites. For instance, and this is very broad/overview stuff, the structure I have been using so far:

1. SQL 2008 backend datastore using Stored Procs
2. MS Enterprise Lib / Data blocks / caching etc forming the "business object" layer if you will.
3. ASHX pages to act as handlers for the frontend
4. JQuery / Javascript frontend - using XML (although some JSON recently) to get the data from the middle tier to the frontend

I realise the above is just a basic view, but it has worked relatively well.. the ASHX pages provide a lightweight means to interact with JQuery ajax calls, and so far the data access blocks in the Enterprise Library (version 5.0), make calling the DB nice and simple and generally fast.

SO WHAT AM I AFTER HERE...

Well, given the above, I sort of know that building some sort of social based web app (for arguments sake let's say a very very mini version of facebook) needs to have certain fundamental structures in place like:

1. Caching (i.e. memcache etc?)
2. Queuing mechanisms, so you can hand off lengthy processes to background tasks
3. Fast data access techniques.. are stored procs the best way to go?

I think I read somewhere that stackoverflow.com etc uses .NET technologies.. and I guess what I am after is some starting points / reading material to apply to a .NET world (I realise there will be a lot of *nix people churning.. and I want to say I am not adverse to learning anything new, but right now my skill set is primarily .NET).

Hope this sort of makes sense, bit of a ramble, but feel free to comment for further information.

A1: It sounds like you've already made a lot of the key architectural decisions - around technology, anyway.

I would say any platform / technology you choose can be made to work; just as any can be perverted and screwed up.

Stored Procs are good for speed - they're also a good security measure.

I suggest you draw up your solution architecture formally - having it documented will help those who come after you (or yourself after time has gone by), and the process of documenting it will help your thinking process.

Key things to include:

- Architectural Goals. What are the things you want to achieve architecturally? These will probably align well with the high-level Non-Functional Requirements (NFR) set out by the business client. For example: are you aiming for high re-use of existing technology so that the business doesn't have to diversify into new areas.
- Architectural Decisions. "We choose to use [technology / component / pattern] "x" because it's well supported". Or "we choose 'A' over 'B' because even though B is faster, A is more secure - which aligns with key NFR's.

Once you've done this it should be easier to make decisions; sometimes you might already know the answer in your head - but it's not that clear, writing it down can help.

108. <https://stackoverflow.com/questions/17926553/what-is-most-important-for-creating-the-architecture-of-a-web-application-scala>

T: What is most important for creating the architecture of a Web Application? Scalability, Maintainability or Performance?

Q: I am currently about to redesign a running, special purpose and German language social networking web application. The current version is so messed up that we decided to start from scratch. I don't want to run into all the problems again so I have been thinking and reading a lot about:

1. Scalability
2. Maintainability of the code
3. Performance

I argued in a blogpost that for the architecture of our system I would use exactly the order of importance like posted above meaning:
scalability >> maintainability >> performance

Those results were kind of surprising to me since I always thought performance is key essential for creating scalable systems.

1. What are your thoughts on the importance of these three factors?
2. I also argued that for achieving them one needs to do careful planning and design beforehand. Do you have any other must have advices?

A1: I believe it should be

maintainability >> scalability >> performance
Scalability / Performance

For me scalability is a special kind of performance problem. Performance also include response time. But I would rate scalability as more important as response time. Especially for a social network. But both are kind of close together in this compare.

In general performance problems are something you best deal with if they appear. If you try to optimize your code for a problem you did not encounter you most likely will just waste your time. What you could do, is to simulate user traffic on the page to force performance problems to appear.

Maintainability

Most important for me is maintainability because it is more expensive. There was a post on the stackoverflow blog about that but I can not find it right now. Performance problems can mostly be solved if you just buy better/more hardware and throw it at the problem. Hardware is relatively cheap and constantly dropping in price. Really expensive is coding time of programmers.

109. <https://stackoverflow.com/questions/22913092/which-approach-for-maintaining-reusable-net-components>

T: Which approach for maintaining reusable .net components?

Q: My team develops .net components which are used by other development teams within the company.

More often than not, these teams need an urgent enhancement and they want it now. To preserve my team's sanity, I would like to make planning more predictable and propose releases with a frequency no less than a month. I am curious about how other solve this kind of issues.

To take a concrete example, let's say we are developing our own Grid class. When one of the teams needs sorting but our next release is in 3 weeks. Would it be a good strategy to let them wrap our Grid in their own code and provide the required functionality themselves?

If not, what would be a good strategy to allow our users to enhance the components themselves? Could you please recommend some literature that explains the different strategies for maintaining an internal framework?

A1: First, you cannot say to the other teams "Hey, hold on for 3 weeks". Think about they own pressure to finish things in time, they got lives and deadlines too.

You can offer two solutions: a) "Ok, We can do it but due to internal agenda we cannot get it done before 3 weeks" b) "You can wrap it yourself and do all the hard work if you cannot afford to wait 3 weeks"

And maybe a third solution:

c) "If you can spare a developer we can guide him to implement it, off course he ill need some time to get in the code and start doing some thing real but we both ill gain at the end"

That was not a answer for your question but mode a advice for the scenario you painted.

Now the answer:

Can you really predict other teams demands? If you say yes stop hardworking now and go to Vegas, you can make lots of money by using super powers.

Think other teams as clients. You mostly cannot predict demands (to new features) unless they are too obvious it's a error to ship without it in first place.

You can try to make some brain storm with the other teams architects before even starting to waste time in any fancy component nobody ill use or care about.

From this you ill start to get a more concrete idea about what you need to build. Now you already got some "clients". Stop doing other components (they ill just create more "new features" pressure anyway) and focus on delivering something ill do the work, all the work it's supposed to do at least.

By just creating components without some agreement with your "clients" you risk to waste time creating things (even pretty good ones) no one needs and forcing your "clients" to seek the some nice other (free?) component they found searching on google.

In the pure technical question, maintainability of components is not very different from any other app. Just let it loose coupled (dependency injection can be a good idea) and you ill be fine.

A2: seems like you need branching (and merging)...here is a good starting point:<http://msdn.microsoft.com/en-us/library/gg475908%28v=vs.100%29.aspx>

110. <https://stackoverflow.com/questions/2818415/what-are-the-advantages-and-disadvantages-of-plug-in-based-architecture>

T: What are the advantages and disadvantages of plug-in based architecture?

Q: I want to do the architectural design for a software that can be used integrate various third party software's (executable) under one platform.

Standard project types will be added to the platform by default. The project type defines the way in which the different software will be executed and their input and output files.

The user can customize the available standard project type and that will be added to the platform as new project type which defines new custom execution flow.

Also it should support easy extension and customization of the features. I read that plug-in based architecture supports both.

What are the advantages and disadvantages of plug-in based architecture? Do we have any better architecture which can be used for this kind of scenario?

A1: The benefits of a pluggable system are

- extensibility: the application can be dynamically extended to include new features.
- parallel development: since features can be implemented as separate components, they can be developed in parallel by different teams.
- clear development direction: since the plugin framework ideally provides a well-defined interface and documentation for plugin writers, developers have a clear roadmap for development.
- simplicity: a plugin typically has one function, and so developers have a single focus

But some of these strengths are also weaknesses:

- extensibility: does the plugin interface anticipate the ways plugin writers want to extend the app, or does it restrict extension. Designing extensibility to meet all use cases often takes several iterations, or extremely good requirements analysis.
- maintainability: the provider of the plugin framework not only has to make sure the plugin interface satisfies intended use cases, is clear and well documented, but also that it can evolve. Managing versions

and backwards compatibility with existing plugins can be very hard. Hard enough that many practical implementations don't bother, and push the onus on plugin writers to update their plugins with each version.

- complexity: although each plugin works when tested alone, interactions between plugins can cause new problems, with bugs appearing only with certain combinations of plugins.
- testing: testing plugins can be difficult if the plugin system does not provide some form of mock plugin runner for testing, which is sometimes not possible, and testing is only available by running the plugin for real, which slows down development.
- artificial separation: a plugin typically has a single focus, but what constitutes a single focus is set by the plugin api provider. If a plugin writer finds he needs a plugin that can reasonably do 2 things (as defined by the plugin api) in close tandem, he may end up having to implement two plugins and find ways of providing communication between them that is not presently provided by the api. He's then having to work around or against the plugin framework.

Designing a good plugin environment has many of the same challenges as designing a good library. If you are producing both the environment and the plugins yourself, then it's not so bad since you can update all the plugins as the environment evolves, but if the plugin api is open to all, then it requires careful planning and execution to get the design right to avoid too many plugin rewrites as the environment evolves.

"[Second-system syndrome](#)" described by Fred Brooks advocates that the second system developed is often excessively generic, aiming for ultimate flexibility, sometimes producing a "platform within a platform"/"[inner platform effect](#)". A pluggable design is often seen as a way out when requirements are non-existent or underspecified. To compensate, the software is made as flexible as possible to try to handle "whatever comes along".

Apologies if this paints a dreary picture - pluggable systems can be fantastic and offer a lot of strengths, but they come at a high price. Before diving into a pluggable system, it's prudent to draw up requirements for all the plugins that you will need to cover the functionality required. This will then help you decide if the pluggable design is worth the effort, or some simpler approach would serve equally well.

A2: The advantages of a plug-in architecture is obviously the increase in flexibility. This allows other developers to extend your application in ways that did not expect in the first place. Note that there are various plug-in architecture ranging from flexible to extreme flexible. The most flexible one is called a Full Plug-in architecture, which is used in [eclipse](#).

The disadvantage is that to be really flexible you have to develop a solid framework that incorporates loading, unloading and communication between plugins. There will also be a slight performance overhead in communication between plug-ins.

For a discussing on how to create a plug-in architecture take a look at [this](#) question.

A3: Though its not easy to maintain plugin based architecture, why people develop in such a way then? Because still its better then other "fixed" approaches. Say if your requirements are changing one after another and design needs to be fixed, then think what will do with other approaches?

Best thing about it is parallel development. When client wants some features ASAP, developers can work in parallel and plug their code as Plugins/Components. Basically Plug-n-Play architecture provides flexibility with complexity, but complexity is for the first time. Once your team is comfortable with it, its easy for them to handle code, bugs etc...

When you want to integrate different 3rd party applications, as you mentioned, it will be better to develop it as plugin OR component/Service based. (I don't want to confuse you but **SOA** might be of interest.) So that you can on/off the service/plugin when its not needed. Even you can get benefit from this when you want to do **SAAS** (Software As A Service) model, where you get revenue for each different service/feature :).

For reference, you can check following JAVA frameworks. There are many ESBs available which provides component/service based plug-n-play architecture.

- [jBPM \(JBoss Business Process Manager\)](#)
- [Apache ServiceMix \(An Enterprise Service Bus\)](#)

111. <https://stackoverflow.com/questions/656252/what-questions-should-i-ask-when-trying-to-determine-if-a-system-should-be-redev/656299#656299>

T: What questions should I ask when trying to determine if a system should be redeveloped?

Q: I've been involved in the assessing whether a number of our systems need to be rewritten from the ground up or if they should be partially rewritten, or if they should just continue as is with patches on top.

In order to better assess the situation I was wondering what questions I should be asking myself and others to help determine the appropriate action to take?

A1: In general, I've found that re-writing code tends to be trouble (it is expensive, time-consuming, and involves a discovery phase that makes the first system look better).

That said, here are a few questions to ask:

1. Would core refactoring suffice? You'll know from evaluating the system whether or not the central issues go deeper than the code. If the issues are in the code base (rather than the technology itself), I prefer refactoring.
2. To what extent is the current system testable? Testability goes a long way toward extending the service life of any system module because testable code generally lends itself more readily to extension and maintainability. This relates to #1 as well.
3. Lastly, would the value provided from a re-write justify the effort. This is a business question, certainly, but one that the developer can and should help make.

A2: I'd recommend you read [Things You Should Never Do, Part I](#). He makes a strong case for not redeveloping. Money quote:

It's important to remember that when you start from scratch there is absolutely no reason to believe that you are going to do a better job than you did the first time. First of all, you probably don't even have the same programming team that worked on version one, so you don't actually have "more experience". You're just going to make most of the old mistakes again, and introduce some new problems that weren't in the original version. Perhaps you should ask yourself if you know the system well enough to fix the problems without re-writing it. If you don't, it might be safe to say you don't know the system well enough to redevelop it from the ground up.

A3: I suggest that you need a context for the discussion, and the best one I'm familiar with is found in Martin Fowler's "Refactoring" book. To me the question really is "Is this application refactorable?"

The first specific guideline would be "Is it written using good OO design principles?" If not, usually you need to either put it on life support, and/or start over. If it is, then the book will provide lots of help; and in my experience there's good reason for hope.

A4: Finally you want to achieve something whenever you rewrite a system from the scratch. You should ask yourself what do you want to achieve? Do you want to:

- Reduce the risk of a system build with old technologies
- Reduce the costs: too expensive to maintain
- ?

You could do a break-even analysis to see when your new system starts to pay out. In my opinion you should be able to reduce rewriting the system to costs and be able to see that a new one costs less than the old.

112. <https://stackoverflow.com/questions/5597512/writing-maintainable-event-driven-code>

T: Writing maintainable Even-Driven code

Q: I have just recently started playing with event-driven architectures, coming from a pretty standard object-oriented mindset.

The first thing I noticed was that the difficulty in understanding and tracing through programs seems to increase exponentially with the size of the program. While small pet projects are easy to follow, it feels like the code will rapidly turn to spaghetti.

I understand that I am new to this development mindset and not all of my object oriented worries carry over. Are there any resources on writing maintainable, understandable event-driven code? What do people who use node.js or Twisted or Event Machine do about this?

A1: There is another post here that shows the inlineCallbacks method, which is cleaner, but requires python 2.5 or newer (meaning not under Centos/RHEL 5 series, which I am sadly stuck with for my app). If you can use it DO SO.

As you can see, this looks like the old school python imperative stuff you know and love, but is WAY easier to maintain without a ton of nested functions and lambdas. I still wish python had blocks though.

As for debugging, you can turn on twisted reactor debugging using the defer.setDebugging(True) call somewhere in your initialization code. This will attach the original traceback that raised an exception in your code, so that you can trivially see where the error ACTUALLY occurred. Just remember to redact the setDebugging statement before going production, because it results in a HUGE amount of extra introspection (watch it in strace if you want to be utterly horrified).

A2: Obviously there are already best practices and models that will continue to develop over time.

However, consider also the possibility that evented programming provides the opportunity for "small pet projects" to interact with each other. Imagine a world where thousands of distributed individual projects interacted in real time through user-defined callbacks.

Users and developers would be able to rewire the web and applications over existing protocols from the top down instead of relying on existing application design. Application designers would then be free to focus on individual use cases instead of providing one-size-fits-all solutions or worrying about every possible contingency.

Check out Web Hooks and look at how services like Twilio are already operating

113. <https://stackoverflow.com/questions/4514677/how-to-hot-update-applications-professionally>

T: How to hot update applications professionally

Q: I wonder how big applications (with several application servers and loadbalancers) are hot update to actual version without taking offline for users. Skipping database schema here - only application layer.

For example there are several glassfish servers balanced by haproxy and we want to update application which is on several servers.

What is used in this case? I know this may be complicated but please enlighten me about methods.

A1: Rails websites frequently use Capistrano to deploy code. The code is updated on each server and the webserver (apache or nginx mostly) usually uses a plugin like passenger. Passenger restarts and reloads the code base which was updated (accomplished by touch tmp/restart in the rails root directory). The next web request will be sent to Passenger which is using the updated code.

Much of Twitter (from what I hear the backend processing is in Erlang) and I believe almost all of Hulu use techniques similar to this.

A2: The classical way of doing this in an >1-server-shared-nothing-configuration is to take one server offline, i.e. instructing the front end web servers or load balancers to direct traffic to the other servers only.

The offline server can then be upgraded and started again. Then the front-ends are re-configured to distribute traffic to the upgraded server.

Doing this with all servers eventually results in a complete upgrade.

114. <https://stackoverflow.com/questions/10946938/functional-requirements-and-architecture>

T: Functional requirements and architecture

Q: How does the key functional requirements affect software architecture? When choosing an architectural pattern you usually do it based on the non-functional requirements. I would like to know how the functional requirements affect the choice.

A1: If you suspect that the functional requirements are ill defined or are bound to change, you choose a more flexible architecture. If they are very well defined or standards based, you can choose a stricter, less flexible one.

A2: Functional requirements does have say in decision of software architecture of the application. For example, type of application whether data intensive or computation expensive plays imp role in decision.

115. <https://stackoverflow.com/questions/19312515/how-to-document-non-functional-requirements-nfrs-in-a-story-feature/19390183#19390183>

T: How do document non-functional requirements (NFRs) in a story/feature?

Q: The [Specification By Example book](#) states the non-functional requirements (commonly referred to as NFRs) can be specified using examples.

I've also been told by a colleague that non-functional requirements may be specified using SBE stories using the format:

Scenario: ...

Given ...

When ...

Then ...

Here is an example functional and non-functional requirement taken from [wikipedia](#):

A system may be required to present the user with a display of the number of records in a database. This is a **functional** requirement. How up-to-date this number needs to be is a **non-functional requirement**. If the number needs to be updated in real time, the system architects must ensure that the system is capable of updating the displayed record count within an acceptably short interval of the number of records changing.

Question 1: Can the non-functional requirement be specified as a story?

Question 2: Should the non-functional requirement be specified as a story?

Question 3: What would the story look like?

A1: Q1: Yes, definitely they can. Take a look on [that](#) article describing Handling Non Functional Requirements in User Stories.

Q2. From my perspective if you able to create them it's really worth of keeping and tracking them in such a way. But citing [this](#) article

There is no magical agile practice that helps you uncover NFR. The first step is to take responsibility. NFR can be represented as User Stories if the team finds that this helps to keep these visible. However, be aware that surfacing such stories may create issues around the priority of work done on them against more obvious features.

Q3. Take a look on the mentioned article from Q1.

A2: I'll give an answer by working through an example.

Let us say that your team has already implemented the following story:

Scenario: User can log in to the website

Given I have entered my login credentials

When I submit these credentials

Then I get navigated to my home screen

To answer Question 1) - Can the non-functional requirement be specified as a story?

The project stakeholders have given you a NFR which reads:

For all website actions, a user should wait no longer than five seconds for a response.

You could create a story for this as follows:

Scenario: User can log in to the website in a timely fashion

Given I have entered my login credentials

When I submit these credentials

Then I get navigated to my home screen

And I should have to wait no longer than the maximum acceptable wait time

Note that instead of imperatively specifying '5' seconds, I have kept the scenario declarative and instead specified "wait no longer than the maximum acceptable wait time".

To answer question 2) - Should the non-functional requirement be specified as a story?

The NFRs should *definitely* be specified as a story.

Creating a story will allow this task's complexity to be estimated (so that the team can determine how difficult it is relative to past stories), plus the team can break the story down into tasks (which can be estimated in hours, so that you can work out if the team can implement this story in the current sprint).

Hence in my contrived example, the team would have already implemented the code to log-in, but they'd then determine how to implement the requirement that it must take no longer than 5 seconds to log in. You will also allow be able to explore the inverse of this problem i.e. what happens if it takes longer than five seconds to log-in? e.g.

Scenario: User encounters a delay when logging in to the website

Given I have entered my login credentials

When I submit these credentials

And I wait for over the the maximum acceptable wait time

Then the Production team is informed

And the problem is logged

And I get navigated to my home screen

And finally, regarding question 3) - What would the story look like?

I've detailed how the stories would look like in answers 1) and 2)

A3: I think the boundaries of NFRs are still not fully agreed upon by everyone. Consider a story that says "As a manager, my employee must get all responses within 5 seconds to avoid hiring a second data entry person and adding \$50,000 in payroll expenses." I consider that a fully functional business requirement, along with any performance requirements that focus on the end user experience.

I categorize "traditional" NFRs as stories where the impacted person is not in the end user's or stakeholder's organization. "As a support person I need logs of the web site traffic to help me troubleshoot problems," or "As a software maintainer, I need a block architecture diagram to help me make changes." Including the role as you would with any user story helps with prioritization. It also helps identify the stakeholder for that NFR, should you have any questions about it.

NFRs may include some aspects of performance, at least those that don't impact the end user. "As a system administrator, I want to allocate no more than 10GB of disk space to the database in order to use SQL Express and avoid expensive SQL Server licenses."

Consider a typical NFR that might only state "Databases are limited to 10GB." It's an arbitrary number with no meaning or rationale, and there's no way to question it. Having the story-like role and explanation helps everyone understand that there is a valid reason for the NFR, so when you're prioritizing them you can ask smart questions. They lead to conversations like "I need to expand my table space to 20GB, but the sysadmin has this NFR about database size. How much do SQL Server licenses really cost him? OMG, that much? OK, I'll denormalize a few tables and save a few GB to fit it in there."

A4: As both @bensmith and @siemic show, yes, you can capture NFRs as stories.

Should you capture them in this way?

I don't think you want to capture NFRs as part of regular feature stories.

Most NFRs apply to more than one story. "The system must be responsive" means every story needs to define maximum wait times. "The system must not consume more than 10GB of disk space" means every story needs to consider disk space. The list of "and"s in the story becomes unmanageable in even trivial cases.

You *may* want to capture NFRs as independent stories, if both the product owner and team are comfortable with this.

For instance:

```
Given I have a PC with at least a dual core processor  
and 8GB of RAM  
and a gigabit connection to the system  
when I interact with the system  
then I never have to wait more than 5 seconds for a response  
and 90% of attempts respond within 1 second
```

This provides a clear requirement, with measurable targets. You just have to make sure that each story takes all of the NFRs into account.

A5: I think you need to look at a few things, NFRs should follow the life span of the application, software, product etc. backup and recovery scenarios should be covered regularly, security scans and performance should be measured in prod as well as in development. Many NFRs need validation from teams outside of the development group so would not be expected to have a script or code written to verify. So obviously security, performance, scalability, resilience etc can and should be tested within the development phase or before code gets promoted into live. Most NFRs can be written up as stories but as said I dont think all need development effort to cover them.

116. <https://stackoverflow.com/questions/21365021/layered-and-pipe-and-filter>

T: Layered and Pipe-and-Filter

Q: I'm a bit confused in which situations these patterns should be used, because in some sense, they seem similar to me?

I understand that Layered is used when system is complex, and can be divided by its hierarchy, so each layer has a function on different level of hierarchy, and uses the functions on the lower level, while in the same time exposes its function to higher level.

On the other hand, Pipe-and-Filter is based on independent components that process data, and can be connected by pipes so they make a whole that executes the complete algorithm.

But if the hierarchy does not exist, it all comes to question if order of the modules can be changed?

And an example that confuses me is compiler. It is an example of pipe-and-filter architecture, but the order of some modules is relevant, if I'm not wrong?

Some example to clarify things would be nice, to remove my confusion

A1: Maybe it is too late to answer but I will try anyway. The main difference between the two architectural styles are the flow of data.

On one hand, for Pipe-and-Filter, the data are pushed from the first filter to the last one. And they WILL be pushed, otherwise, the process will not be deemed successful. For example, in a car manufacturing factory, each station is placed after one another. The car will be assembled from the first station to the last. If nothing goes wrong, you will get a complete car at the end. And this is also true for compiler example. You get the binary code after the last compiling process.

On the other hand, Layered architecture dictates that the components are grouped in so-called layers. Typically, the client (the user or component that accesses the system) can access the system only from the top-most layer. He also does not care how many layers the system has. He cares only about the outcome from the layer that he is accessing (which is the top-most one). This is not the same as Pipe-and-Filter where the output comes from the last filter.

Also, as you said, the components in the same layer are using "services" from the lower layers. However, not all services from the lower layer must be accessed. Nor that the upper layer must access the lower layer at all. As long as the client gets what he wants, the system is said to work. Like TCP/IP architecture, the user is using a web browser from application layer without any knowledge how the web browser or any underlying protocols work.

To your question, the "hierarchy" in layered architecture is just a logical model. You can just say they are packages or some groups of components accessing each other in chain. The key point here is that the results must be returned in chain from the last component back to the first one (where the client is accessing) too. (In contrast to Pipe-and-Filter where the client gets the result from the last component.)

A2: 1.) *Layered Architecture* is **hierarchical architecture**, it views the entire system as -
hierarchy of structures

The software system is decomposed into logical modules at different levels of hierarchy.

where as

2.) *Pipe and Filter* is a **Data-Flow architecture**, it views the entire system as -
series of transformations on successive sets of data
where data and operations on it are independent of each other.

117. <https://stackoverflow.com/questions/14590200/quality-attribute-trade-off-in-eclipse-architecture>

T: Quality attribute trade-off in eclipse architecture

Q: I'm currently working on a project that is concerned with the software architecture of the Eclipse IDE. My aim is to make a trade-off analysis between two key quality attributes, in this case Modifiability and Performance. The plug-in architecture in Eclipse is obviously promoting a high degree of modifiability, but my research is currently concerned with whether this level of modifiability is impacting performance in running Eclipse (performance-weaknesses in the Eclipse architecture). I've been trying to find some reliable info on this for quite some time, but have so far found very little.

If anyone has some pointers/tips on this subject, it will be much appreciated!

A: In fact, Eclipse's plugin architecture is specifically designed to take memory footprint and general performance into consideration. For example, plugins are lazy-loaded, meaning Equinox will wait until the functionality is actually invoked/requested before loading a plugin. This even goes as far as enabling the discovery and/or representation of a plugin's functionality in the UI without having to actually load and activate that plugin. These were conscious and direct design decisions made with performance in mind.

See When Does a Plug-in Get Started?

Here is another example of a design change that was made that both improved performance and provided a cleaner design.

118. <https://stackoverflow.com/questions/1882576/does-three-tier-architecture-ever-work/1882663#1882663>

T: Does three-tier architecture ever work?

A: We are building three-tier architectures for over a decade now. Dividing presentation-, logic- and data-tier is supposed to allow us to exchange each layer individually, should the need ever arise, be it through changed requirements or new technologies.

I have never seen it working in practice...

Mostly because (at least) one of the following reasons:

- The three tiers concept was only visible in the source code (e.g. package naming in Java) which was then deployed as one, tied together package.

- The code representing each layer was nicely bundled in its own deployable format but then thrown into the same process (e.g. an "enterprise container").
- Each layer was run in its own process, sometimes even on different machines but through the static nature they were connected to each other, replacing one of them meant breaking all of them.

Thus what you usually end up with, is a monolithic, tightly coupled system that does not deliver what it's architecture promised.

I therefore think "three-tier architecture" is a total misnomer. The true benefit it brings is that the code is logically sound. But that's at "write time", not at "run time". A better name would be something like "layered by responsibility". In any case, the "architecture" word is misleading.

What are your thoughts on this? How could *working* three-tier architecture be achieved? By that I mean one which holds its promises: Allowing to plug out a layer without affecting the other ones. The system should survive that and be in a well defined state afterwards.

A1: The true purpose of layered architectures (both logical and physical tiers) isn't to make it easy to *replace* a layer (which is quite rare), but to make it easy to make changes within a layer without affecting the others (and [as Ben notes](#), to facilitate scalability, consistency, and security) - which works all the time all around us.

A2: One example of a 3-tier architecture is a typical database-driven web application:

End-user's web browser
 Server-side web application logic
 Database engine

A3: If you haven't seen it working, you may just have bad luck. I've worked on projects that serve several UIs (presentation) from one web service (logic). In addition, we swapped data providers via configuration (data) so we could use a low-cost database while developing and Oracle in higher environments.

Sure, there's always some duplication - maybe you add validation in the UI for responsiveness and then validate again in the logic layer - but overall, a clean separation is possible and nice to work with.

A4: In every system, there is the nice, elegant architecture dreamed up at the beginning, then the hairy mess when it's finally in production, full of hundreds of bug fixes and special case handlers, and other typical nasty changes made to address specific issues not realized during the design.

I don't think the problems you've described are specific to three-tier architecture at all.

A5: Once you accept that n-tier's major benefits--namely scalability, logical consistency, security--could not easily be achieved through other means, the question of whether or not any of the tiers can be replaced outright without breaking the others becomes more like asking whether there's any icing on the cake.

A6: Any operating system will have a similar kind of architecture, or else it won't work. The presentation layer is independent of the hardware layer, which is abstracted into drivers that implement a certain interface. The data is handled using logic that changes depending on the type of data being read (think NTFS vs. FAT32 vs. EXT3 vs. CD-ROM). Linux can run on just about any hardware you can throw at it and it will still look and behave the same because the abstractions between the layers insulate each other from changes within a single layer.

A7: One of the biggest practical benefits of the 3-tier approach is that it makes it easy to split up work. You can easily have a DBA and a business analyst or two building a data layer, a traditional programmer building the server side app code, and a graphic designer/ web designer building the UI. The three teams still need to communicate, of course, but this allows for much smoother development in most cases. In this regard, I see the 3-tier approach working reliably everyday, and this enough for me, even if I cannot count on "interchangeable parts", so to speak.

119. <https://stackoverflow.com/questions/30597580/which-layer-of-an-application-should-keep-security-logic-permissions-authorization>

T: Which layer of an application should keep security logic (permissions, authorization)?

Q: Since the most similar questions are related to ASP MVC I want to know some common right choice strategies.

Lets try to decide, will it go into the business layer or sit on the service layer.

Considering service layer to have a classical remote facade interface it seems to be essential just to land permission checks here as the user object instance is always here (the service session is bound to the user) and ready for .hasPermission(...) calls. But that looks like a business logic leak.

In the different approach with an implementation of security checks in the business layer we pollute domain object interfaces with 'security token' arguments and similar things.

Any suggestions how to overcome this tradeoff or maybe you know the only true solution?

A1: I think the answer to this question is complex and worth a bit of thought early on. Here are some guidelines.

The service layer is a good place for:

- Is a page public or only open to registered users?
- Does this page require a user of a specific role?
- Authentication process including converting tokens to an internal representation of users.
- Network checks such as IP and spam filters.

The business layer is a good place for:

- Does this particular user have access to the requested record? For example, a user should have access to their profile but not someone else's profile.
- Auditing of requests. The business layer is in the best situation to describe the specifics about requests because protocol and other details have been filtered out by this point. You can audit in terms of the business entities that you are setting policy on.

You can play around a bit separating the access decision from the enforcement point. For example, your business logic can have code to determine if a user can access a specific role and present that as a callback to the service layer. Sometimes this will make sense.

Some thoughts to keep in mind:

1. The more you can push security into a framework, the better. You are asking for a bug (and maybe a vulnerability) if you have dozens of service calls where each one needs to perform security checks in the beginning of the code. If you have a framework, use it.
2. Some security is best nearest the network. For example, if you wish to ban IP addresses that are spamming you, that definitely shouldn't be in the business layer. The nearer to the network connection you can get the better.
3. Duplicating security checks is not a problem (unless it's a performance problem). It is often the case that the earlier in the workflow that you can detect a security problem, the better the user experience. That said, you want to protect business operations as close to the implementation as possible to avoid back doors that bypass earlier security checks. This frequently leads to having early checks for the sake of UI but the definitive checks happening late in the business process.

Hope this helps.

120. <https://stackoverflow.com/questions/5083887/how-many-tiers-do-you-need/5084021#5084021>

T: How many tiers do you need?

Q: We have a web-app that consists of web-tier (PHP), app-tier (Java) and DB (mysql). web-tier communicates with app-tier AND with DB to retrieve some data. One of our clients insists on separating each tier with a

firewall and blocking traffic from web-tier to DB. They claim that this is insecure and app-tier needs to have the "get data" function that will be used by web-tier instead of reading data directly from DB.

It seems like a real waste to tunnel data through app-tier when it can be easily accessed by web-tier directly from DB. Read-only data can come from highly-optimized views and can be presented as-is. This greatly simplifies the design and removes additional problems like paging. The technique is known as Fast-Lane-Reader and advocates retrieving tabular read-only data directly from DB. For updates the app-tier is used where business rules are applied.

So my question is whether this 3-tiered firewall-isolated topology can be adjusted and allow direct traffic from web to db tiers?

A1: I would suggest you explain to your client how you define "value" and let them explain to you how they define it. My guess is you are not on the same page. It sounds like you value fast and cheap over quality (of design). Does your client agree with this approach? It sounds like they are more concerned with quality of design than fast and cheap. If this is the case, I'd listen to your client (since they are paying you, - and they should be willing to pay for that quality). Maybe after a conversation about defining value your customer will see it your way. Maybe not.

There are valid reasons - namely maintainability and extensibility - for keeping your PHP layer away from the DB layer (and only accessing data via the Java middle tier).

Just think of the maintainability reason:

A middle tier such as your Java layer acts as a facade. The database schema can be changed (for whatever reason) at any time, and your PHP layer does not need to care about that (meaning you don't need to update anything in your PHP code). Only the Java layer needs to be updated. The Java layer maintains a consistent interface (for your PHP code to write against).

Now, if you change the DB schema while both the Java and PHP layers access it directly, BOTH layers will have to be updated. This is a brittle design (a maintenance nightmare), and especially bad if you are not in charge of both the Java application layer AND the PHP layer.

A2: I'm not so sure I buy the whole security angle, but I do think it is wise to limit/eliminate direct chatter between the presentation tier (web app) and the data tier (database) to clearly delineate the separation of concerns.

For one thing, it encourages code re-use and encapsulating business logic rather than spreading it out throughout the application. For example, if you ever had multiple front ends (desktop, web, mobile) the duplication of logic would be minimized.

Secondly, it helps to future proof your application somewhat. For example, if you went from PHP to ASP.NET or a Mobile OS front end it would minimize the work involved to the relevant parts to display the data.

All in all, it is probably a good idea anyway. If there are some benefits in terms of the security architecture.

A3: To give a real-world, "today-proofing" benefit of going through the app layer, think of it like encapsulation. You should only have one way of setting/getting a particular piece of data, because you only want validation/formatting/filtering in one place.

Imagine you have a WidgetService.addWidget() service method in your java code. You want to make sure all widgets are of types the current user is allowed to work with, so addWidget() checks the permissions for that. Now if your PHP code tries to add a widget to the database directly, it bypasses those checks.

A4: I would say the point is not in having firewalls to block communication between FrontEnd (PHP) and DataLayer (MySql), even without any firewall it is usually not good to have a direct link UI -> Database.

In your case you even have a nice middle-tier done in Java, I would definitely tunnel everything through the java layer in order to fully decouple UI and Database.

Don't be afraid in performance issues normally there aren't any or could be addressed, and I do think you can do everything like accessing views or stored procedures, paging sorting and so on having your calls started from the java component instead of the php presentation layer.

121. <https://stackoverflow.com/questions/14050931/n-tier-development-standards/14051915#14051915>

T: N tier development standards

Q: Am new user of the n-tier development, and am wondering how can i determine the number of layers to use? i know the structure and divisions DAL and BLL, but some user may divide their projects into more tiers, depending on what reasons should developer make it more or less tiers? is it performance and functionality reasons?
please explain.
also is there a standard number of tiers?

A1: To manage the application development and maintenance, one needs to divide the application into logical (and physical) units/group - each devoted to specific concern (in terms of functionality or in terms of infrastructure or in some other terms). Division can be vertical and/or horizontal. Layer is a horizontal split while vertical splits get driven from domain perspective (modules/sub-modules). At a very broad level, number of layers get decided based on degree of separation of concerns that you want to achieve. Common layers are data access, business logic, presentation. But you can have such as business facade that provides simpler API on top of business logic, or services layer that allow external application to integrate with yours and so on. Each layer can have sub-layers and so on. And there can be cross-cutting concerns such as logging, security, audit trails etc

Tier indicates *physical* separation of layer(s) - tiering is done so that different layers can be scaled independently of each other. So you can have database server, application server (hosting business layer) and web server (hosting presentation) as tiers.

Will recommend reading [this article](#) to understand more on layers and tiers.

A2: As more complex or bigger application it is better to have more tiers, so you can separate concerns as DAL, BLL and etc. and write unit test separately for each tier. But for small application it will be too complex and it will slow down your developing process.

<https://stackoverflow.com/questions/7359533/c-sharp-microkernel-pattern-example>

T: C# Microkernel pattern example

Q: Does anyone have a simple but good explanation and possible C# .NET classes or libraries either built in or 3rd party that is a good example of the Microkernel architectural pattern.

To me it is a bit vague and mostly looks like it is the classes that are at your lowest level of design. Yet we never call this the microkernel but rather our Core assemblies.

I'm battling to understand the relevance outside of an os kernel for example.

thanks

A: The Microkernel analogy at application level in C# would be a main C# application (the micro kernel) which creates different app domains and loads different assemblies (kernel drivers services etc) in those app domain and communicate with them using IPC mechanism for message passing OR calling across app domain using Remoting (MarshalByRefObject). This will result in the required isolation level that is desired in a micro kernel arch.

122. <https://stackoverflow.com/questions/4192887/software-architecture-design-patterns/9447147#9447147>

T: Software architecture design patterns

Q: Can you please educate me on what are the software architecture design patterns that are available?

To elaborate my question, I want to read through different architecture design patterns and decide what suits my project requirements?

For example, there are Enterprise application design patterns, Enterprise Integration design patterns, ESB patterns, SOA patterns etc..

Thank you for your help.

A: patterns occur at many levels. Architecture patterns (i.e., architectural styles) are generally the largest in scope and cover the fundamental organization of the system. Design patterns are at the level of several collaborating objects. Bernd's suggestion of Fowler's and other enterprise patterns is a good one. Just recognize that those patterns tend to be more specific than these architectural patterns:

- Layered (i.e., virtual machine pattern)
- Big Ball of Mud
- Pipe and Filter
- Batch-Sequential
- Model-Centered (Shared Data)
- Publish-Subscribe
- Client-Server (and N-Tier)
- Peer-to-peer
- MapReduce

Architecture patterns most often apply to the runtime structure of the system, but can also apply to its modules or its hardware allocation. One common mistake is to think that the Layered pattern applies to the runtime when it really applies to a system's modules (i.e., its compile-time dependencies). You can, of course, mirror your module structure in the runtime

These patterns are discussed in detail in my book, [Just Enough Software Architecture, Fairbanks \(2010\)](#). Most of them are also covered in other books including [Garlan & Shaw \(1996\)](#), [Taylor, Medvidovic, & Dashovy \(2009\)](#), and [Documenting Software Architectures \(SEI, 2010\)](#).

With the list of pattern names, you should be able to find plenty of web pages (I've marked this as a community Wiki so that we can add those links). The books are helpful too because they give you more insight on how to use the patterns.

A2: Read these books:

- Martin Fowler: Patterns of Enterprise Application Architecture
- Gregor Hohpe, Bobby Woolf: Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions

A3: For architectural patterns, read [Pattern-Oriented Software Architecture Volume 1: A System of Patterns](#). patterns discussed are:

- Layers
- Pipes & Filters
- Blackboard
- Broker
- Model-View-Controller (MVC)
- Presentation-Abstraction-Control (Hierarchical MVC)
- Microkernel
- Reflection

A4: Not very sure about your question! Your one tag is design pattern so I will say this: If you have not read design patterns book then you need to read design pattern books first. Head First Design Patterns is good. When you can understand about design patterns then Architecture design patterns can be understood.

123.<https://stackoverflow.com/questions/2842014/best-practice-in-architecture-in-centralizing-location-of-different-modules-cms/2842035#2842035>

T: Best practice in architecture in centralizing location of different modules (cms, webapplication)

Q: Let's just say that i want to create a CMS and other online applications.

I want to integrate them all in a central location, but they also have to be available separately (not everyone wants more than the CMS solution).

Should I create a huge central application that contains all the database, which communicates through a webservice with the "standalone - integrated" modules?

Or should I create them separately, so that the only thing the "central" application would do is syncing the information (eg. the CMS and another solution can have the same tables eg. clients or employees).

Or do you have another idea? (I know I'm a little vague, but I can't "give" a lot of details because of work contract).

If someone has all the "packages" it should be possible for the central application to integrate all the modules at one place! Or if someone has more than one module, it should combine this on the website.

What I thought is best, is that the central location contains only the users and their rights (eg. CMS - all rights, ...), and the information get synced with every change.

(module cms, adding a new client -> store locally and send data to the central location, central location -> send to modules -> table clients updated everywhere)

This way it is easy if someone only "bought" one module, they can sync it easily through the complete architecture.

A: It is quite hard to answer, but still I think it might help you to look at the Microkernel architectural pattern (from the Pattern Oriented Software Architecture book). It is a general solution for having a minimal (microkernel) system (cms in your case) and allow for different modules.

<https://stackoverflow.com/questions/3787028/versatile-software-architecture-pattern-for-web-applications/3790691#3790691>

T: Versatile software architecture/pattern for web application

Q: I'm currently gathering all the possible information to build a new web application core.

I have built many different CMS'es before, but they have always turned out to be too weak for my requirements and to expand them, it takes too much time. Basicly, I want to build this "new" core, which would allow me to easily extend it with modules/plugins, you name it.

I have read about MVC, but I think there should be other architectures/patterns which could be used.

Could you please name any other architectures or design patterns you have used in past or are sticking with at the moment, and why exactly this architecture/pattern?

Answers with comparisions between different architectures are much appreciated!

Thanks in advance!

EDIT:

With CMS (in my case), I meant a static built site, where when you want to extend it, you have to change too much of code. Basicly, no architecture or logic behind the system.

My requirements now are that I need a versatile architecture behind my core. Core should be there only to make everything work together, not do stuff like content managing or anything, that's what modules are meant for. MVC really looks like the choice, but I'm interested in other architectures too.

I've imagined, that core would only take user requests. According to request, send them to appropriate module, but module again can request library or something, that should go through the core. Everything has to work with no extra use. If module doesn't need database, then there shouldn't be loaded library for database. Simplified- everything has to work on demand. I know that it depends on me, but yeah, the question still is, **what architecture would bring the best results for this?**

Feel free to ask, I'm only 18 and not natively English, therefore it's hard to express myself.

A: This is one the best architecture I've ever seen:
<http://trac.edgewall.org/wiki/TracDev/ComponentArchitecture>

A2: It seems like you do not know much about software architecture patterns, I would recommend you reading Pattern Oriented Software Architecture books and Enterprise Architecture Patterns.

What you describe somewhat resembles the idea of microkernel architecture pattern, try to look that up, you will definitely find it in the first of POSA books.

124. <https://stackoverflow.com/questions/984302/which-language-would-you-use-in-your-os/984336#984336>

T: Which language would you use in your OS?

Q: This is probably more of a subjective question, but which language (not API like .NET or JDK) would you use should you write your own operating system? Which language provides flexibility, simplicity, and possibly a low-level interface to the hardware? I was thinking Java or C...

A1: C, of course.

A2: Haskell.

Once you have flipped the right hardware bits, C is a terrible language to use for the rest of the OS. Things like the scheduler, filesystems, drivers, etc. are complex high-level algorithms, and you don't want to be writing those in assembly language (or C; same thing). It's too hard to get right. (The VM subsystem and memory manager may need to be written in something low-level, as you will need to bootstrap your high-level langauge's runtime somehow.)

Anyway, this isn't just a crazy idea that I am coming up with for SO. Here is an OS written in Haskell: <http://programatica.cs.pdx.edu/House/>

Lisp is another good choice; the original Lisp machines were infinitely more tweakable (at runtime) than "modern" OSes like UNIX and Windows.

Sometimes history forgets good ideas (often in the name of "maximum performance"), and that makes me sad.

A3: D would be an interesting choice. From its own description:

D is a systems programming language. Its focus is on combining the power and high performance of C and C++ with the programmer productivity of modern languages like Ruby and Python. Special attention is given to the needs of quality assurance, documentation, management, portability and reliability.

The D runtime assumes the existence of a garbage collector, which would not be appropriate for the very lowest levels of the kernel. However, it would be appropriate for many of the higher layers.

A3: Build the basic components like task schedulers and drivers etc with Assembly, then build the higher level components like applications and tools with C

I believe this is how Windows XP was built too (unsure about Windows Vista and Windows 7).

A4:

- : **Low-level** in something like **Haskell** or **D**. Productivity over performance, in my opinion. You can rewrite slow parts in C++ or even assembly later if the need arises.
- **High-level** in **Python** or **Ruby**. Ideally I'd also have a really fast JIT-capable VM for that language, but that's not going to happen for either language for a while. **Lua** would be a good alternative if speed gets in the way.

125.<https://stackoverflow.com/questions/4514677/how-to-hot-update-applications-professionally/4517369#4517369>

T: How to hot update applications professionally

Q: I wonder how big applications (with several application servers and loadbalancers) are hot update to actual version without taking offline for users. Skipping database schema here - only application layer.

For example there are several glassfish servers balanced by haproxy and we want to update application which is on several servers.

What is used in this case? I know this may be complicated but please enlighten me about methods.

A: Rails websites frequently use Capistrano to deploy code. The code is updated on each server and the webserver (apache or nginx mostly) usually uses a plugin like passenger. Passenger restarts and reloads the code base which was updated (accomplished by touch tmp/restart in the rails root directory). The next web request will be sent to Passenger which is using the updated code.

Much of Twitter (from what I hear the backend processing is in Erlang) and I believe almost all of Hulu use techniques similar to this.

A2: The classical way of doing this in an >1-server-shared-nothing-configuration is to take one server offline, i.e. instructing the front end web servers or load balancers to direct traffic to the other servers only.

The offline server can then be upgraded and started again. Then the front-ends are re-configured to distribute traffic to the upgraded server.

Doing this with all servers eventually results in a complete upgrade.

126.<https://stackoverflow.com/questions/77670/what-is-the-best-way-to-create-a-security-architecture>

T: What is the best way to create a security architecture?

Q: I'm designing a portal's security architecture. The site has pages, videos, pictures, users, databases, file system objects, etc. What is the best way to control access to all of these objects? How would you store permissions? Is a 64-bit database variable enough for storing permissions?

E.g. Windows employs ACLs and SIDs. Do you have a more up-to-date solution?

A1: I don't like idea of storing permissions as flags in one variable. I'd rather make roles objects in relation many-to-many with users.

For editing rights of the specific object I use an object's method or external function depending on how can I generalise security policies.

For a middle sized portals this approach works very well.

A2: Most of the common web infrastructures have built-in security systems. ASP.NET, for example, has a security sub-system that is fairly robust. Security is very hard to get right, so it's almost always the case that you're going to want to use a system that is being tested regularly.

If you absolutely have to write your own security system then I would suggest researching the various technologies like ACL, LDAP as user, groups, impersonation are all complicated topics and need to be researched in order to get the best match to your actual needs.

A3: I plan to follow **Role-based access control security design pattern** ([Security Patterns: Integrating Security and Systems Engineering](#), p249). Role has association with ProtectionObject. The association name is IsAuthorised for. There is an association class called Right that has an accessType member and a checkRights method. Role is in many-to-many association with User. Association name is MemberOf. This structure can represent roles, users and permission check.

The main question for me is **how to store permissions per object**. Let's say we have pages, webparts, file system objects. I can store permissions for these objects in database. This method enables to control system objects and file system objects as well. It's a big question for me **how to store and cache these permission sets in memory and how to check access efficiently**.

A4: Whatever will you do, make it **simple**. Easier to make, easier to prove, easier to audit. *Easier to adapt*. First, consider a group/user system. For each object define set of permissions, and then connect them like - this user has these permissions, this group has these permissions, etc.

If that's not enough for you (**make sure it's really not enough**), use some kind of ACL system, preferably integrated with your existing solution, and preferably as simple as possible.

127.<https://stackoverflow.com/questions/44980693/how-to-route-requests-to-mvc-controllers-to-an-application-tier>

T: How to route requests to MVC controllers to an applications tier

Q: My team is reviewing security on a 2-tier ASP MVC application and has decided to introduce a service tier to prevent the website connecting directly to the database. I'm looking for ways to avoid a large rewrite of the application.

Is there a framework to route all controller calls to a service? Microsoft have a similar framework to introduce an intermediary for WCF services. Is there anything similar for MVC?<https://docs.microsoft.com/en-us/dotnet/framework/wcf/feature-details/routing-service>

A1: I'm trying to introduce another physical tier so that if the web server is compromised...

Cool. You can solve that problem without changing the application at all using a Reverse Proxy. Like

[IIS Application Request Routing](#)

Or, for internet-facing or cloud applications [Azure Web Application Gateway / Web Application Firewall](#).

128.<https://stackoverflow.com/questions/44479615/secure-connections-to-database-on-multi-tier-server/44482023#44482023>

T: Secure connections to database on multi-tier server

Q: I have a multi-tier architecture where my Rails web app and Nginx is on one server (that can be replicated and load-balanced if need be) and the Postgres database is on its own VPS in the same data centre.

Is there a common way to secure connections between the app and database in this setup so data isn't transmitted in plaintext?

An option I've considered is using an SSH tunnel but I'm not sure if that's a standard practice in a production setup.

A: You can use SSH tunnel or SSL certificates to secure remote PostgreSQL instance.

I suggest you to use SSH tunnel, because it will work for non-SSL-capable PostgreSQL clients and later you can use it for other services.

Links:

1. [Secure TCP/IP Connections with SSH Tunnels](#)
2. [Secure TCP/IP Connections with SSL](#)

129.<https://stackoverflow.com/questions/43382402/preferred-approach-for-inter-service-communication-in-microservices-soa>

T: Preferred approach for inter-service communication in microservices/SOA

Q: In my architecture, I have several internal services that need to communicate with each other. I also have a identity access management service that stores information about users, roles and (coarse-grained) permissions.

Components (not exhaustive):

- Service A
- Service B
- IAM service

Rather than giving services A and B full access to each other via IP whitelisting, I would like them to run as users who are managed by the IAM service. So the services need a way of interrogating each other's roles and permissions. I've considered the following approach:

I create opaque API keys for the users that the services will be running under. I store them on each service. When service A calls service B, it passes its API key. Service B then calls the IAM service to validate the key and acquire information about service A's roles before processing the request. Service B caches its responses from the IAM service to reduce chattiness.

I've seen solutions that involve an API gateway, but this assumes that the traffic is coming outside the network. I do not want to redirect internal traffic to the outside just for the sake of converting opaque tokens to by-value JWTs.

A: Opaque by-value tokens are really intended for the following purposes:

- Reducing token size to a minimum (for client efficiency)
- Hiding the details of what claims a user has as they dont need to know
- Forcing a lookup of the claims on each request (so you can revoke/change tokens instantly)

You are on an internal network so payload size isn't as big of an issue and you probably don't care about leaking claims to other services. If your claims aren't changing often then opaque tokens probably aren't needed. This means that your service simply needs to request and maintain a by-value token to access internal resources.

That's not too bad.

If you do need to convert by ref to by value on every request, or you want to simplify the auth loop for consumers a proxy approach is best. This would intercept requests to your service and replace the by-ref token (or perhaps apikey) with a by-value token. The advantage here would be that you have more detailed control over usage of by-value tokens, and your clients don't need to care about your internal security infrastructure.

This approach adds more overhead in exchange for more control. It's also fine to call through this from your internal services.

I wrote a bit about [the authentication proxy](#) pattern on my blog.

130.<https://stackoverflow.com/questions/42398097/amazon-rds-database-across-application-environments/42400305#42400305>

T: Amazon RDS database across application environments

Q: I have three different application environments: production, demo, and dev. In each, I have an RDS instance running MySQL. I have five tables that house data that needs to be the same across all environments. I am trying to find a way to handle this.

For security purposes, it's not best to allow demo and dev to access the production database, so putting the data there seems to be a bad idea.

All environments need read/write capabilities. Is there a good solution to this?

Many thanks.

A: For security purposes, it's not best to allow demo and dev to access the production database, so putting the data there seems to be a bad idea.

Agreed. Do not have your demo/dev environments access data from your production environments.

I don't know your business logic, but I cannot think of a case where dev/demo data needs to be "in sync" with production data, unless the dev/demo environment is also dependent on other "production assets". If that were the case, I would suggest duplicating that data into your other environments.

Usually, the data in your database would be dependent on the environment it's contained within.

For best security and separation of concerns, keep your environment segregated as much as possible. This includes (but not limited to):

- database data,
- customer data,
- images and other files

If data needs to be synchronized, create a script/program to perform that synchronization completely (db + all necessary assets). But do that as part of your normal development pipeline so it goes through dev+testing+qa etc.

A2: So the thing about RDS and database level access is that you still would manage the user credentials like you would on premise. From an AWS perspective all you would need to do to allow access is update the security groups of your Mysql RDS instances to allow the traffic, then give your application the credentials you have provisioned for it. **I do agree it is bad practice to give production level access to your dev or demo environments.**

As far as the data being the same you can automate a nightly snapshot of the Production database and recreate new instances based on that. If your infrastructure is in Cloudformation or Terraform you can provide the new endpoint created in the snapshot and spin up a new DEV or DEMO environment.

Amazon RDS creates a storage volume snapshot of your DB instance, backing up the entire DB instance and not just individual databases. You can create a DB instance by restoring from this DB snapshot. When you restore the DB instance, you provide the name of the DB snapshot to restore from, and then provide a name for the new DB instance that is created from the restore. You cannot restore from a DB snapshot to an existing DB instance; a new DB instance is created when you restore.

A3: I would recommend using a fan out system at the point of data capture, along with a snapshot.

Take a point in time snap shot (i.e. now), spin up test/dev databases from this, and then use SQS->SNS->SQS fan out architecture to push any new changes to the data to your other databases?

131. <https://stackoverflow.com/questions/41459958/mulesoft-architectural-suggestion>

T: Mulesoft , Architectural suggestion

Q: I have following architectural issues .

I have two tomcat servers . Each running few services. One of the server is deployed at DMZ and other one is behind firewall (inside application landscape). I am in the process of deploying another server Mule ESB. Consolidating all the services and deploying it on single Mule EE server.

My question is what would be the right security strategy for implementing the services running on DMZ and other set of service running behind the firewall. Since i am consolidating my services running on DMZ and behind the firewall , and deploying it on ESB which is hosted behind firewall , is there any security issues you can foresee. if i remove services from DMZ and deploying it on behind the firewall , do you foresee any other issues like performance etc

A: As per the Security you can implement to have Certificates on your Services which you expose. There are also some API managements like Layer 7 which can be implemented. As per your question on performance, if wont affect much.

132. <https://stackoverflow.com/questions/41027449/is-a-security-service-a-single-point-of-failure-in-a-microservice-architecture>

T: Is a security service a single point of failure in a microservice architecture?

Q: I am working on an application with a microservice architecture. Each microservice can live for its own has no direct dependencies to other microservices in the system. In each microservice we are using CQRS and event sourcing to inform a state change in the service. Other services are informed about those events if the are interested and are able to update their data as well.

So far the system works very well. If one microservice is down, others are still working. After the interrupted service will start again, it receives all events happened in its absence and will update its own state depending to those events.

Now we need to secure our services and we are using IdentityServer for this. We have one more service, our security service, which will be called by other microservices to get a token. This is the first time a microservice has to talk to another microservice directly.

My problem with this approach is that if the security server is down, the entire system is down.

I am thinking about the following solution:

Every microservice should persist the user data in its own database. If a user accesses a microservice, the user is authenticated inside the service without a remote call to the security service. I should still have a security service for just managing users. Changes to users will again raise events and the other microservices can update their user data. Of course everything with https. And maybe to reduce redundant code for security, I could use a nuget package.

Do you think this is a reasonable approach?

A1: Your solution would introduce the risk of user data being available for an attacker that compromised *any* microservice as opposed to the one particular security service. I think this is a significant difference and a risk that you might not want to accept.

Note though that with an SSO solution similar to OAuth2 / OpenID Connect there is no need for each microservice (the Service Povider, SP in SSO speak) to connect to the security service (the Identity Provider, IP) for each request. Once a client (a client being a consumer of the microservices) got a token from the IP, the token can be verified on SPs independently of the IP (by means of public key cryptography for instance). This means if the IP is down, no new access tokens will be issued, but the ones already issued will continue to work, and microservices don't necessarily talk directly to each other, only through their consumer.

A2: Your solution suggests duplicating logic and state of the IdentityServer across several microservices. You can achieve essentially the same thing but in a more elegant way by creating multiple instances of the IdentityServer in several geographically distributed places in order to minimise the risks of failure (HA cluster). You will introduce more risks by duplicating this logic (even by reusing NuGet package) in multiple services. You still have to wire-up that nuget thing into every microservice, right? This is one possible source of errors.

Also as [Gabor](#) mentioned in his answer, this will increase the risks of compromising users database. If you are worried about the fact that errors can happen after deploying a new version of the IdentityServer, you can solve this by more thoroughly testing it on staging environment before deploying to production.

133. <https://stackoverflow.com/questions/39699034/how-digital-security-is-different-than-information-cyber-infrastructure-security/39750779#39750779>

T: How Digital Security is different than Information/Cyber/Infrastructure Security?

Q: I do understand the elements/aspects considered in Information security, Infrastructure security/Cyber security discipline. However I do not understand the different scenarios/cases/prospects which needs to be considered under Digital Security.

As part of my research I found that most people are correlating Digital Security with either Identity or Digital Certificates, which I personally don't think. It would fall under cyber security.

I could find that most of the known security concerns are still being addressed by Information/Cyber/Infrastructure security areas of study. Under this context what issues does the Digital security should address?

A: Thanks Kayess, your comment helped in getting couple of insights from security.stackexchange.com. Let me summarize the understanding.

Actually, there is no specification for Digital Security. Generally Digital Security is limited to only data or bit-type assets. For example machine learning can help for security problems in machine-machine interaction, which could be possible business case for Digital Security.

However I have seen people often relating Digital Security with either Identity or Digital Certificates, which should not be the case.

134. <https://stackoverflow.com/questions/36989958/apis-and-front-end-development>

T: APIs and front-end development

Q: We are currently implementing a web application using APIs and front-end JS libraries. One concern that is currently arising from a security point of view:

is it an issue exposing these API calls in front-end code? Since this will be a public website, an example of an API call would be getting all available products. Is it possible for the webpage to display all available products with API call (without user having to sign in), but not allow others to make this call outside of the website (for eg using a tool like fiddler)?

I guess I am looking for either an architectural pattern and/or best practices for using APIs in the front-end of publicly accessible websites.

A: The api itself can limit where http requests are coming in from using various methods. Depending on the language/platform you are using you have complete control over who/what can actually perform http requests to your API.

Most people would just use CORS as an extremely basic solution. CORS will prevent unauthorized HTTP requests from coming in if they are not white listed by the API itself.

135. <https://stackoverflow.com/questions/36188708/safest-way-to-connect-to-your-database>

T: Safest way to connect to your database

Q: I've been thinking about this quite a while and it's bugging my head off, lets say we have a website a mobile app and a database.

Usually when we develop our websites we pretend to store our database credentials in a configuration file and connect the website directly to the database without using a multi-tier architecture, but when it comes to a mobile application such Android or iOS this applications can be engineer reversed meaning that there's a risk of exposing your database credentials.

So I started thinking about this multi-tier architecture and kind of thinking about how Facebook and other social network do their job, they usually make an API and use a lot of HTTP Requests.

Usually social networks APIs have a app_id and a secret_key, this secret key would be used to increase the safety of the application but I'm thinking about how could I store these keys inside my application since I would go back to the begining of my discussion, if I was to use Java I could use the Java Preference Class but that isn't safe either has I saw in this question, plus I would need to make sure my HTTP Requests are CSRF safe.

So, how could I store these keys inside my app? What's the best way to do it, since hard-codding it's out of the question.

A1: You should always require users to log in - never store credentials or private keys in an app you'll be distributing. At the very least, don't store them unless they're specific to the user who has chosen to store them after being validated.

The basic idea is that the user should have to be authenticated in some manner, and how you do that is really too broad to cover in a SO answer. The basic structure should be:

User asks to authenticate at your service and is presented with a challenge

User responds to that challenge (by giving a password or an authentication token from a trusted identity provider).

Service has credentials to access the database, and only allows authenticated users to do so.

There are entire services out there built around providing this kind of thing, particularly for mobile apps.

You might store the users own credentials on the device, and if so it should be encrypted (but you're right, a malicious app could potentially pick them up).

Bottom line: never distribute hard coded access to a database directly.

136. <https://stackoverflow.com/questions/28319278/how-to-connect-separate-microservice-applications>

T: How to connect separate microservice applications?

Q: I am building huge application using microservices architecture. The application will consist of multiple backend microservices (deployed on multiple cloud instances), some of which I would like to connect using rest apis in order to pass data between them.

The application will also expose public api for third parties, but the above mentioned endpoints should be restricted ONLY to other microservices within the same application creating some kind of a private network.

So, my question is:

How to achieve that restricted api access to other microservices within the same application?

If there are better ways to connect microservices than using http transport layer, please mention them.

Please keep the answers server/language agnostic if possible.

A1: One way is to use HTTPS for internal MS communication. Lock down the access (using a trust store) to only your services. You can share a certificate among the services for backend communication. Preferably a wildcard certificate. Then it should work as long as your services can be addressed to the same domain. Like *.yourcompany.com.

Once you have it all in place, it should work fine. HTTPS sessions does imply some overhead, but that's primarily in the handshake process. Using keep-alive on your sessions, there shouldn't be much overhead with encrypted channels.

Of course, you can simply add some credentials to your http headers as well. That would be less secure.

A2: The easiest way is to only enable access from the IP address that your microservices are running on.

137. <https://stackoverflow.com/questions/27559710/authorization-in-multi-layered-architecture>

T: Authorization in multi layered architecture

Q: For an application that is split in multiple logical layers how does one go about authorization?

What are the available options? Are there some existing frameworks out there? n Where should these checks be performed in the Service layer?

A1: Security is a cross cutting concern (like logging, validation, caching and so on) and since of this you don't code this in the domain model. The application layer should allow only an authorized call to reach the domain layer.

Usually, security *at the gate* is the preferred approach. This means that you apply security as top as you can in the call stack (even starting from hiding some buttons in the UI).

For all about "frameworks", DDD don't say anything about that. Google around and use the one that most inspire you, bearing in mind security at the gate aspects.

138. <https://stackoverflow.com/questions/11976543/security-in-3-tier-applications-in-which-layer/11976751#11976751>

T: Security in 3-Tier applications: in which layer?

Q: By "security" I mean data access rights, for example:

- Andrew only has read-only access to clients in France
- Brian can update clients in France and Germany
- Charles is an administrator, he has read and update rights for everything

I can see potential arguments for each layer.

1. Data Access Layer

The DAL only exposes clients to which the user has access, and passes an appropriate error up to the business layer when the user tries to do something unauthorised.

This simplifies the upper layers, and can reduce the data traffic for users who only have access to a small fraction of the data.

2. Business Layer

Because this is where the business logic resides and only the business layer has the complete knowledge of how the security should be implemented.

3. UI Layer

A tangent argument is because the UI layer is the one that deals with authentication. A stronger argument is when the application has non-UI functions: calculating the daily P&L, archiving, etc. These programs don't have a security context and creating a fictitious 'system' user is a maintenance nightmare.

4. A separate layer?

Slotted somewhere inside the 3?

I'm looking for a cogent argument which will convince me that layer X is the best for large-scale 3-Tier applications. Please refrain from 'it depends' answers ;-).

A: I guess this may be a subjective topic. Nevertheless, we follow the principle to never trust any external source (e.g. data crossing a service boundary). Typically, modern applications are a bit different from the old client-server three-tier model, since they are usually service-oriented (I see a web server is also as a service).

This rules out the delegation of access checks to the client - the client may know about the allowed access and use this information to behave differently (e.g. not offer some functionality or so), but in the end only what the service (server) decides to allow counts.

On the other hand, the database or DAL is too low, since most checks also depend on some business logic or on external information (such as user roles). So this rules out the data layer; in our environments the data access is a trusted space that does not do any checks. In the end, the DB layer and the application server form a logical unit (one could call it a fortress - as per Roger Sessions Software Fortresses book), where no service boundary exists. If the app layer accesses another service however it has to perform checks on the received data.

In summary, you might want to get a copy of [Roger Sessions book](#) because it does give some valuable input and food for thought on large-scale applications and how to deal with security and other issues.

139. <https://stackoverflow.com/questions/9272314/2-tier-o-3-tier-which-is-safer/9272362#9272362>

T: 2-tier o 3-tier: Which is safer?

Q: I'm reading about architecture and found the following expression:

For instance, in a 2-tier Windows Forms or ASP.NET application, the machine running the interface code must have credentials to access the database server. Switching to a 3-tier model in which the data access code runs on an application server machine running the means that code no longer needs those credentials, making the system potentially more secure. (Rockford Lhotka)

I can not realize why i should use 3-tier app.

A: In a three-tier application, the middle tier (the application server) controls all access to data, so it is possible to specify very fine and specific access control rules (in code), much more than the database itself offers. Whatever an end-user wants to do, has to go through your code (in a two-tier application, the end-user "directly" talks to the database).

OTOH, if you stop using the database access protections, securing the data is now entirely up to your application and coding errors can create huge security holes.

140. <https://stackoverflow.com/search?q=%5Bsecurity%5D+architecture+pattern>

T: Bank-style Navigation Restrictions

Q: Some web applications, banking websites in particular, prevent you from using the browser's navigation buttons, opening links in new tabs or even refreshing the page. Often they'll warn you not to do so and even kill the session forcing you to login again.

Is there a particular architectural pattern they are following to achieve this? What are their goals? How does this increase security?

A: From javascript you can detect a new window by checking the length of the history.

You can capture a backbutton event by injecting an iframe in your page, pointing to (e.g.) http://www.example.com/cacheable_blank_page.html then changing it's location to http://www.example.com/cacheable_blank_page.html#offset. When the user clicks on the back button, the iframe reverts to it's original location. If you attach an event handler to this then you can detect the back button and handle the situation appropriately.

There's some code to do that here.

Ultimately the problem that people usually use this for is that their server-side code is poorly written and is inappropriately storing transaction related data in the session and/or overusing PRG patterns - ultimately this is a nasty hack intended to pre-empt problems rather than a solution to the root cause of the problem.

SilverlightFox's token based solution is great for CSRF but does not solve the problem of poor state management on the server.

141. <https://stackoverflow.com/questions/782930/can-you-recommend-me-a-book-about-authorization-architecture-and-associated-paras/1166097#1166097>

T: Can you recommend me a book about authorization architecture associated paradigms?

Q: I come from an ASP.NET background and find the entire roles based authorization scheme limiting to say the least. I've read about Microsoft's new Identity Model and the Geneva Framework with its Claims based architecture but it seems overly complex.

In general, I'd like to know more about possible authorization architectures to find out what fits my needs best.

For instance, application wide roles seem to be good enough if you want to create, well, application wide roles, like "Administrator". But what if I have i.e. a project management application with project entities where every project has its own set of roles ("Editor" on project A and "Photographer" on project B for instance) and associated permissions.

Are there any books on this subject that you could recommend?

A: Since you're coming from an ASP.NET background, probably the most specifically focused book on the subject of security/authorization within the ASP.NET framework is:

[Professional ASP.NET 3.5 Security, Membership, and Role Management with C# and VB](#)
(or it's previous editions that target ASP.NET 2.0 etc.)

There is also the older:

[Programming .NET Security](#)

However, these books will simply detail the existing authentication and authorization mechanisms as they exist within ASP.NET membership model and, as you say, are heavily based upon a user/role setup.

If you're looking to stay specifically within the Microsoft/.NET world, one thing that could be worth looking into is the *federated security* model that can be employed by technologies such as WCF (Windows Communication Foundation). This mechanism allows a relatively lightweight approach to security management and makes it easier to accomplish the kind of thing you're after in your example (ProjectA: Editor / ProjectB: Photographer).

Some links on this are:

[Federation \(from MSDN\)](#)

[Federation and Issued Tokens](#)

[patterns & practices: WCF Security Guidance Learning WCF Book - Federated Security Section](#)

If you're after a more general or generic approach to security and authentication/authorization mechanisms that is fairly platform agnostic, some good resources / books would be:

[Designing Security Architecture Solutions](#)

(This book details different security concepts and architectures not only for authenticating/authorizing users but also for concepts such as [code access security](#))

There is also:

[Enterprise Security Architecture: A Business-Driven Approach](#)

(As its name suggests, it's a bit more "business" focused, and does primarily focus on the [SABSA \(Sherwood Applied Business Security Architecture\)](#) methodology)

142. <https://stackoverflow.com/questions/24354511/correlation-between-code-maintainability-and-development-velocity>

T: Correlation between code maintainability and development velocity

Q: Has anyone seen a clear correlation data between the code maintainability and a team's development velocity? Can anyone suggest an own experience, a research paper or any other information sources?

I have often experienced that long-lasting architectural problems, such as application modularity, migrating between dbs, are difficult to be refactored due to urgent demands from the business side. It is also difficult to argue from developer's view point how quantitatively such refactoring would enhance the development speed and longer-term benefits.

This question might not be suited for StackOverflow. I am happy to post this question somewhere else if someone could give me a suggestion just where.

143. <https://stackoverflow.com/questions/39878596/what-is-reliability-in-the-context-of-a-web-application>

T: What is reliability in the context of a web application?

Q: How do we say a web application is reliable and is reliability related to correctness i.e. the correctness of the web application's algorithm?

A: Reliability involves providing both stable and consistent results. They don't necessarily have to be correct. Do you know someone who is always late? You can technically rely on them being late, but that doesn't make them correct in behaving that way.

The "correctness" of its associated algorithms is more closely related to the concept of accuracy.

Rikard Edgren, Henrik Emilsson, and Martin Jansson compiled a very thorough list of software quality characteristics that I find helpful. It places accuracy as a subcomponent of capability, along with completeness, efficiency, etc. Reliability, on the other hand, they put at the top tier of characteristics, being comprised of components such as stability, robustness, error handling, and so on.

A2: The Website is reliable if you see the same behaviour every time for the same specific set of actions. Well, reliability and correctness are not really related since I would say when you are trying to identify the reliability of the application, make sure that the application has been tested for correctness first. For example, if your application has a Search field for user to enter a State/Zip, the search results should appear correctly as per the State/Zip entered. This is correctness. Now, let's switch to reliability. In the same scenario, reliability will make sure that the user is able to use the Search feature every time under normal conditions and should see the same results for particular entry. Reliability of an application is its probability of failure-free software operation for a specified period of time in a specified environment. I would say correctness is a pre-requisite to test Reliability of a web app.

144. <https://stackoverflow.com/questions/33041733/microservices-vs-monolithic-architecture/33662057#33662057>

T: Microservices vs Monolithic Architecture

Q: I did some reading about microservices, and I'm little bit intrigued. Seems like it is interesting concept. But I wonder, what are advantages and disadvantages using microservices over monolithic architecture, and vice versa.

When microservices suitable better, and where better to go with monolithic architecture.

A: While I'm relatively new to the microservices world, I'll try to answer your question as complete as possible.

When you use the microservices architecture, you will have increased decoupling and separation of concerns. Since you are literally splitting up your application.

This results into that your **codebase will be easier to manage** (each application is independent of the other applications to stay up and running). Therefore, **if you do this right**, it will be **easier in the future to add new features** to your application. Whereas with a monolithic architecture, it might become a very hard thing to do if your application is big (and you can assume at some point it will be).

Also **deploying the application is easier**, since you are building the independent microservices separately and deploying them on separate servers. This means that you can build and deploy services whenever you like without having to rebuild the rest of your application.

Since the different services are small and deployed separately, it's obvious **easier to scale** them, with the advantage that you can scale specific services of your application (with a monolithic you scale the complete "thing", even if it's just a specific part within the application that is getting an excessive load).

However, for applications that are not intended to become too big to manage in the future. It is better to keep it at the monolithic architecture. Since the microservices architecture has some serious difficulties involved. I stated that it is easier to deploy microservices, but this is only true in comparison with big monoliths. Using microservices you have the added complexity of distributing the services to different servers at different locations and you need to find a way to manage all of that. Building microservices will help you in the long-run if your application gets big, but for smaller applications it is just easier to stay monolithic.

A2: This is a very important question because a few people get lured by all the buzz around microservices, and there are tradeoffs to consider. So, what are the pros and cons of microservices (when compared with the monolithic model)?

Pros:

- **Deployability:** more agility to roll out new versions of a service due to shorter build+test+deploy cycles. Also, flexibility to employ service-specific security, replication, persistence, and monitoring configurations.
- **Reliability:** a microservice fault affects that microservice alone and its consumers, whereas in the monolithic model a service fault may bring down the entire monolith.
- **Availability:** rolling out a new version of a microservice requires little downtime, whereas rolling out a new version of a service in the monolith requires a typically slower restart of the entire monolith.
- **Scalability:** each microservice can be scaled independently using pools, clusters, grids. The deployment characteristics make microservices a great match for the elasticity of the cloud.
- **Modifiability:** more flexibility to use new frameworks, libraries, datasources, and other resources. Also, microservices are loosely-coupled, modular components only accessible via their contracts, and hence less prone to turn into a big ball of mud. Dynamic discovery and binding via a registry (e.g., Apache ZooKeeper, Netflix Eureka) is sometimes used for location transparency.
- **Management:** the application *development* effort is divided across teams that are smaller and work more independently.
- **Design autonomy:** the team has freedom to employ different technologies, frameworks, and patterns to design and implement each microservice, and can change and redeploy each microservice independently

Cons:

- **Deployability:** deployment becomes more complex with many jobs, scripts, transfer areas, and config files for deployment.

- **Performance:** services more likely need to communicate over the network, whereas services within the monolith may benefit from local calls. Also, if the microservice uses dynamic discovery, the registry lookup is a performance overhead.
- **Availability:** if you use a registry for dynamic discovery, unavailability of the registry may compromise the consumer-service interaction.
- **Modifiability:** changes to the contract are more likely to impact consumers deployed elsewhere, whereas in the monolithic model consumers are more likely to be within the monolith and will be rolled out in lockstep with the service. Also, mechanisms to improve autonomy, such as eventual consistency and asynchronous calls, add complexity to microservices.
- **Testability:** automated tests are harder to setup and run because they may span different microservices on different runtime environments.
- **Management:** the application operation effort increases because there are more runtime components, log files, and point-to-point interactions to oversee.
- **Memory use:** several classes and libraries are often replicated in each microservice bundle and the overall memory footprint increases.
- **Runtime autonomy:** in the monolith the overall business logic is collocated. With microservices the logic is spread across microservices. So, all else being equal, it's more likely that a microservice will interact with other microservices over the network--that interaction decreases autonomy. If the interaction between microservices involves changing data, the need for a transactional boundary further compromises autonomy. The good news is that to avoid runtime autonomy issues, we can employ techniques such as eventual consistency, event-driven architecture, CQRS, cache (data replication), and aligning microservices with DDD bounded contexts. These techniques are not inherent to microservices, but have been suggested by virtually every author I've read.

Once we understand [these tradeoffs](#), there's one more thing we need to know to answer the other question: which is better, microservices or monolith? *We need to know the non-functional requirements (quality attribute requirements) of the application. Once you understand how important is performance vs scalability, for example, you can weigh the tradeoffs and make an educated design decision.*

A3: I'd just like to offer a slight variation and bring about the organizational perspective of it. Not only does microservices allow the applications to be decoupled but it may also help on an organizational level. The organization for example would be able to divide into multiple teams where each may develop on a set of microservices that the team may provide.

For example, in larger shops like Amazon, you might have a personalization team, ecommerce team, infrastructure services team, etc. If you'd like to get into microservices, Amazon is a very good example of it. Jeff Bezos made it a mandate for teams to communicate to another team's services if they needed access to a shared functionality. See [here](#) for a brief description.

In addition, engineers from [Etsy](#) and [Netflix](#) also had a small debate back in the day of microservices vs monolith on Twitter. The debate is a little less technical but can offer a few insights as well.

145. <https://stackoverflow.com/questions/3718311/software-engineering-principles-with-javascript>

T: Software Engineering Principles with Javascript

Q: We are always trying to improve on our ability to apply our skills to solve a problem. Software engineering principles have significantly helped my ability to write higher quality code. This includes testing, modularization, using OO where appropriate, etc.

Here's an example of how I achieved some modularization in my JS. Maybe it is a bad way to achieve this, but it serves as an example of what I mean and contains a few questions of its own.

Question:

In what ways do you apply [software engineering](#) principles to improve the readability, maintainability, and other quality attributes of your JS?

Other Related (more specific) Questions to help in answering:

I had once written a simple JS unit testing framework, which had simple asserts and a test helper method taking a lambda. What are your thoughts on unit testing javascript?

How important is defining the boundary between your code and framework?

JS is mostly used in a browser or in a website. Does this reduce/nullify certain concerns?

Do you suggest usage of Classes and OO principles?

Usage of undefined and/or null? Should it be forbidden?

Usage of try/catch? Suggested?

When do you go from JSON to classes? Do you use Util methods that operate on the data?

Usage of prototype? Suggested? What is a good case where you wouldn't use it?

146. <https://stackoverflow.com/questions/4435792/what-should-you-put-into-an-architecture-specification/4564216#4564216>

T: What should you put into an Architecture specification

Q: I'm currently revising a number of document templates for my company. One thing we've never had is a formal Architecture Specification, so I'm starting to put one together.

What sort of things do you put into your architecture specs? Feel free to copy and paste a table of contents - that would be helpful. Are there any good templates already available on the web?

A1: I agree with Asaph's sentiment; fortunately it's not impossible to produce useful / practical architectural documentation - just not common.

For me the key thing is to understand who the document is for: when would they use it? Why would they use it? Too many times it simply becomes a form-filling exercise for ticking boxes on some project plan.

I'm assuming you mean a software architecture document or solution architecture document - and not an enterprise strategy or something.

Remember too that there're two things a typical architecture document will do:

- Providing input into decisions to be made elsewhere: "this is our current thinking - would someone please decide whether to spend the big \$\$ for a DR site or not, etc".
- Recording decisions: particularly justifying your decisions.

In terms of both structure and key information to capture I'd recommend looking at different views of the system: logical, physical, data, security, and so on. A good starting point is the [4+1 model](#).

[Update:] One of the uses of such an **artefact** is Traceability - from requirements and design artefacts through to code artefacts; and while that might sound Waterfall orientated it actually applies (and works) for Agile based projects as well.

[Update:] Artefact **doesn't** mean "Word Document". The ToC example below is a supporting document / document based version of the system modelled in a UML modelling tool (SparxEA) which includes requirements as well. Sometimes you "have to" use a document, but I try to be as sparing as possible.

[Update:] The other good thing about a nice clearly laid out document is that it's easier for new blood to get some understanding of what they are inheriting - especially if previous staff are not available.

The Software Engineering Institute at Carnegie Mellon has a bunch of information, and on the page below there's a link to a template: <http://www.sei.cmu.edu/architecture/tools/viewsandbeyond/>

Beware that it's very comprehensive - not for the faint of heart (or lacking in time).

[Update:] Finally, here's an example Table of Contents from a recent project. Despite the many sections the document's not overly long (only about 35 pages, and a good portion of that is diagrams)

A2: In my personal opinion I consider the following topics to be useful when defining **Software Documentation**:

- **Introduction**(document objectives)

- **Context diagram**(application purpose)
- **Hardware Requirements**(memory and processor requirements)
- **Software Requirements**(operative systems, database server, frameworks, libraries)
- **Operation Model**(business operation, process sheets)
- **Physical Architecture Model**(physical disposition, servers, DMZ, firewall)
- **Application Architecture Model**(application layers, services, components, UML diagrams)
- **Database Model**(UML-PDM; tables, Sps, Views, triggers)
- **Security Model**(authentication, authorization, personification, hashing techniques)
- **GUI Model**(screens, use-case diagrams, generic controls)
- **Data Dictionary**(Excel format)

147. <https://stackoverflow.com/questions/45661006/what-is-the-difference-between-monolith-and-n-layer/45661246#45661246>

T: What is the difference between Monolith and n Layer?

Q: I have a few questions regarding **monolith** and **n layer architecture**.
First, what's the difference between Monolith and n Layer architecture?

Second, let's say I have a single Visual Studio solutions that consist of multiple projects such as:

1. Presentation Layer
2. Service Layer
3. Business Layer
4. Cross Layer
5. Data Layer
6. Unit Test

Is that considered as Monolith or n layer architecture?

If I have microservices that consist (let's say) 3 Web API and I build each service in single separate Visual Studio solutions, **it is ok** to implement my previous project structure (service layer, business layer, etc)?

A: Ok, so **Monolith** solutions are the old way of basically having ONE project in a single solution which has *all* the code in there.

So lets say you're doing a website.

This means you would create a single Solution with a single Project and all the database calls (persistence), logic (business logic/services) and finally figuring out how to display that calculated data (presentation) are all mixed in , in a chaotic way in that single project. Sometimes people have tried to split the concerns into folders, but usually it's a large mess. This makes support/maintenance of the application a nightmare. If you wish to make a single change to the website/application, *the entire application will go offline/restart*.

vs

n-tier / n-layered solutions/applications. This is where we have multiple projects (usually) in a solution which separates the concerns of our application into more bite-sized components. This enables us to keep the problem space to a single area making it waaay easier to maintain and support. This also enables easier **reuse** of your various components/projects/dll's into various *other* subsystems of your application. It's way better than the old monolith architecture pattern. But, if you wish to make a single change to the website/application, *the entire application will go offline/restart* still.

Finally, we have microservices. This is a more modern concept and continues on with the evolution of **monolith** -> **n tier** -> **microservices**. This is when we split up our application concerns into individual applications so that when one microservice needs to be updated, then *entire application* hasn't come to a stop. Sure, the *part* of the application that has a dependency on the microservice might stop/be affected, but it's possible that the *entire app* is not.

Lets use an example:

I have a website that sells Pets (cats/dogs/etc). I might split this website up into separate microservice mini websites:

- authentication
- administration/backend management (think: stuff only an admin can see)
- public website
- animal inventory
- shopping cart

So each of those are a single website, like the n-tiered architecture'd application. So it would have a presentation layer (the MVC website), some database project and some basic services.

Now each of the 4 microservices (mini websites) all do that.

Now, you need to update some stuff with your administration section of the website. You take that offline and the main website stays up. People can still browse and buy animals.

So yes, it's a nice thing to implement microservices *if your application is large enough that it has areas you might want to segment*. It does add some more complexity but it also brings about its own advantages.
And yes, your microservices should follow the n-tiered pattern *if your application isn't some silly hello-world app or some Research Project*.

148. <https://stackoverflow.com/questions/44556411/what-are-the-advantages-of-mvvm-pattern-to-the-user>

T: What are the advantages of MVVM pattern to the user?

Q: I'm searching a lot about MVVM pattern.

The advantages that I found are about the developer/design, architecture, etc.

But what are the advantages to the user? (User interaction)

A: None. Users use the user interface, not the code.

149. <https://stackoverflow.com/questions/41574854/is-layered-architecture-useful-without-any-design-pattern-or-repository/41692602#41692602>

T: Is layered architecture useful without any design pattern like DI or Repository?

Q: I'm a little bit confused on this matter: is layered architecture useful without any design pattern like DI or Repo? I'm not talking about direct DI and Repository patterns; they are just examples. As per my knowledge, we use architecture mainly to remove dependencies across layers; but without using the above mentioned design patterns just code direct references to those layers. As an example if we have a Logic layer and Database layer with design pattern, we heavily couple each layer. Can anyone explain this?

A: Longer answer: Layered Architecture is almost always a design goal of a good developer, regardless of what project they are working on (assuming a project of sufficient size at least + good developer).

Layered Architecture at its most fundamental concept is just "division of labor" into "logical units"... which sounds a lot like 'methods'. Technically you can write an entire 10,000 line java program in a single class inside the main method... but obviously it is beneficial (regardless of what other design decisions you make) to subdivide your program into packages, classes, and methods based on grouping of similar code (I'm being VERY broad here). So multi-layered arch. is just another level of 'abstraction' to assist in dividing an application into different 'parts'.

Even without the use of DI, etc. Designing your application to use a set of interfaces to define interactions between different components will not only assist you in developing alternative implementations of different layers(which would then be easy to change via a few lines of code for testing before final integration/merging) but it also will help you mentally design your project better. This is more of an 'experience' thing, but having a good guideline like mutli-layers helps you more quickly make the decisions of what parts should be part of which layers, etc.

It can also help with dividing the workload and reducing the number of issues when you go to merge everyone's code. For example, in my undergraduate software engineering course we designed a 3 layered program and we used ui, logic, storage as our 3 layers and besides defining 3 segments of the code, we were then able to divide the workload among the group and finally combine our different parts with 0 hassle.

A2: Looking at your question, I assume that you are asking about 3-Tier Layered Architecture (Database | Business Logic | UI). I would first list your questions and thoughts, then emphasize the overall picture.

- (1) Is Layered architecture useful without any design pattern?
- (2) we use layered architecture mainly to remove dependencies across layers.
- (3) but without using the above mentioned design patterns, we just code direct references to those layers.
- (4) without any design pattern, we heavily couple each layer.

In above [(1) & (2)] and [(3) & (4)] are related with each other.

I'll first talk about (1) & (2). Simply, Layered Architecture makes up our application into 3 **isolated** layers. It addresses a **System-level** concern. Some advantage, we follow LA are

- Since we have separated out the UI layer and it's not mixed with lower levels, we can **reuse** same server (assume an API with Database + Business Logic) for different UI (web & mobile).
- If we develop stand-alone desktop app, we can **reuse** same (Business Logic + Database) and build a mobile app.

If I talk about (3) & (4), Design patterns are simply **problem-solution** pairs, which we often get involved with. So it describes an answer for a **general-problem**. In different with Layered-Architecture, Design Patterns addresses **class-level**.

One thing I notice in your description is you believe that not-using design patterns will lead a bad-code. Actually it is not. And conversely if we add a design pattern in a wrong way, we would get ended up with creating an anti-pattern and going to suffer high time. As I said it's an answer for a general problem, but your practical problem will be much specific one for your system. So how good you can tailor that general one into the specific will really matter. In simplest terms, if you are good at utilizing basic OOP principles and good at keeping the things simple, you might not need a thing called design patterns at all. And you have used design patterns in your code would not necessarily claim that you have a solid code (This does **not** claim that design patterns are a bad concept). In fact there are some design patterns which are not very good in general. And there are very good ones too.

As a direct answer for your main question. Those 2 are not much interrelated. I agree that there is a little. But more over they are two different things which addresses different context. :))

A3: Layer architecture is software architecture where layers are (physically) separated.
Examples: [multi layer](#), [network osi layers](#)

In Java you if all source code is in one project you can use package names for layering if you have multi project then layering can be defined on project level.

Dependency Injection pattern is way how to write a code with "programing against interfaces" principle, so there is no direct relation.

150. <https://stackoverflow.com/questions/710122/we-made-it-reliable-whats-next-usability/710172#710172>

T: We made it reliable. What's next? Usability

Q: I'm working in a small development group. We are building and improving our product.

Half a year ago we couldn't think about higher characteristics, such as usability, because we had so many problems with our product. Many bugs, high technical debt, low performance and other problems kept us from being able to focus on usability.

With time we've improved our process substantially. What we've done:

Real Agile iterations

Continuous integration

Testing(unit-tests, functional Smoke tests, performance)

Code quality is 'good'

Painless deployment process

So we are now producing stable, reliable releases. The following quote (paraphrased) describes our current situation:

first - make it work; after that, make it reliable; after that, make it usable

We are geeks, so we can't 'make' a great UI by ourselves. So what should we do? What direction can you recommend? Maybe we should hire Usability experts part-time or full-time? How can we explain the importance of Usability to our stakeholders? How do we convince them that this is useful?

A1: You ask, "How can we explain the importance of Usability to our stakeholders?" but I'm not sure that you yourselves get it!

Interaction design (iD) and usability aren't things that you can tack on to an existing products when the "important" things are done. They should be there from the very first start, preferably done in small iterations with small tests and studies. I'm talking about cheap and dirty iD/usability, stuff like lo-fi prototyping, user testing with just four people, having enough stats to be able to detect user errors and such.

If you don't to iD/usability from the start, you risk ending up with the same crappy product as your competitors and/or providing users with band aids when they need surgery.

A2: What do your Business people say will make you the most money? Do that. Maybe usability is the next thing to do, maybe more features, maybe a different product. It's not something a "geek" will necessarily be able to guess.

A3: I'm in the same boat as you are - I basically live on the command line, and I'm completely out of touch with the modern UI (both web and desktop application).

The solution for me was using a real UI developer for all my GUIs, and I just live in the back-end as it were.

There are quite a few benefits of this arrangement:

- You **don't have to debug your own crappy UIs** anymore :) that's their job, and they're better at it than you, so no worries.
- Your **code will naturally gravitate to a MVC** or at least tiered API approach, which is easier to code against for all parties involved.
- Good UI people **know what questions to ask end users**, and know when those users don't know what they're talking about. I certainly don't have that skill.
- You can **do what you do best**, and they do what they do best, making a stronger team overall.

The cons are obvious - you need to not only find the money for a talented UI dev, but you need to find a talented UI dev!

Now, I can't speak for you and your company's position in your market etc etc (I also don't do buisnessspeak :)) but if you can afford another hire, it will give back more to the team than the cost of the position. It did for me!

A4: What do your users want ? They're probably the people best placed to identify requirements.

A5: You are the ones who know and understand the product, so don't assume that just because someone else has 'usability expert' in their title that hiring them will somehow make your product usable.

Also, don't undercut your own instincts for usability. As a programmer, you use software all the time, what products do find the most usable? Think about what you like about them and compare them to your product.

Think about what your product does, and imagine that you are the person having to use the product and imagine how *you* would want it to work. Think of what a user wants to accomplish using your product, and imagine the steps they would have to go through to do it. Does it seem easy to understand what to do? Can it be done in fewer steps?

Most importantly, talk to your customers. Find out what they found confusing or difficult to accomplish. See if they have come up with their own workarounds for using your product in ways you didn't initially picture.

If you put as much thought, planning and effort into usability as you did into improving the reliability and deployment, you will end up with a much better product.

A6: When analyzing the next step it really all comes down to business requirements & goals.

What is upper management like? Are they tech-savy? Are they open to new ideas? Do they think that the current product needs adjustment, improvement, etc? Is the product still in high demand? Is the marketplace changing such that the product/service will soon be obsolete? etc. etc. etc.

IF there are real business reasons for spending the \$/time/resources then you can begin to explore product improvements. At that point consider the opinions of previous posters regarding user opinion.

A7: I think the answer is in the order of things, you say its:

"first - make it work; after that, make it reliable; after that, make it usable"

But the most important thing here is "make it work". Acceptance criteria for a functionality to "work" is that it is in fact - usable. If not, it will not be executed. Then it's just a block of dead code. And dead code should not be in the system in the first place.

A8: I know so many geeks including myself who know usability, so one way would be learning it. Another way bringing someone in who can do UI design and usability.

To convince them that usability is important: **It's useless if you can't use it!**

I don't know what sort of product you build but you always got clients, and clients always love usable applications. This will increase sales, happy client count and decrease tech support.

A8: What does it do for your users? What do they think about the usability? Maybe it's not an ssue for them.

Make it more valueable to your users. Deliver more business value. Help your customers getter a better return on their investment. Do this by making it do more of what they need it to do, to do it better (more accurately, more quickly, more reliably more useably), or to do it at lower cost (less infrastructure needed to run it, reduced maintenance costs because you improved reliability), more flexibly (deals with their business changes)...

Lots of dimensions which do connect with the technical ones you refer to (usability reliabilty stability etc). But paying customers normally care about their business needs/features, not your technical ones that deliver them.

Go talk to your users (or potential users)

T: Usability techniques for better form presentation

Q: I'm trying to simplify a form (using ASP.NET MVC but I guess that might be irrelevant) with a lot of fields. My initial thought was to split it up into tabs, but then I read somewhere that this would be usability hell. Also, required fields would be split between different tabs, so validation would be a challenge. What are some ways to present forms in a nice way so that it's not one long page of fields?

A1: Personally I think showing "one long page of fields" is not only the most usable but also the nicest way to present a form.

There's an argument that users are more likely to fill in a long form that's split over multiple pages, however as a personal preference, I like to see what I'm in for and what needs to be filled in.

(from my own experience of multi page forms, I usually end up quitting half way through because I wasn't able to estimate how long it was going to take to fill out the form and I've got something else that needs doing.)

One thing I like to do is separate the relevant areas using `<fieldset>`'s and then style these to offer a clean and clear form. This makes it easy for the user to see what data they need to fill in (separated into logical fieldsets) as well as provides the developer the opportunity to style each area in such a way that the form seems less daunting.

A2: I think the key is to respect the user's expectations.

- Tabs have their place, but I think to most users the expectation is that you go to a different tab to do a different task, rather than needing to go to multiple tabs to fill out a single form.
- A wizard approach can be nice for a long form, especially if you give feedback about the user's progress.
- If some questions only apply depending on the answers to other questions, it's definitely nice to hide the conditional questions until they are relevant.
- Sometimes it's possible to scatter questions throughout the user's interaction with the site rather than make them answer everything at once.
- Lastly, I do feel as a developer that I have a responsibility to advocate for the user by suggesting to the client that they may not need to ask for so much information.

A3: It sounds like [Accordion Forms](#) could suit your needs.

Basically rather than showing your fields as a wizard or a series of tabs, the form is presented on one page but with collapsed sections that expand as they are needed or as the user clicks 'next'.

The case example shows Apple's use of them.

A4: I must say that I really like the form on [StackOverflow Careers](#), where you post/edit your CV. It's a pretty long form in one page, but it does not become a problem since you always know where you are and what to do. Personally, one single page with the whole form is what I prefer. That way, you can in a quick way get a look of the form and what you have to do to complete it.

A5: Multiple tabs are fine, but instead of "submit" have "Next", until the last tab, where you have "Finish". Also indicate where you are at with a "Part 2 of 5" on top of the form.

You can dispense with the tabs, in fact, but it is nice if you can go back and fix things up, so if not tabs, then a "Previous" as well as a "Next" button is necessary.

Having just tabs, and a submit button on each tab, and required fields all over the place would be *very* annoying. :) That's even worse than having one humongous form where you have to scroll up and down.

A6: If you use the wizard like method, then it is better to validate each page after pressing Next instead of on the last page after pressing Finish.

152. <https://stackoverflow.com/questions/4573419/what-are-the-main-advantages-of-mvc-pattern-over-the-old-fashioned-3-layer-patte>

T: What are the main advantages of MVC pattern over the old fashioned 3-layer pattern?

Q: I am contemplating about using an MVC pattern in my new project and I can clearly see the main advantage of being able to put the data layer (the model) a little closer to the presentation layer (the view), which will allow a little increase in application speed. But apart from performance stand point are there any other advantages of MVC over the view-logic-data layered type pattern?

EDIT: For those who's interested I just uploaded a sample PHP code that I created to test the use of MVC. I purposly omitted all the security checks to make the code a little easier to read. Please don't critisize it too much, because I know it could be a lot more refined and advanced, but nevertheless - it works!!! I will welcome questions and suggestions: Here is the link: http://www.sourcecodester.com/sites/default/files/download/techexpert/test_mvc.zip

A1: The separation of concerns that's quoted as being an advantage of MVC is actually also an advance of a 3-layer/3-tier system. There too, the business logic is independent and can be used from different presentation tiers.

A main difference is that in classic MVC the model can have a reference back to the view. This means when data is updated the model can push this data back to possibly multiple views. The prime example is a desktop application where data is visualized in multiple ways. This can be as simple as a table and graph. A change in the table (which is a change in one view) is first pushed via the controller to the model, which then pushes it back to the graph (the other view). The graph then updates itself.

Since desktop development is on the decline, a lot of programmers have only come in touch with MVC in some web variant, e.g. via JSF in Java EE.

In those cases the model almost never has a reference to the view. This is because the web is mainly request/response based and after a request has been served, the server cannot send additional information. I.e. an update pushed from the model to the client would be meaningless. With reverse ajax/comet this is changing, but many web based MVC frameworks still don't fully utilize this.

Thus, in the case of web based MVC, the typical "triangle" between M, V and C is less there and that MVC variant is actually closer to an n-tier model than 'true' MVC is.

Also note that some web MVC frameworks have an intermediate plumbing part between M, V and C called a backing bean (Java/JSF) or code behind (ASP.NET). In JSF the controller is provided by the framework, and the view often doesn't bind directly to the model but uses this backing bean as an intermediary. The backing bean is very slim and basically just pre-fetches data from the model one way and translates model specific messages (e.g. exceptions) into view specific messages (e.g. some human readable text).

A2: Beside

- code reuse,
 - separating of concerns,
 - less coupling between the layers,
- already mentioned by @bakoyaro and @arjan

i think that MVC is better than 3-tier when combined with the "**convention over configuration**" pattern. (i.e. "ruby on rails" or Microsofts "MVC for asp.net").

In my opinion this combination leads to to **better and easier code maintanance**.

In the first place it makes learning the mvc-framework a bit more difficult since you have to learn the conventions (a la controllers go into the controllers folder and must be named xxxxcontroller)

But after you learned the conventions it is easier to maintain your own and foreign code.

A3: Forget increasing application speed by moving to MVC. I have found the biggest benefit to be ease of code reuse. Once you move to MVC, there are no dependencies on the presentation of your data or the storage of the actual data.

For example you could write a servlet that served up .jsp pages as your presentation layer one day, and the next day write a web service as another presentation layer to your existing Model and Controller. Like wise if you want or need to switch your DBMS. Since accessing the Model is completely separate from everything else, you would just need to re-write just your data access objects to return the data in a way your Controller can handle it.

By separating concerns into 3 distinct pieces, you also facilitate true unit testing. Your Presentation layer can be tested free of the Model or Controller, and vice-a-versa.

On a side note, I've often felt that the MVC abbreviation was inaccurate. Whenever I see it I think of it as View->Controller->Model. The presentation layer will never have DAO code in it, and the model will never have presentation logic in it. The Controller is forced to act as a go-between.

A4: Where 3-tier separates presentation from business and data access, MVC is a presentation layer pattern which further separates Model (data) from View (screen) and Controller (input).

There is no choosing MVC over 3-tier/3-layered. Use them both.

153. <https://stackoverflow.com/questions/2210026/is-the-mvc-design-pattern-used-in-commercial-computer-games>

T: Is the MVC design pattern used in commercial computer games

Q: Is the MVC design pattern used in commercial computer games?

Particularly with regard to high performance games I am curious if there have been any commercial users of MVC in the games industry?

A1: It's rarely used in games. It took me a while to figure out why, but here's my thoughts:

MVC exists to make a distinction between two representations. The Model is the abstract representation of your data. It's how the machine views the state of your application. The View (and Controllers) represent a more concrete visible instantiation of that system in a way that's meaningful to humans.

In most business apps, these two worlds are pretty different. For example, a spreadsheet's model is simply a 2D grid of values. It doesn't have to think about how wide the cells are in pixels, where the scrollbars are, etc. At the same time, the spreadsheet view doesn't know how cell values are calculated or stored.

In a game, those two worlds are much closer to each other. The game world (model) is typically a set of entities positioned in some virtual space. The game view is also a set of entities positioned in some virtual space. Bounding volumes, animation, position, etc., all things you would consider part of the "view" are also directly used by the "model": animation can affect physics and AI, etc.

The end result is that the line between model and view in a game would be arbitrary and not helpful: you'd end up duplicating a *lot* of state between them.

Instead, games tend to decouple things along domain boundaries: AI, physics, audio, rendering, etc. will be kept as separate as possible.

A2: That will depend a lot on the game.

For example, a first-person shooter, probably not.

A flight simulator, MVC is very likely (X-Plane and FlightGear both actually do use MVC, you can tell from their plugin APIs). SimCity, you certainly could do that way and make sense (no idea if they actually did). Real-time strategy, perhaps. Bejeweled, who knows.

A3: I don't know of any commercial games that use it; there may be some. However, I was able to find a [paper](#) (PDF) that mentions the MVC pattern being used in computer games. This may give you a little bit of insight.

154. <https://stackoverflow.com/questions/6497277/specification-pattern-and-performance>

T: Specification Pattern and Performance

Q: I've been playing around w/ the specification pattern to handle and contain the business logic in our c#/mvc application. So far so good. I do have a question though - since we'll be creating a number of specification objects on the heap, will that affect performance in any way versus, say creating helper methods to handle the business logic? Thanks!

Q: Of course it will affect performance, every line of code you write and design choice you makes affects performance in one way or another. This one is unlikely to be meaningful, be a bottleneck in your application or be worth caring about as this is almost surely a case of premature optimization. These days you should just focus on modeling your domain properly, and writing extremely clear and maintainable code. Focus more on developer productivity than on machine productivity. CPU cycles are cheap, and in nearly limitless supply. Developer cycles are not cheap, and are not limitless in supply.

But only you can know if it will impact the real-world use of your application on real-world data by profiling. We don't, and can't know, because we don't know your domain, don't know your users, don't know what performance you expect, etc. And even if we knew those things, we still couldn't give you as powerful of an answer as you can give yourself by dusting a profiler off the shelf and seeing what your application actually does.

A1: Most design patterns trade off some overhead for cleanliness of design - this is no exception. In general, the amount of memory that the specifications add is very minimal (typically a couple of references, and that's it). In addition, they tend to add a couple of extra method calls vs. custom logic.

That being said, I would not try to prematurely optimize this. The overhead here is incredibly small, so I would highly doubt it would be noticeable in any real world application.

155. <https://stackoverflow.com/questions/16176990/proper-repository-pattern-design-in-php>

T: Proper Repository Pattern Design in PHP?

Q: Preface: I'm attempting to use the repository pattern in a MVC architecture with relational databases.

I've recently started learning TDD in PHP, and I'm realizing that my database is coupled much too closely with the rest of my application. I've read about repositories, and using an IoC container to "inject" it into my controllers. Very cool stuff. But now have some practical questions about repository design. Consider the follow example.

This leads me to believe that repository should only have a fixed number of methods (like save(), remove(), find(), findAll(), etc). But then how do I run specific lookups? I've heard of the Specification Pattern, but it seems to me that this only reduces an entire set of records (via IsSatisfiedBy()), which clearly has major performance issues if you're pulling from a database.

156. <https://stackoverflow.com/questions/17727607/which-pattern-to-choose-asp-net-mvc-4>

T: Which Pattern to choose ? Asp.net Mvc 4

Q: I'm really confused, I learned with the book "Apress pro Asp.net Mvc 4", that the best pattern for Mvc 4, is the Dependency Injection, (to put the Model data of the database etc... in another project (Domain) and then create interfaces and implementation to those interfaces, and then connect it to the controller with Ninja..

And all the connect to the db is only from the data-layer solution, the only model in the web solution in viewModel.

Some questions:

1. which patter is better for performance (fast website)?

2. is't good to use " public Db db = new Db();" in the controller, instead of use it only in the domain layer (solution)??
3. What is the advantages of using Dependency Injection? is't bad to use my pattern?
4. What is the advantages of split the project into 2 solutions for the Data Layer?

A: which patter is better for performance (fast website)?

Impossible to answer. You could have non-performant code in either of these approaches. Don't try to prematurely optimize for performance, optimize for clean and supportable code and address performance bottlenecks that are actually observed in real scenarios.

is't good to use " public Db db = new Db();" in the controller, instead of use it only in the domain layer (solution)
It's a question of separating concerns and isolating dependencies. If your controller internally instantiates a connection to a database then that controller can *only ever* be used in the context of that database. This will make unit testing the controller very difficult. It also means that replacing the database means modifying the controller, which shouldn't need to be modified in that case.

Dependency injection frameworks are simply a way of addressing the [Dependency Inversion Principle](#). The idea is that if Object A (the controller) needs an instance of Object B (the database object) then it should require that the instance be supplied to it, rather than internally instantiate it. The immediate benefit here is that Object B can just be an interface or abstract class which could have many different implementations. Object A shouldn't care which implementation is given to it, as long as it satisfies the same observable behavior.

By inverting the dependency (whether or not you use a dependency injection framework), you remove the dependency on the database from the controller. The controller just handles client-initiated requests. Something else handles the database dependency. This makes these two separate objects more portable and re-usable.

What is the advantages of using Dependency Injection? is't bad to use my pattern?

See above. Dependency injection is a way to achieve inversion of dependencies, which is the core goal in this case. Note that there are a few different ways to achieve this. Some frameworks prefer constructor injection, some support property/setter injection, etc. Personally I tend to go with the service locator pattern, which has the added benefit of being able to abstract the dependency of the dependency injector itself.

It's only "bad" to use your approach if you run into any problems when using it. There are good patterns to address various concerns, but if your project doesn't legitimately *have* those concerns then using those patterns would be over-engineering and would actually hurt the supportability of the code. So, as with anything, "it depends."

What is the advantages of split the project into 2 solutions for the Data Layer?

Two solutions? Or two *projects* in the same *solution*? (Resulting in two assemblies.) The advantage is that you can re-use one without having a dependency on the other. For example, in some of the code you posted there is an allusion to the repository pattern. If you have an assembly which serves only the purpose of implementing repositories to the back-end data then any application can use those repositories. If instead it's all implemented in the MVC application directly then no other application can use it, it's tightly coupled to the MVC application. If you will never need to re-use that functionality, then this isn't the end of the world. If you would like to re-use that functionality, separating it into a portable assembly which internally isolates its dependencies would allow for that.

157. <https://stackoverflow.com/questions/5013255/which-design-patterns-improve-performance>

T: Which design patterns improve performance

Q: Always the first thing i hear when we talk about design pattern is like a documented solution to common architectural issues.

I am curious to know which design patterns are good solutions to improve performance of an application in general.

A1: Flyweight reduces memory consumption.

The Proxy pattern can be used for speed optimization.

The Bridge pattern can change the implementation of an abstraction on the fly - always picking the most efficient one.

A2: On a more serious note, design patterns will probably reduce performance. From my experience, the usage of design patterns gives cleaner, more maintainable code. Should you need to optimize anything, you would probably need to de-design pattern the code.

Often performance of code is dependent on a relatively small piece (a data structure, a function, or even a single loop), so it doesn't go into the scope of design patterns any way. Changing a straight forward function in C to a super optimized version in assembly probably won't change the way the entire class behaves.

A3: Probably the "don't-do-stupid-things" pattern. If followed to the tee, you'll find it beats:

- Factory
- Singleton
- MVC
- Aspect Oriented Programming
- Extreme Programming and Extreme Programmers (mercilessly)
- DotNetNuke (twice)
- Drupal (once)

158. <https://stackoverflow.com/questions/5212568/scalability-and-performance-in-java-web-applications>

T: scalability and performance in java web applications

Q: Let's say you want to build a web application with high scalability (over 10,000 simultaneous users). How do you guarantee good and steady performance? What design patterns are recommendable? What are most frequent mistakes?

Are there frameworks that force yourself to write scalable code? Would you maybe consider PHP as frontend and Java as backend technology? Or is let's say JSF reasonable as well and it's all about your architecture? And how good is developing with Grails in that context?

Hope this thread is not too subjective but I like to gather some experiences of you :-)

A1: If you want to build a highly scalable application then it should be stateless and use shared nothing architecture as much as possible. If you share nothing between nodes and a node doesn't have a state then synchronization is minimum. There are several good web frameworks suitable for your requirements (Play Framework and Lift for Java, Django for Python, Ruby on Rails for Ruby).

As for JSF and related technologies, I don't think it would be wise to use them in your case. A good old request-response is better.

A2: If you want your application to scale nicely and perform well then you need to have a Distributed Cache. Distributed cache can incredibly boost up application performance and for this purpose you can use any third party distributed cache like NCache.

A3: With so many simultaneous users (a situation I confess I've never encountered myself), what I think is the most important is to be able to load-balance your traffic across many web servers.

If you want failover (which is probably a must-have), this means that you must be very careful about state : the more state you have, the more memory you need, and the more difficult it is to handle failover between servers : either you need to persist the session state in a location that is common to all the servers, or you need to replicate the state across servers.

So, I would choose an architecture where you don't need too much state on the server. IMHO, an action based framework is more suited to this kind of architecture than a component-based one, unless the state is handled at client side, with rich JavaScript components.

159.<https://stackoverflow.com/questions/6544026/what-are-possible-architecture-options-for-large-scale-web-applications/6549469#6549469>

T: What are possible architecture options for large scale web applications?

Q: I am assigned a task to develop a large scale social web application like Facebook, twitter etc, using ASP.net with C#

Before this my development was based on three tier architecture (i.e Presentation Layer, business logic layer, and data access layer) but for this project i am confused because its my first large scale project :(

I just want to know what are other possible architectural choices i have?

I know its difficult to answer such question, but i only want to have good resource, then i study each possible option and finally, choose one that suits my requirement. I did a little RnD over internet but didn't succeed much.

A1: You should check out Windows Azure. it offers hosting, 3 types of scalable (but not relational) storage in the form of Blobs (or files / images / raw), Queues (for distributed communication) and Table Storage (to maintain 'entity' data in a non-relational manner).

There is also SQL Azure for relational storage and AppFabric for hybrid (on-prem/cloud) application addressability and Access Control for Claims-based Identity Management.

It has built-in diagnostics and if you know C#/ASP.NET/ASP.NET MVC no new skills are needed to take advantage of this platform. It also works with Java and PHP.

A2: As far as architecture goes, you can still maintain your 3 tiers. What you want to be able to do is easily scale your database reads and ideally have a caching layer in place like memcached or membase. Facebook, YouTube, and basically every other high traffic application use these caches.

After that, it's optimizing the page load and delivery time - which is a broad task, but also much easier than trying to figure out how to modify a table with 100 million records.

A3: I would choose Service Oriented Architecture. All business logic and DAL on good server to perform all time and resource consuming operations, logic. There is all architecture patters elaborated for us by best practices and patterns Microsoft Team. Read about Web Service Software Factory and choose it to perform BLL and DAL, and simply call services from server on which is hosted web site. On another server you should put presentation layer - pages.

This will give up following benefits:

1. Best practices and architecture
2. If you are developing with someone else, you can easily split the work.
3. Performance, all work is done on server.

These are major perspectives, which are more than enough.

A4: I think for designing large web architecture not only performance, you have to look broadly, both the resource, the data architecture, easy to refactor and can view different handling service (multi-layer), see my blog post about large web architecture with javascript.

160. <https://stackoverflow.com/questions/7621832/architecture-more-suitable-for-web-apps-than-mvc/7622038#7622038>

T: Architecture more suitable for web apps than MVC?

Q: I've been learning Zend and its MVC application structure for my new job, and found that working with it just bothered me for reasons I couldn't quite put my finger on. Then during the course of my studies I came across articles such as MVC: No Silver Bullet and this podcast on the topic of MVC and web applications. The guy in the podcast made a very good case against MVC as a web application architecture and nailed a lot of what was bugging me on the head.

However, the question remains, if MVC isn't really a good fit for web applications, what is?

A1: It all depends on your coding style. Here's the secret: It is impossible to write classical MVC in PHP.

Any framework which claims you can is lying to you. The reality is that frameworks themselves cannot even implement MVC -- your code can. But that's not as good a marketing pitch, I guess.

To implement a classical MVC it would require for you to have persistent Models to begin with. Additionally, Model should inform View about the changes (observer pattern), which too is impossible in your vanilla PHP page (you can do something close to classical MVC, if you use sockets, but that's impractical for real website).

In web development you actually have 4 other MVC-inspired solutions:

Model2 MVC: View is requesting data from the Model and then deciding how to render it and which templates to use. Controller is responsible for changing the state of both View and Model.

MVVM: Controller is swapped out for a ViewModel, which is responsible for the translation between View's expectations and Model's logic. View requests data from controller, which translates the request so that Model can understand it.

Most often you would use this when you have no control over either views or the model layer.

MVP (what php frameworks call "MVC"): Presenter requests information from Model, collects it, modifies it, and passes it to the passive View.

To explore this pattern, I would recommend for you begin with this publication. It will explain it in detail.

HMVC (or PAC): differs from Model2 with ability of a controller to execute sub-controllers. Each with own triad of M, V and C. You gain modularity and maintainability, but pay with some hit in performance.

Anyway. The bottom line is: you haven't really used MVC.

But if you are sick of all the MVC-like structures, you can look into:

event driven architectures

n-Tier architecture

And then there is always the DCI paradigm, but it has some issues when applied to PHP (you cannot cast to a class in PHP .. not without ugly hacks).

A2: From my experience, the benefits you get from an MVC architecture far outweighs its costs and apparent overhead when developing for the web.

For someone starting out with a complex MVC framework, it can be a little daunting to make the extra effort of separating the three layers, and getting a good feel as to what belongs where (some things are obvious, others can be quite border-line and tend to be good topics of discussion). I think this cost pays for itself in the long run, especially if you're expecting your application to grow or to be maintained over a reasonable period of time.

I've had situations where the cost of creating a new API to allow other clients to connect to an existing web application was extremely low, due to good separation of the layers: the business logic wasn't at all connected to the presentation, so it was cake.

In the current MVC framework eco-system I believe your mileage may vary greatly, since the principles are common, but there are a lot of differences between, for instance, Zend, Django, RoR and SpringMVC.

If there are truly other good alternatives to this paradigm out there... I'm quite interested in the answers!

Sorry for the slight wall of text!

A3: I think it would depend on what you're trying to do, personally. Magenta uses MVC pretty successfully, and it makes it fairly easy to add new functionality or modify existing.

Of course if you're trying to make something fairly simple, going with an MVC architecture could be overkill.

161. <https://stackoverflow.com/questions/536744/what-are-the-advantages-and-disadvantages-of-using-the-front-controller-pattern/4369671#4369671>

T: What are the advantages and disadvantages of using

Q: I currently design all of my websites with a file for each page, then include common elements like the header, footer and so on. However, I've noticed that many frameworks and CMSs use the Front Controller pattern.

What are the advantages and disadvantages of using a Front Controller? Is the pattern simply used in frameworks and CMSs because it's not known which pages will exist in the final system?

A1: These are the reasons why I would never use a front controller.

- We have a perfectly good front controller it's called a web browser.
- Each http request is unique and separate and should be treated as such.
- It is not possible to scale an application using a front controller.
- If you break a web application into small modules that are loosely coupled it's easier to test the unit/module (you're not testing the architecture as well as the controller for example).
- Performance is better if you deal with a single request uniquely.

The front controller pattern simply doesn't fit IMHO. Build applications much the same way as UNIX, break a larger problem into small units that do one task, and do that task really well. Most of the frameworks are pushing developers to use front controllers and they are simply wrong.

T2: Rephrasing the [Wikipedia article on Front Controller](#):

In a sentence -- **you use it to avoid duplication**.

A little more detailed:

Front controller "provides a centralized entry point for handling requests." Let's assume the front controller for your web-app is index.php.

This script, index.php, would handle all tasks that are common to the whole application or the framework around, like **session handling, caching, input filtering**. Depending on the given input it would then instantiate further objects and call methods to handle the particular task.

The alternative to a front controller would be individual scripts like login.php and order.php that would each include the code or objects that are common to all tasks. This would need a repetition of the inclusion code in each script but might also leave more room for specific needs of a script.

A2: One advantage of using a Front Controller is its testability. if you use TDD it is alot easier to test a controller than it is to request alot of different websites.

Added later: Tom: Thea reason i mean it is more testable is because you normally implement the webhandlers as class rather than server pages. and then you can do alot of tetst directly on the classes.

162.<https://stackoverflow.com/questions/11542960/main-difference-between-3-tier-n-tier-architecture-in-.net/37505622#37505622>

T: Main Difference Between 3-tier & n-tier Architecture in .NET?

Q: I have searched Google to find the main difference between 3-tier and n-tier architecture in .net but I have failed to find it out. Several sites said both are the same in nature and some of the sites said there are differences between them.

I want to know the major differences, and which one is better in performance optimization?

A: An N-Tier application is an application where you have 3 or more physical tiers. I mean with that things like, “Presentation/Client Tier”, “Application/Business Server Tier” and “Data Tier” (a database server in most of the cases) and nowadays we use web services (or even better, WCF Services) to communicate between presentation tier and the application server tier. Here you see a simple & typical picture about N-Tier architecture:

A different matter is that we'd probably design our application as an N-Layer application, I mean, with several logic layers where we implement different logic tasks. For example we could have the DAL layer (Data Access Layer), BLL Layer (Business Logic Layer), BFLL Layer (Busines Façade Logic Layer), WCF Service Layer and several Presentation layers depending of the pattern we use, like MVC (Model-View-Controller), MVP (Model-View-Presenter), etc.. Also, within the N-Layer architecture, you can guess that Entity Framework fits as the DAL Layer (Data Access Classes) as well as using EF entities as our disconnected entities to pass thru all the layers, all right?

BTW, not all N-Layer apps should be N-Tier apps, but all N-Tier Apps must internally be designed as N-Layer. I mean, there are many cases where the less you physically split your model, the better for performance (more tiers is good for scalability but not for pure performance, due to latencies). Remember, N-Layer is about logic layers.

OK!, so if we get back to the N-Tier architecture (physical tiers), like I said, we need remote mechanisms to communicate the client tier with the application server tier (for instance, WCF Services) and therefore when we query the database from the app server tier, to obtain data (like an Order), we keep it as an EF entity, then we disconnect it from the EF context (detach), WCF serializes it and sends that disconnected entity to the presentation tier (client apps & machines).

163.<https://stackoverflow.com/questions/1263886/making-decisions-about-the-architecture-of-your-project-what-is-your-decision-p/1264203#1264203>

T: Making decisions about the architecture of your project; what is your decision process like?

Q: Many of us, who have designed and developed systems from scratch, have been in situations where you had to make tough decisions about the architecture of a project. Where did you, or would you, draw the line on taking the "next step" in building an architecturally sound, and scalable system?

I've built a large scale web site that was rather collapsed in terms of architecture. There was a web layer with the front-end code, then business and data layers that handled the real work to be done. The various layers of logical separation co-existed on the same physical machine. A physical, or even simply logical, separation could have existed through the use of a web services layer/tier. For various reasons, it wasn't implemented that way.

Whether the decision was right or wrong is simply a matter of opinion. I've been in other situations where a relatively simplistic application was over engineered, from my point of view.

What are some of the factors you consider while designing the architecture for a new project? Do you have a consistent project design you often use, are you n-tier from the start, or do you evaluate as each project comes in?

Having these experiences repeatedly, I often wonder how others in the same position justify and make these considerations. I'm sure we all will have varying opinions, but I believe understanding the thought process behind the opinions will be enlightening.

A1: The correct architecture for a given problem depends entirely on the problem. Your question is too general to offer a real answer, other than to say I keep the architecture as simple as I can to account for all known and expected requirements, but no simpler.

EDIT:

For "typical" business solutions, here are some of the factors that I consider:

- UI
 - Can it be web-based? What are the user interaction requirements?
 - If a classic web interface is not sufficient, can I use a more interactive technology such as Silverlight?
 - If it has to be thick-client (yes, there are still scenarios that justify that), how serious are the deployment challenges? Small user base, large user base? Do I need to include automatic updating? Does it need to be enforced?
- Business Layer
 - Do I have performance/scalability considerations that require a physically separate business layer? (My business layers are always logically separate, and easy to physically separate if need be. I sometimes use [CSLA](#) to allow for that decision at deployment time when targeting Windows, but that's a heavy framework and not always appropriate).
 - How simple or complex are my business rules? Are they likely to evolve considerably over time? Is it worth incorporating a rules engine such as [Drools](#)?
 - Are there asynchronous processing requirements? Do I need a work queue system?
 - Are there external systems to interface with? What types of interfaces are they present? Web service, COM+, XML over HTTP, proprietary, DB, batch files, ...?
- Data Persistence
 - What ORM choices are available to me given any pre-existing platform choices/constraints?
 - Will I benefit from extensive use of stored procedures? Will there be a DBA to maintain stored procedures and modify them over time? If no DBA, I only use stored procedures where really necessary for performance. If there is a DBA, more extensive use of stored procedures gives the DBA flexibility to manage the physical architecture independent of the application (but as with all added complexity, that comes with a cost).
- Cross-Cutting
 - What are the security requirements? Is there an existing mechanism (Active Directory/LDAP/...) to be integrated with? Do I need to support role-based security?
 - What are the operational monitoring requirements? "Report this bug" functionality? Simple logging?

A2: Well, let me be the one to tell you - simply do it. Concentrate on whatever requirements you have now but do not try to address all possible future features, imaginary requirement changes and the various courses of development.

There is a great article written by Joel: [Don't Let Architecture Astronauts Scare You](#).

Analyze whatever requirements you have, whatever features your software needs, look at your previous experience with similar projects and go for it.

A great architecture is never born right out of the first brain storming session. You start with one approach, adjust your course as the weather changes, have code review sessions that will yield ideas to improve the

architecture, refactor some bad code pieces into good and reusable components, then finally your garage will be transforming into a castle.

Follow the [KISS principle](#) and avoid premature optimization.

Do you have a consistent project design you often use?

Of course. An individual or a team develops his own style, the techniques to solve typical problems, reusable components which altogether will form your tool set. Why would you throw them away each time you start a new project?

are you n-tier from the start?

I try to be. It serves the goals of consistency, clean structure and the separation of concerns.

or do you evaluate as each project comes in

That as well. There may be a different way to address the problem and solve it in the most efficient manner.

A3: My observation is that really good architects take the time to understand deeply the known requirements and use considerable judgement in understanding where future flexibility is provided for.

They also understand the difference between logical and physical separation of tiers.

All too often I see one of two patterns:

- This worked on the last project so we use it here ... even though the requirements are different.
- That didn't work before so we won't use it ... even though the reason it didn't work was that the implementation was done badly

(If the only architecture problems you need address are how many tiers to have in your solution then you are indeed lucky :-)

A4: Where did you, or would you, draw the line on taking the "next step" in building an architecturally sound, and scalable system?

I don't understand this part of the question.

What are some of the factors you consider while designing the architecture for a new project? Do you have a consistent project design you often use, are you n-tier from the start, or do you evaluate as each project comes in?

I've been fortunate enough to do almost all of my work in small teams, and unfortunate enough to do almost all of it on teams with high turnover. I've learned **never to try to architect a system all by myself**; results are better with a team effort. Sometimes we've done rapid prototyping, but if the team is good I've found that you can get surprisingly far with a whiteboard, index cards, and a paper design.

We definitely do *not* have a consistent project design; each architecture is potentially one-off for the project—but I've worked almost exclusively in research and advanced development.

Factors considered:

1. Does the team think the architecture will get the job done? Trumps all other considerations.
2. Can the architecture be easily learned by junior team members or newcomers? Other groups will steal your best people, they will leave to start companies. In one case we had a group that was just too busy servicing field requests to learn a new architecture, even though the architecture they had was holding them back.
3. Does the structure of the architecture reflect the structure of the organization that needs to create it? :-) Somewhat tongue in cheek, but we need to believe we can build it with the people and the time we have, not the perfect development team. So being able to identify pieces of the architecture that match with individuals is a good thing.
4. Are there parts we don't understand—or worse, are there parts we're afraid of? If so, major red flags.
5. Is it beautiful? Is it something we'd be proud to talk about at lunch with people from other teams? If not, the design/architecture probably isn't good enough yet.
6. Is there an identifiable new idea? Something that others can learn from? (This is important in a research environment, but I suspect not important elsewhere.)

A5: I find that it's generally very bad practice to assume performance bottlenecks up front. You can spend a lot of up front optimizing that makes no noticeable difference at the end.

We have some great refactoring tools these days and a lot of resources on development patterns. Because the tools have gotten so much better I do not spend nearly as much time as I used to in the architecture function. Very roughly my process is like this:

1. Gather Requirements
2. Prioritize requirements (don't spend a lot of time on gold plating features)
3. I generally start with 2 tier (UI / Data&Business logic) unless I know that the Data & Business logic tiers will be separated up front.
4. For each requirement, first make it work. No patterns here unless it's painfully obvious that it is needed. I find that the need for patterns emerges in the implementation.
5. After it works, clean up the code, identify places for patterns and implement them *only if you need to*
6. If performance is a requirement, do performance testing, refactor as necessary.

If you work in this manner, you'll find that you err on the side of simplicity. Patterns, 3rd party tools, etc can be totally awesome at solving specific problems, but I like to keep in mind that every time I add something like that, it raises the bar of understanding required to maintain the application later. So I start simple, and add complexity only when it specifically gains me something.

I actually get a pretty bad taste in my mouth when dealing with other architects who even for a small, simple application will reach for a Dependency Injection framework, NHibernate, NUnit, roll their own logging library, write 3x as many unit tests as they have lines of code, etc. All of these tools have specific instances where the ROI (Return on Investment, "bang for your buck") is very good, and other cases where it isn't. A good architect provides as much value as they can at the lowest time/cost possible.

A6: I initially consider the complexity of the domain. If complex and in business, commerce or industry, rather than computer or data sciences, I default to an architecture based on an object domain model.

I next consider size, criticality, expectations and other non-functional requirements.

164. <https://stackoverflow.com/questions/8930721/how-to-best-represent-database-views-summary-info-in-3-tiered-application/8931847#8931847>

T: How to best represent database views/summary info in “3-Tiered” application

Q: This is basically asking the same question as in [How to handle views in a multilayer-application](#). However, that post didn't receive much feedback.

Here's the problem: we have built a 3-tiered web application with the following tiers:

- Data Access (using repositories)
- Service
- UI (MVC 3)

DTO's are passed between the UI (Controller) Layer and Service Layer. Heavier Domain Models, containing a lot of domain-level logic, are passed between the Service and Data Access Layers. Everything is decoupled using IOC and the app follows SOLID principals (or tries too) --a big happy decoupled family!

Currently the DTO->Domain Model and Domain Model->DTO conversion happens all in the service layer.

So, finally to my question:

We are going to need to start displaying more complex read-only subsets of information, (i.e. summary views joining multiple entities doing rollup totals, etc). So what is the best practice for representing this type of read-only data in the n-tiered system? Having to map read-only Domain Model types to DTO types in this case doesn't make sense to me. In most cases, there would be no difference between the 2 types anyway. My thought would be to "break" the layering boundaries for these read-only types, having the Data Access Layer serve up the DTO's directly and pass those through to the Service Layer and on to the UI.

Can anyone point me in the right direction?

A1: Your thought on breaking the layering for reading and then displaying values make sense completely. After all, the architecture/design of the system should help you and not the other way around.

Displaying report-like data to the user should be queried simply from the database and pushed to the view; no domain/dto conversion, especially if you're in a web app. You will save yourself a lot of trouble by doing this. Personally, I had some attempts to go through these mappings just to display some read only data and it worked poorly; the performance, the unnecessary mappings, the odd things I had to do just to display some kind of report-like views. In this case, you'll likely have your domain model and a read model. You can look up CQRS pattern, it might guide you away from thinking that you want to use the same data model for both writes and reads.

So, to answer your question, I believe that in this case the best way would be to skip layering and read DTOs directly from the database through a thin layer.

165. <https://stackoverflow.com/questions/15138222/which-architecture-is-more-scalable/15144907#15144907>

T: which architecture is more scalable

Q: I'm developing an application for *Windows azure cloud service*.

The general description for the application is quite simple: a front end on MVC 4, a middle tier for processing front-end processing requests and a SQL Azure/Blob backend...

I did not start to write code so far, and before that I would like to get some feedback on the which of the following scenario would models is more scalable and possibly why. If you think that there's a N'th option that I did not consider please expose it!

Just to be clear single tier app is out of question.

Scenario 1:

Front-End consumes a WCF service on middle tier that does all the processing.

Scenario 2:

Front-End consumes a WCF service on middle tier that queues up that request on a SB and waits. "Tier 3" consumes the message and processes it, also queueing the answer for WCF Service to respond...

Scenario 3:

Front-End queues a message and loops waiting for response message. "Tier 3" consumes the message, processes it and re-queues it for Front-End to stop waiting...

Basically all the questions reduce to "How well WCF scales-out horizontally?"...

A1: The most scalable solution is the one that you ruled out — a single tier web app with no shared state that can have as many nodes as you like. There is nothing more *scalable* than n web servers behind a load balancer and m distributed database nodes. Since you've ruled out the most scalable architecture, you are asking the wrong question, because you are probably not after scalability. Perhaps you are looking at some other architectural principle such as availability.

Why do we separate out functionality across multiple services? There are many reasons. Asynchronous processing allows better availability (by writing to a queue and not being concerned about failures). It also allows us to manage bottlenecks, such as the database. We also break our application up into services in order to ease development, deployment. So it may be availability, maintainability, security, performance, deployability, cost, usability, testability, compliance, or something else that you are looking for. You kinda need to answer that question for yourself before grabbing the scalability hammer. I wrote [CALM](#) specifically to help ask, and answer, these difficult questions.

Back to the specifics of your question. The *de facto* asynchronous processing pattern that is generally scalable (if that is what you really need) on Windows Azure does not have WCF in it. Is there a specific reason for WCF? It had better be a good one, because WCF and Service Bus, if not needed, introduces unnecessary complexity. On Windows Azure we implement asynchronous processing with Web Roles (that host the MVC app), that place messages on Windows Azure Queues, these are processed by worker roles. If you need the client (browser) to know about the result, you can hand roll a CQRS pattern, or use SignalR, as other people have mentioned. I would seriously look at taking out WCF.

In terms of your scenarios:

Scenario 0: Stateless web servers do all processing and communicate directly with distributed database node. This is the most scalable, but has other disadvantages.

Scenario 4: Front end places message on Azure queue and returns result to client. Worker role processes message and puts result *somewhere* (table storage or blob). Browser Javascript polls for result data and presents it to client when 'done'. This is CQRS-ish. (dunnry's answer)

Scenario 5: Front end places message on Azure queue and returns result to client. Worker role processes message and sends result to client via SignalR. (jgauffin's answer)

I would prefer Scenario 5

A2: Messaging is always the most scalable solution since you can configure any number of workers to consume the messages and process them.

The switch to asynchronous handling is however not trivial if you still want the UI to act synchronously. You typically switch to task based UI where there is no immediate feedback to the users (or faked feedback).

I've blogged about how you can use queries, domain events and commands to scale out: <http://blog.gauffin.org/2012/10/writing-decoupled-and-scalable-applications-2/>

A3: You didn't say what the front-end requirements are. Is this a website that expects a response with data? Typically, a message queuing pattern will be more scalable (but not faster) as you then have many options to process the requests. However, once you go that path, it is harder to get direct synchronous-like feedback to the user without a few tricks (SignalR might be a choice here).

For what it is worth, I tend to use the CQRS pattern in the cloud as it scales well for what I need. I have to deal with the fact that the command is processed async and the user does not get a synchronous response. The UI has to deal with it then. We use a command processing table with status. The web (our client in this case) has to poll that table to figure out when a command has been completed in order to know when to try and display any results to the client. For us, this is a worthy trade-off to get the scale we are looking for (and other benefits of CQRS).

166. <https://stackoverflow.com/questions/10560407/architectural-analysis-help-for-new-project>
T: Architectural analysis help for new project

Q: I could really use some help with my class model above. I'm ashamed to say that I have been one of "those" developers that learned object orientation at university, wrote the exams, aced them but then never set about implementing the principles in my real world code. I never truly sat down and considered my application design before beginning the codification of it. Thus my design and coding skills have been slowly dying and stagnating under the weight of monolithic legacy banking application development and maintenance. After years of this I've decided that it's definitely time for a change! I've been delving deep into the world of design patterns, DDD, NoSQL, DI, etc etc. The last 2 weeks have been a really intense experience for me, and at times I think I was nearly brought to tears at the sheer volume of best practices and tech that I had missed while working for large corporations and banks. I simply couldn't believe how far removed I had been from cutting edge tech and good design approaches for so long, and the sudden swathe of everything threatened to send me into a state of coding paralysis! I simply could not start coding, as I felt my design needed more tweaking, or I needed more studying on a particular topic. Enough is enough though, and I need to crack on and at least make a first iteration on the project.

Anyway, enough of the drama, on to my issue:

I have begun work on the model creation for my golfing app. Wanting to adhere somewhat to DDD and also wanting to make use of NoSQL (RavenDB), I set about with the following requirements.

- My platform stack is Windows / IIS / MVC 3.0 / RavenDB
- I need to find my aggregate roots! I have set about defining them as the only elements in my system that are capable of persisting in their own right. Everything else I've simply deemed a "sub-component" of the aggregates. Note that no real behaviour has yet been defined.
- My aggregate roots will be the only classes to actually persist in my RavenDB doc store, and they will persist "as-is". Having large tree-like class structures would appear to be a best case scenario for RavenDB in terms of performance benefits realised.

- I don't feel the need for a repository layer (been following some of Ayende's posts), as the RavenDB API feels fluent and quite lightweight. I'll be simply opening and closing my sessions via Custom Action Attributes on my controllers where required. I've seen that without the repository layer testing might be tricky, but surely I should be able to simply mock some "in-memory" domain objects?
- Writes to the DB will happen in a separate service layer
- At one point I stopped and asked myself: "Where on earth am I going to put my domain behaviour!?". The general consensus from searching the web would seem to indicate I should leave my domain (entities) void of any behaviour (business logic) and have it all handled in my service layer. But after reading some Eric Evans, I'm convinced that as much of my domain behaviour should exist right there... in the domain!

Questions - As a bona fide noob in the area of DDD and architectural design, am I at least on the right track, or am I destined for destruction? - Any thoughts, admonishments, constructive criticism and insights into the above would be greatly appreciated!

A1: To counter being overly academic about it all and be stuck in analysis too long: First make it work. Then make it pretty.

Put behavior near data as much as possible. Use services where you can't cleanly assign a responsibility to a class (e.g. should a 'transfer money' method be on an SavingsAccount class?). Services can be part of an aggregate.

Do use repositories (I don't agree with Ayende). You mention using a separate service layer for DB writes. Repository is a perfect interface to put that layer behind. It's also a perfect testing seam.

Didn't look at your class diagram thoroughly, but you may be overusing inheritance here and there. Favor composition over inheritance. Inheritance can rear its ugly head quite quickly.

When choosing aggregate roots, an important criteria is life cycle. When the aggregate root dies, everything else in the aggregate dies also. The aggregate root is also in control, everything outside the aggregate passes through it. When in doubt just create a lot of them (single entity aggregate). With a document database you would typically store a document per aggregate, so that does matches somewhat with how you choose them. Store IDs of references to different aggregates

A2: So yeah, going down the rabbit hole will not increase your productivity in short term, but may help you mature as a developer in long term. There is so much to DDD, NoSQL, etc that you could spend years just learning.

If you want your next project to be successful, my advice would be to stick to what you know, and introduce new techniques gradually so that you can always feel in full control, and not depend on "best practices" someone has to put up for you.

A3: Firstly, may I congratulate you on deciding to take the steps to try and become more professional. I despair at the lack of profession in this industry and sometimes feel like I'm walking amongst 80% cowboys/hackers 20% professionals.

To your question:

- Have you read [this article](#) by Vaughn Veron? If not, you should. It provides an excellent guide to designing aggregates, which I think is underrated in its complexity.
- Looking at your model, I'm not sure if you actually have defined aggregates? I can see you have identified aggregate roots, but the aggregates should have clear boundaries and be separate from other aggregates (i.e. don't have entities referencing other aggregate roots, let them reference their ID). The property name `RefereeUserIDList` hints that you are in fact doing this, but the diagram shows it holding reference to the actual 'User' aggregate root?
- In terms of identifying aggregates & roots & the model design, I don't really think we can help you here as this is entirely circumstantial to the behavioural requirements. I will say though: try to base your design on *behaviour*, not data structure. It's a difficult mindset to shift to, but try not picturing the database structure.

- I haven't read what Ayende has said about repositories, but as long as you can mock the Raven API (which I assume you can given he made Rhino mocks) then it shouldn't be a problem.
- Possibly most importantly, **do not put all your domain logic into the service layer**. You'll end up with an [Anemic domain model](#), which is the DDD equivalent to the anti-christ.
- Personally when learning DDD I understood all of the principals but struggled when attempting to turn theory into practice. If I'm honest I'd say I've only really been successful with it since I understood the principals [CQRS](#) which compliments DDD. I'd really recommend watching some videos on the subject by [Greg Young](#).

167. <https://stackoverflow.com/questions/2632126/architecture-with-nhibernate-and-repositories/2640584#2640584>

T: Architecture with NHibernate and Repositories

Q: I've been reading up on MVC 2 and the recommended patterns, so far I've come to the conclusion (amongst much hair pulling and total confusion) that:

- **Model** - Is just a basic data container
- **Repository** - Provides data access
- **Service** - Provides business logic and acts as an API to the Controller

The Controller talks to the Service, the Service talks to the Repository and Model. So for example, if I wanted to display a blog post page with its comments, I might do:

If so, where is this being set, from the repository? the problem there being its not lazy loaded.. that's not a huge problem but then say I wanted to list 10 posts with the first 2 comments for each, id have to load the posts then loop and load the comments which becomes messy.

All of the example's use "InMemory" repository's for testing and say that including db stuff would be out of scope. But this leaves me with many blanks, so for a start can anyone comment on the above?

A: Traversing the Model like that is achievable, and desirable. You are absolutely right though that it is an implementation ideal that comes at a performance price, especially when dealing with collections (and you won't have any hair left when it comes to hierachic data structures).

You'll want to configure NH mappings to do batched lazy loading. (fetch=subselect batch-size=#), otherwise eager loading will pull back too much data, and lazy loading will results in an N+1 selects problem (1 query to fetch the posts, + N queries to fetch comments where N is the number of posts - your loop).

If your requirement is really to show 2 comments for each post, a batchsize of 2 will do, but as you'll no doubt have guessed, as soon as your app tries to access the 3rd comment, NH will perform another select to fill the comments collection with 2 more, so you might want a bigger batch size from the outset. Plan for a perf tuning phase when you know your use cases. This may be very difficult if you are developing a general purpose data access API. (Also, you will want to add an order-by="SOME_COLUMN_NAME" on your comments collection mapping to control how to get the 'first' comments). It's easy to underestimate the importance of the NH mappings settings; ORM solves many dev problems, but adds a whole world of new ones.

'Domain Driven Design' by Eric Evans defines the repository pattern & services. They are not always appropriate. I've stopped using them for all but the very complex projects, and rarely on MVC builds. The benefits of the repository pattern & services are separation, isolation, testability and flexibility of your architectural components. In real-world terms - consider your 'usings' namespaces. If you would rather avoid having 'using nhibernate' in your controllers, then hide it away in a repository and just reference the repo assembly.

This ties in with testability - you can unit test your repo in isolation from the controllers. If you are now offended by having repo references in your controllers then employ a service layer. It's all about loose coupling.

Benefits of a service layer include complete hiding of the data access mechanics, exposing the service methods remotely over other transport options (web services, for instance), and veiling generic repository methods with API friendly names. For example, post = MyAwesomeAPI.PostService.Get(id); might simply be a wrapper to a generic - get any type by id - Repository.Get(id); This API wrapping is massively useful when developing a set

of services for 3rd parties to consume, or just other devs on your team. Provided your method signatures stay the same, you can change the underlying implementation at any time - your switch from NH to plain SQL for example would not break existing apps that consume that API.

For maximum flexibility you would not even link your services assembly to your repo implementation assembly at all. Rather you would use a dependency injection tool like Structure Map to wire everything up at runtime. This allows you to switch repo implementations by configuration alone without recompiling/linking. You could even have multiple data access techniques. The consumer of the API would not know, nor should it care.

If you don't need any of those things, put 'using nhibernate' in your controllers and be done. The risk is that you have tightly tied your MVC app to NH and everyone needs to know everything to do make the smallest change to your app. That decision will likely be made by your project constraints (time/money/people/calendar). If you do need all those things, check out Sharp architecture, or assemble your own stack. MVC is so much more VC than M.

168. <https://stackoverflow.com/questions/10055290/middleware-soa-by-example/10188644#10188644>

T: Middleware & SOA by Example

Q: I am an inexperienced Java developer trying to wrap my head around some fundamental middleware/SOA concepts and technologies, specifically:

- Service-Oriented Architecture (SOA)
- Message-Oriented Middleware (MOM)
- Message Queue
- Apache Camel
- Mule
- EJBs
- Endpoints & Routes
- Service Bus/ESB
- JMS

After looking each of these up online/on Wikipedia, I was able to get (for the most part) decent *definitions* for each of these. What I am not understanding is **how all of these technologies/concepts work together** on the backend to provide a 2nd/business tier solution.

Can someone please give an example of an architecture that would use all of these technologies/concepts, and explain what **role** each of them play in the overall solution? Once I see a working example I'm sure it will help me connect most of the dots.

Edit: Since I added the bounty, I've had several answers that suggest reading books. Although I appreciate all feedback here, I simply can't part ways with 300 reputation points for an answer that, essentially, boils down to "RTM" (especially when I'm flat broke and can't *afford* the manual!) To reiterate, the bounty and definitive answer will go to someone who can hit all of these bullets in a meaningful, practical example. **This does not have to be a middleware compendium!!!** Just a paragraph or two that shows how all these can be used together in harmony to produce a Java business-tier solution. Thanks again.

A1: SOA main principles: Build systems as set of services where each service is

- Coarse-grained
- Interoperable
- Loosely coupled

A company offers a lot of business services (coarse-grained) developed over many years and exposed to the users (human or other systems) in some form. There are more chances that each of these features have been designed and developed not keeping the above three principles in mind. Moreover, each of those features might be running on disparate heterogeneous platforms, using different technologies etc.

What if you want to integrate these disparate features thus creating new solutions (For e.g. Amazon store front is a new service composed of their catalog service, shopping cart service etc)?

You have two choices:

1. Building the new feature from scratch keeping the 3 principles in mind. But it is a very costly endeavor, and one that's almost never successful.
2. An effective and less risky alternative is to assemble/compose it from existing, proven (well tested) services.

Option 2 is where **ESBs** can help with their support for routing, transformation, monitoring etc. [Apache Camel](#), [Mule](#) are open-source ESB's. Endpoints & Routes are the terminology used in EIP ([Enterprise Integration Patterns](#)) that these ESB's implement. ESB's can take help of **MOM's** when they want to route/integrate services that are running on heterogeneous platforms (For e.g. the catalog service might be running on a mainframe system but the shopping cart is implemented using **stateful EJBs** running in a Java Application server). **Message queue** is a concept in MOM that acts a temporary storage of the message between the sender and receiver. This temporary storage provides lot of benefits like asynchronous delivery, guaranteed delivery etc. Now, there can me multiple MOM vendors like IBM (WebSphere MQ), open-source ActiveMQ etc. We can use **JMS** to keep your code independent of the vendor.

I tried to relate all the concepts with an example. I also tried to keep it short. Please ask follow up questions to gain more understanding.

MOM is not a requirement to implement SOA. For e.g. if all of your services are exposed over SOAP via HTTP then you doesn't need a MOM in this case.

A2: [Enterprise Integration Patterns](#) can help you understand how everything fits together.

[update:] Your follow-up question on another answer made me realise that you're confused about specific products. That's partly because software in practice tends to map to more than one concept and partly because different companies argue that they provide "everything", when really they don't.

The ESBs are toolkits / libraries that let you connect everything together. They are neither the services themselves, nor the messaging implementations, but the goo that fills the odd little gaps in-between. If you were writing everything from scratch you might not even need one, because what they are best at is fixing the mismatch between a whole pile of different technologies, and if you are starting from scratch you can avoid that mess.

The services are, well, the services. You might use some EJBs when implementing one (I only mention this because for some reason you include them in your question).

The messaging middleware is software that gets messages from A to B. That's extremely useful, but also complex, and everyone and their brother has invented their own. So you need some abstraction that lets you avoid lock-in. That can be an ESB or, if you are all-Java then it can be JMS. But even when you are all-Java with JMS you may still want to use an ESB because they are libraries of all the bits of Java code you would still need to write (random bits of routing logic, message reformatting, etc etc).

Hope that helps. My original answer is more about the abstract patterns that you build with these tools - when you're wiring things together the same problems come up again and again.

A3: ou mix a lot of different concepts and technologies with different abstraction levels. But all of your concepts have something to do with (enterprise) application integration. I will try to comment your definitions:

- Service-Oriented Architecture (SOA)
SOA provides a set of principles and methodologies to integrate existing applications as loosely coupled units. From the Enterprise Integration Patterns (see below): "*SOAs blur the line between integration and distributed applications*".
- Service Bus/ESB
The ESB is a main concept of SOA to reduce the dependencies within the applications in a SOA. Instead of a lot of dependencies between the applications each application is connected to the ESB.
- Message-Oriented Middleware (MOM)
MOM is a infrastructure for sending and receiving messages between distributed systems. This is used to

integrate applications. MOM was the golden hammer before the SOA hype came up. Since both are useful, big integration suites provides both ESB and MOM (or use MOM inside their ESB).

- Message Queue
A message queue is just a technical detail aspect in MOM architecture. When message sending/receiving is decoupled, message are stored in queues until the recipient is ready.
- Apache Camel
When the book [Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions](#) hit the market, some software solutions have been created which provides implementation for the patterns in this book. Apache Camel is one of them. Camel is also a part of Apache ServiceMix which is also an open source ESB. FuseSource and Talend are packaging Apache ServiceMix, Apache Camel and Apache Active MQ (MOM) to bundles with commercial support.
- Mule
Mule is also an open source ESB and integration platform.
- EJBs
From Wikipedia: *Enterprise JavaBeans (EJB) is a managed, server-side component architecture for modular construction of enterprise applications.* This means EJB is a component within an application and has primary nothing to do with integrating applications.
- Endpoints & Routes
When you work with Apache Camel you are designing routes between endpoints, see a [tutorial](#). In short, message are entering/leaving your system via endpoints and are processed in a flow defined by a route.
- JMS
JMS or Java Message Service is a Message Oriented Middleware (MOM) with an standardized Java API.

A4: Taking all of your requirements and packaging them into a query, I came across an *excellent* case study that should meet your needs:

- [Service Oriented Architecture: An Integration Blueprint](#)

I went ahead and fulltext searched the book using Amazon's "Search Inside This Book" feature. It covers all of the integration cases you've discussed, appears to be thorough, and steps you through the entire design and implementation process.

I'm embarrassed to state I haven't read through this *myself*, but I highly recommend using the same tools I did to see if it fits your needs before investing in a copy. It seems more thorough, more complete, and more helpful than simply foisting you on a whole lot of incomplete documentation or spooling out content into an answer here.

A5: **Enterprise Application Integration (EAI)** is key to connecting business applications with heterogeneous systems. Over the years, architects of integration solutions have invented their own blend of patterns in a variety of ways. But most of these architectures have similarities, initiating a set of widely accepted standards in architecting integration patterns. Most of these standards are described in the Enterprise Integration Patterns Catalog available at:<http://www.eapatterns.com/toc.html>.

WSO2 [ESB](#)

WSO2 Enterprise Service Bus (ESB) 4.7.0 documentation! WSO2 ESB is a fast, lightweight, 100% open source, and user-friendly ESB distributed under the Apache Software License v2.0. WSO2 ESB allows system administrators and developers to conveniently configure message routing, mediation, transformation, logging, task scheduling, failover, load balancing, and more. It supports the most commonly used Enterprise Integration Patterns (EIPs) and enables transport switching, eventing, rule-based mediation, and priority-based mediation for advanced integration requirements. The ESB runtime is designed to be completely asynchronous, non-blocking, and streaming based on the Apache Synapse mediation engine.

169. <https://stackoverflow.com/questions/34167965/mvc-with-service-architecture/34168330#34168330>

T: MVC with service architecture

Q: I'm creating a MVC project where in one of its View, there will be search part and the listing part. At the same time I have an idea of using a service layer (Web API or WCF).

I would like to ask which one is correct way or setup for building this search and listing page ?

The way I'm doing it at the moment is using partial view for listing part that will get updated every time searching occurs and position the service layer behind the controller (service layer in the middle of controller and business layer).

A1:

MVC Controllers should be thin route drivers. In general your controller actions should look similar to

```
[Authorize(Roles = "User,Admin")]
[GET("hosts")]
public ActionResult Hosts(int id)
{
    if (false == ModelState.IsValid)
        return new HttpStatusCodeResult(403, "Forbidden for reasons....");

    var bizResponse = bizService.DoThings();

    if(bizResponse == null) return HttpNotFound(id + "could not be found")

    if(false == bizResponse.Success)
        return new HttpStatusCodeResult(400, "Bad request for reasons....");

    return View(bizResponse);
}
```

You can also generalize the model state checking and response object checking (if you use a common contract - base type or interface) to simply have:

```
[Authorize(Roles = "User,Admin")]
[GET("hosts")]
[AutoServiceResponseActionFilter]
public ActionResult Hosts(int id)
{
    var bizResponse = bizService.DoThings();

    return View(bizResponse);
}
```

I am a proponent of using serialization to pass from the business layer to the http/MVC/ASP.NET layer. Anything that you use should not generate any http or tcp requests if it is in-process and should used named-pipes for in memory transport. WCF with IDesign InProcFactory gives you this out of the box, you can't emulate this very well WebApi, you may be able to emulate this with NFX or Service Stack but I am not sure off hand.

If you want the bizService to be hosted out of process the best transport at this point is to use a Message Bus or Message Queue to the bizService. Generally when working with this architecture you need a truly asynchronous UI that once the http endpoint accepts the request it can immediately receive the http OK or http ACCEPTED response and be informed later of the execution of the action.

In general a MVC controller / ASP.NET http endpoint should never initiate a http request. Your bizService if necessary is free to call a third party http service. Ultimately roundtrip network calls are what kills the perceived performance of everything. If you cannot avoid roundtrip calls you should strive to limit it to at most one for read and at most one for write. If you find yourself needing to invoke multiple read and multiple write calls over the wire that is highly illustrative of a bad architectural design of the business system.

Lastly in well designed SOA, your system is much more functional than OO. Functional logic with immutable data / lack of shared state, is what scales. The more dependent you are on any shared state the more fragile the system is and starts to actively become **anti-scale**. Being highly stateful can easily lead to systems that fracture at the 20-50 req/s range. Nominally a single server system should handle 300-500 req/s of real world usage. The reason to proxy business services such as this is to follow the trusted subsystem pattern. No user is ever able to authenticate to your business service, only your application is able to authenticate. No user is ever able to

determine where your business services are hosted. Related to this is users should never authorize to business service itself, a business service **action** should be able to authorize the originator of the request if necessary. In general this is only needed for fine grained control such as individual records can be barred from a user.

Since clients are remote and untrustworthy (users can maliciously manipulate them whether they're javascript or compiled binaries) they should never have any knowledge of your service layer. The service layer itself could literally be firewalled off from the entire internet only allowing your web servers to communicate to the service layer. Your web server may have some presentation building logic in it, such as seeding your client with userId, name, security tokens etc but it will likely be minimal. It is the web server acting as a proxy that needs to initiate calls to the service layer

Short version, only a controller should call your service layer.

One exception, if you use a message queuing system like Azure Service Bus for example, depending on security constraints it could be fine by your UI to directly enqueue messages to the ASB as the ASB could be treated as a DMZ and still shields your services from any client knowledge. The main risk of direct queue access is a malicious user could flood your queue for a denial of service type attack (and costing you money). A non-malicious risk is if you change the queue contract out of date clients could result in numerous dead letters or poison messages

I really believe the future of all development are clients that directly enqueue messages but current technology is very lacking for doing this easily and securely. Direct queue access will be imperative for the future of Internet of Things. Web servers just do not have the capacity to receive continuous streams of events from thousands or millions of light bulbs and refrigerators.

170. <https://stackoverflow.com/questions/21839783/more-layers-and-performance-issue>

T: Based on this presentation(for more detail) it seems that having unduly layers and assembly could cause performance problem. take a look at this scenario , it's about sending a message on "Contact Us" part of an application.

Q: I blogged a post about it, although it's not the easy to optimize n-layered architectures but I've talked about some tips: <http://ehsanghanbari.com/Post/115/disadvantages-of-n-layered-architectures>

171. <https://stackoverflow.com/questions/24851276/mvc-search-functionality-using-repository-pattern>

T: MVC Search functionality using repository pattern

Q: I'm trying to build a simple Search functionality into an application using repository pattern, domain models, and a service layer.

I've searched around and haven't found anything that fits the repository pattern. I've had a quick read on the Specification method, but that doesn't look like it will fit what I require. Please read on.

A typical search would involve: Find a student that goes to college xyz, and studies subject abc, and speaks english, and... So, I'm hitting each table essentially.

I have the following layers:

Service layer

AppStudentService, AppCollegeService, ...

Business Logic Layer (BLL) which contains the following domain models:
Student, College, Subject, Language, SearchService ...

Data Access Layer (DAL) which contains the following repositories:
StudentRepository, CollegeRepository, SubjectRepository, LanguageRepository

To attack this problem, I built an AppSearchService in the Service layer. This instantiates the SearchService in the BLL, and all required repositories in the DAL.

In the BLL I built a SearchService which contains the search logic and calls a SubSearch() method on each of the repositories to fetch data for it's area, e.g. StudentRepository.SubSearch returns student(s) details. The business logic will tie up all the sub-search results together for the final search results to be returned.

I decided to break the search into a number of small queries, i.e. SubSearch methods, rather than a massive search query which would contain many joins. Using Entity Framework.

Question 1.

Each repository has it's standard methods, e.g. Add, Save, Remove, FindAll, FindBy, and a SubSearch method. Is adding my custom (non-repo) method a good idea here, or does it contaminate the repository design?

Question 2.

Would it be better put all the SubSearch methods and search logic together into a new Search class (and method) in the DAL? This way all the logic is together and doesn't require instantiating all the BLL objects and Repo objects, i.e. better performance.

Question 3.

Is what I've done a good approach for the repository pattern? If not can someone point me in the right direction, thanks.

A1: You would be better off create a SearchRepository, that is used to search across your data layer. This will be the most efficient, because joining the results of multiple repositories together is going to be ugly, and inefficient at best. A nightmare to maintain at worst.

You don't want to perform multiple queries for a search if you don't have to. You should perform the query as a single unit. This is most efficient.

172. <https://stackoverflow.com/questions/11383355/application-server-design>

T: Application server design

Q: I would like to design an application that consists of an application server.

There would be a layered core with different responsibilities:

- Receiving messages from the network (e.g. using Netty) using different protocols (e.g. SIP, DNS...)
- Parsing the incoming messages
- Converting the protocol-specific messages into application-specific messages. A particular application may be interested to receive messages of different protocols (e.g. both SIP and DNS).

My question concerns the above layers. Since there will be different applications on top of the core, I would like to find an efficient way to distribute the incoming messages to the relevant applications. By efficient, I mean using a good design (including good patterns), good performance... Which advice can you give me for such a scenario?

A: Maybe the [Enterprise Integration Patterns](#) can help you for designing the message flow within your application.

Depending on what you are planning exactly it can also be worth looking into [Spring integration](#) or [Apache Camel](#).

173. <https://stackoverflow.com/questions/2637114/what-are-the-benefits-of-an-n-layered-architecture/2637150#2637150>

T: What are the benefits of an N-layered architecture?

Q: What are the benefits of an N-layered architecture? How does that make an application better?

A1:

- A: Other applications will be able to reuse the functionality exposed by your layers.
- You will be able to distribute your layers over multiple physical tiers. This can make a very good impact on your application by improving performance (sometimes), scalability and fault tolerance.
- The maintenance of your application is easier because of the low coupling between layers.
- Adding more functionality to your application is made easier.
- Layers make your application more testable.
- Building a well formed layers makes the orientation in your application more easier.
- Having your application not layered means that you have to deal with all security threats in one place which is very difficult. Having your application distributed to layers makes it much easier for design and implement
- Without a good deployment plan it is not trivial to distribute your layers over multiple physical tiers in distributed computing. You need to plan ahead your layers when you create a distributed application.

A2: Maintenance of and enhancements to the solution are easier due to the low coupling between layers, high cohesion between the layers, and the ability to switch out varying implementations of the layer interfaces.

Other solutions should be able to reuse functionality exposed by the various layers, especially if the layer interfaces are designed with reuse in mind.

Distributed development is easier if the work can be distributed at layer boundaries.

Distributing the layers over multiple physical tiers can improve scalability, fault-tolerance, and performance. For more information, see the Tiered Distribution pattern.

Testability benefits from having well-defined layer interfaces as well as the ability to switch out various implementations of the layer interfaces.

Summary

Benefits are

1. Reuse of layers
2. Support for standardization
3. Dependencies are kept local
4. Exchangeability

A3: First of all, layered architecture is a type of "Modular Design". Hence, in order to appreciate the benefits of layered architecture, one needs to know what modular design is. Secondly, it is a special type of modular design, specifically organized to manage dependencies in order to minimize tight coupling, thus achieving the objectives of modular design - autonomous modules/components. When we have autonomous/independent modules, then they can be reused, extended, tested, and so on, compared to the case where the architecture/design is not modular.

I have an article about layered architecture, where I discuss these things in more detail. It might be helpful.

174. <https://stackoverflow.com/questions/31742485/what-is-the-standard-i-should-use-in-mvc-coding/31742915#31742915>

T: What is the standard I should use in MVC coding

Q: what is the impact on my website performance if I will use the mentioned above code inside controller or inside Model?

which method I should use? for example if I want to work with a team, is there a standard I should follow to separate the code, kindly advise

for using the repository pattern: I read that we should not use it as mentioned for example [here](#), i will copy some of what mentioned:

The single best reason to not use the repository pattern with Entity Framework? Entity Framework already implements a repository pattern. DbContext is your UoW (Unit of Work) and each DbSet is the repository. Implementing another layer on top of this is not only redundant, but makes maintenance harder.

if my database contains the following tables: **Manufacturers** , **Cars** , **Rent** , **Clients** , rent class is the a table with 2 foreign keys between Clients and Cars and contains other detailed fields.

how to deal with Rent Object which need to get data from 2 different repositories Cars and Clients in order to display the renting grid based on search criteria entered by the user, if I will use the repositories Cars and Clients , they have their own dbContext, **BOOM** my head cannot understand this technique, kindly advise

A: The answer to your question is, it does not really affect performance but it will definitely become an issue in terms of maintainability as the application grows bigger. You can adopt the SOLID architecture principles: [SOLID architecture principles using simple C# examples](#). This enables you to develop high quality software.

You can create a multi-layered application:

1. Interface Layer - MVC application
2. Business Layer - Class Library with classes with logic
3. Data Access Layer - Database Contexts and Repositories, unit of work with CRUD operations
4. Shared layer - Logging, AppSettings, validations, utilities, extensions, constants, enums

Having your application in this structure would require you to consider things like inversion of control, dependency injection and many more to ensure loosely coupled classes, easy unit testing and most of all a solid application.

You can also read this: [Implementing the Repository and Unit of Work Patterns in an ASP.NET MVC Application](#)

175. <https://stackoverflow.com/questions/10560407/architectural-analysis-help-for-new-project>

T:Architectural analysis help for new project

Q: I could really use some help with my class model above. I'm ashamed to say that I have been one of "those" developers that learned object orientation at university, wrote the exams, aced them but then never set about implementing the principles in my real world code. I never truly sat down and considered my application design before beginning the codification of it. Thus my design and coding skills have been slowly dying and stagnating under the weight of monolithic legacy banking application development and maintenance. After years of this I've decided that it's definitely time for a change! I've been delving deep into the world of design patterns, DDD, NoSQL, DI, etc etc. The last 2 weeks have been a really intense experience for me, and at times I think I was nearly brought to tears at the sheer volume of best practices and tech that I had missed while working for large corporations and banks. I simply couldn't believe how far removed I had been from cutting edge tech and good design approaches for so long, and the sudden swathe of everything threatened to send me into a state of coding paralysis! I simply could not start coding, as I felt my design needed more tweaking, or I needed more studying

on a particular topic. Enough is enough though, and I need to crack on and at least make a first iteration on the project.

Anyway, enough of the drama, on to my issue:

I have begun work on the model creation for my golfing app. Wanting to adhere somewhat to DDD and also wanting to make use of NoSQL (RavenDB), I set about with the following requirements.

- My platform stack is Windows / IIS / MVC 3.0 / RavenDB
- I need to find my aggregate roots! I have set about defining them as the only elements in my system that are capable of persisting in their own right. Everything else I've simply deemed a "sub-component" of the aggregates. Note that no real behaviour has yet been defined.
- My aggregate roots will be the only classes to actually persist in my RavenDB doc store, and they will persist "as-is". Having large tree-like class structures would appear to be a best case scenario for RavenDB in terms of performance benefits realised.
- I don't feel the need for a repository layer (been following some of Ayende's posts), as the RavenDB API feels fluent and quite lightweight. I'll be simply opening and closing my sessions via Custom Action Attributes on my controllers where required. I've seen that without the repository layer testing might be tricky, but surely I should be able to simply mock some "in-memory" domain objects?
- Writes to the DB will happen in a separate service layer
- At one point I stopped and asked myself: "Where on earth am I going to put my domain behaviour!?". The general consensus from searching the web would seem to indicate I should leave my domain (entities) void of any behaviour (business logic) and have it all handled in my service layer. But after reading some Eric Evans, I'm convinced that as much of my domain behaviour should exist right there... in the domain!

Questions - As a bona fide noob in the area of DDD and architectural design, am I at least on the right track, or am I destined for destruction? - Any thoughts, admonishments, constructive criticism and insights into the above would be greatly appreciated!

A: To counter being overly academic about it all and be stuck in analysis too long: First make it work. Then make it pretty.

Put behavior near data as much as possible. Use services where you can't cleanly assign a responsibility to a class (e.g. should a 'transfer money' method be on an SavingsAccount class?). Services can be part of an aggregate.

Do use repositories (I don't agree with Ayende). You mention using a separate service layer for DB writes. Repository is a perfect interface to put that layer behind. It's also a perfect testing seam.

Didn't look at your class diagram thoroughly, but you may be overusing inheritance here and there. Favor composition over inheritance. Inheritance can rear its ugly head quite quickly.

When choosing aggregate roots, an important criteria is life cycle. When the aggregate root dies, everything else in the aggregate dies also. The aggregate root is also in control, everything outside the aggregate passes through it. When in doubt just create a lot of them (single entity aggregate). With a document database you would typically store a document per aggregate, so that does matches somewhat with how you choose them. Store IDs of references to different aggregates.

A2: So yeah, going down the rabbit hole will not increase your productivity in short term, but may help you mature as a developer in long term. There is so much to DDD, NoSQL, etc that you could spend years just learning.

If you want your next project to be successful, my advice would be to stick to what you know, and introduce new techniques gradually so that you can always feel in full control, and not depend on "best practices" someone has to put up for you.

A3: Firstly, may I congratulate you on deciding to take the steps to try and become more professional. I despair at the lack of profession in this industry and sometimes feel like I'm walking amongst 80% cowboys/hackers 20% professionals.

To your question:

- Have you read [this article](#) by Vaughn Veron? If not, you should. It provides an **excellent** guide to designing aggregates, which I think is underrated in its complexity.
- Looking at your model, I'm not sure if you actually have defined aggregates? I can see you have identified aggregate *roots*, but the aggregates should have clear boundaries and be separate from other aggregates (i.e. don't have entities referencing other aggregate roots, let them reference their ID). The property name *RefereeUserIDList* hints that you are in fact doing this, but the diagram shows it holding reference to the actual 'User' aggregate root?
- In terms of identifying aggregates & roots & the model design, I don't really think we can help you here as this is entirely circumstantial to the behavioural requirements. I will say though: try to base your design on *behaviour*, not data structure. It's a difficult mindset to shift to, but try not picturing the database structure.
- I haven't read what Ayende has said about repositories, but as long as you can mock the Raven API (which I assume you can given he made Rhino mocks) then it shouldn't be a problem.
- Possibly most importantly, **do not put all your domain logic into the service layer**. You'll end up with an [Anemic domain model](#), which is the DDD equivalent to the anti-christ.
- Personally when learning DDD I understood all of the principals but struggled when attempting to turn theory into practice. If I'm honest I'd say I've only really been successful with it since I understood the principals [CQRS](#) which compliments DDD. I'd really recommend watching some videos on the subject by [Greg Young](#).

176. <https://stackoverflow.com/questions/1113464/what-other-mvc-like-design-patterns-architectures-are-there-for-highly-flexible/1113582#1113582>

T: What other MVC-like design patterns/architectures are there for highly flexible applications?

Q: A while back i read somewhere about how to improve upon the MVC pattern to accomodate the highly flexible and layered (web)applications we see today. (and to my frustration, i can't seem to find that article again)

For example, some of the Google applications like GMail or even a browser like Firefox.

It consists of components that can be extended and completely replaced. Users can choose the user interface or theme they like, has some kind of plugin system, etc etc...

Owkay I know, this is how big/great applications are build. That's why i ask this question.

Could you provide me with resources or insight in what patterns are used or how these applications are build architecturally...

A1: I guess you are talking about software architecture (in contrast to hardware or system architecture).

Possibly the most important rule (I wouldn't call it pattern) is seperation of concerns. Meaning one component should handle exactly one task, only that task and the complete task. If you stick to that (which is harder than it seems). You'll have the basis for the plugability you mentioned, e.g. exchanging the UI. If your UI layer really does only UI, it can be replaced by something completely different.

If you are really talking big, like the mentioned GMail the concept of 'eventually consistent' becomes important. Classical applications are structured in a way that the user performs an action, say pressing a button. The application processes that action (e.g. saving data from a form in a database). And refreshes the GUI when it is done (e.g. replacing the 'save' button with an edit button. This linear processing has the benefit, that the user always sees a consistent state. If he turns around and searches the database he'll find his data right there. But this doesn't scale to well, when you have extremely high load on the system, because the optimum database for saving, is most of the time not the perfect database for searching. So some application do something like this:

When the user hits the save button, the store the data in the fastest way possible (e.g. a database optimised for updates), set a marker that further processing is needed and refresh the gui. Now a separate process comes along to process the saved data, e.g. by updating special indexes or by storing it in a separate database that is optimized for searching. This second process might gather changes for many actions in order to improve performance.

With this design you can scale further, because you are separating concerns: storing and searching data are two different tasks, so they are split in two different components, which can in this extreme case work in parallel. For the user this means he might not immediately find the stuff he just saved, but he eventually will. Hence 'eventual consistency'

Edit: I forgot about the resources. Great books about application architecture are: Martin Fowler's 'Patterns of Enterprise Application Architecture'. For Patterns in general of course: 'Design Patterns' for Patterns concerning Messaging Architecture

http://www.amazon.de/s/ref=nb_ss_eb?_mk_de_DE=%C5M%C5Z%D5%D1&url=search-alias%3Denglish-books&field-keywords=Enterprise+Integration&x=0&y=0. I can't recommend any books on scalability, but 'Building Scalable Web Sites' was recommended to me. The architecture of various big applications (e.g. Twitter) is a topic of talks, presentations and papers, so you'll get lots of resources when you google > architecture twitter.

A2: [Model View Presenter](#) (MVP), it is often confused with MVC, but I find it much more flexible, although it could possibly benefit from an additional controller component. I can't tell you if it's more beneficial in large-scale applications, but it's definitely a MVC-like pattern. Other MVC variants exist, such as the [Model View ViewModel](#) (MVVM), but that one's more specific to Microsoft's WPF.

177. <https://stackoverflow.com/questions/2664661/could-macruby-hotcocoa-supplant-the-need-to-know-objective-c/2664799#2664799>

T: Could MacRuby/HotCocoa supplant the need to know Objective-C?

Q: I just discovered [MacRuby](#) / HotCocoa and really like the sound of what they're doing.

I had essentially discounted the prospect of making Cocoa GUI applications myself because I have an aversion to spending time & effort learning yet another C-based language, Objective-C. I'm not saying it's bad, just not for me.

Is it the case now, or in the probable future, that one will be able to make Cocoa GUI applications of substantial and first-class nature with MacRuby / HotCocoa alone while ignoring Objective-C completely?

(Edit: Desktop Mac, not iPhone)

A: It will be extremely difficult to build first-class apps through a translation layer. It's hard enough to get the performance and behavior you need natively. I'm impressed with MacRuby's approach, and particularly impressed that they are able to manage things like Core Animation (a key piece of first-class Mac apps) and Core Data (which is tough stuff). I'm really impressed with their use of more idiomatic Ruby rather than the ugliness of RubyCocoa. But there are reasons that Apple has "deemphasized" (as they've called it) their multi-language dalliances in Java, Ruby, Python, etc. It's hard enough to write this stuff in one language. It's hard enough to get it right when you're not going through a semi-supported translation layer. In practice, you still have to learn the ObjC syntax to deal with the documentation and all the existing code. In practice, you still have to learn the ObjC patterns to develop decent Mac apps.

MacRuby is interesting. Even as a seasoned ObjC programmer, I might consider HotCocoa for hacking up prototypes and trying out interfaces. But it's not the kind of thing I'd use to build, as you say, "Cocoa GUI applications of substantial and first-class nature."

As developers, part of our job is to have a bag of tools. Like a good carpenter has several different hammers, plus pry bars, nail sets, several kinds of square and a dozen other tools, a programmer should be comfortable with a variety of languages, programming paradigms, platforms and environments. She then should be able to choose the correct tools for the job and employ them effectively. In the case of Mac programming, the correct tools for the job include Xcode, IB, ObjC and Cocoa. Avoiding them is like a carpenter avoiding a framing hammer and speed square. They're just part of the job.

A2: MacRuby isn't a 'translation layer' as Rob says. It's Ruby on the same object system that Cocoa is using. You can certainly build "first-class" applications with it, and also accomplish things that are inconvenient with Objective-C.

Be careful not to confuse MacRuby with RubyCocoa. Apple did not 'pull all the templates' for MacRuby, because they've never shipped by default.

Furthermore, LLVM's integration with Apple's platforms grows with each release. The next release of XCode will rely on LLVM for advanced code-completion, checking, and compilation. If Apple is deemphasizing anything it's the GCC.

One might also note that MacRuby has similar limitations in API coverage as Objective-C does: for instance, creating authenticated apps or accessing the keychain requires wrapper classes for both languages.

178. <https://stackoverflow.com/questions/34543283/is-document-view-architecture-in-mfc-basically-a-model-view-controller-pattern-b>

T: Is document/view architecture in MFC basically a Model/View/Controller pattern but without the controller?

Q: Is the document/view architecture in MFC really a Model/View/Controller pattern without the controller part?

I'm studying MFC and I simply love it to bits. I know it is somewhat outdated and somewhat bit more difficult to use, but I discovered that it gives me so much more power and performance gain when compared to QT.

Am I correct to think of the MFC doc/view model as simply MVC without the Controller part?

A1: The [Model/View/Controller](#) has the following components:

- Model
- View: responsible to show the model to the user
- Controller: responsible to get user input and translate it in operations on the model

MFC's [Document/View](#) has only 2 components:

- The document, which is in fact our model
- The View, which has the responsibility to show the Document AND [interpret the user's commands](#). So it is the view+controller (refer to section *Variants* in [this MSDN article](#))

A2: Let's look at it:

The view contains UI code, both for rendering the data and for taking input from the user.

The document contains the serialization code.

From that perspective, there's just a separation between UI and a backend. However, there's more, because you can have multiple different views on the same document. You could also use the document to just provide data storage and put any actual program logic into the view. In particular when you only effectively use a single view per document, it is easy to blur the separation in practice.

In summary, I wouldn't say the MVC controller part is missing but that it's merged with the MVC view parts into the MFC view.

179. <https://stackoverflow.com/questions/31786384/swift-integrate-pattern-mvc-and-facade-pattern>

T: Swift integrate pattern MVC and Façade pattern

Q: I am very confused and would like to have your suggestion about using a powerful architecture. 1) First question The pattern I am using are mvc end Facade. In my project all controllers called the Facade class. The facade class calls the Model (business logic) This process is considered performance from your experiences? 2) Second question The manual of the Facade pattern suggests using a single class centralized. Here I go crazy :) Imagine having a class (A) which contains 20 methods, and a class (B) which contains 20 other methods. The

Facade class instantiates class (A) end class (B) I'll have to call in the Facade class call 40 methods? Become a class very very big :(

From your experience what system you have adopted?

A: Before you go into "how do I implement it", you should really think about why to implement it.

Facade design pattern

The Facade pattern is used to make your life easier by creating simpler interface for otherwise complex system. Usually - as you already probably noticed, you use it for management of multiple classes (or even subsystems that you have interface for).

What it means in practice is that you will use facade pattern everywhere where you are doing tasks regularly with the same boilerplate code (which is quite often) so those can be replaced with something shorter or if the facade will provide you with cleaner code that is simpler to manage. Also, you can use it to shield internal implementation, so if some subsystem changes they way how they work, your higher-level function will still remain the same and fill the same role.

180. <https://stackoverflow.com/questions/21839783/more-layers-and-performance-issue>

T: More layers and performance issue

Q: in this kind of implementation, there is no need to go throw five layers to persist a contact, yeah!? I know for creating a contact and this kind of simple business the second imp is the best but for complex businesses it's impossible to have an action to handle everything. definitely calling A by B and B by C and ... is makes a kind of performance issue.

Now I'm just wanna to know that what is the ways of optimizing the layered architecture performance?

A: I blogged a post about it, although it's not the easy to optimize n-layered architectures but I've talked about some tips: <http://ehsanghanbari.com/Post/115/disadvantages-of-n-layered-architectures>.

181. <https://stackoverflow.com/questions/13350056/whats-the-best-architecture-for-a-medium-sized-high-traffic-web-site>

T: What's the best architecture for a medium-sized, high traffic web site?

Q: I'm starting a new project (non-corporative) and I want to know how would be a great architecture nowadays.

What I'm planning for now is to use:

- ASP.NET MVC 4.0
- SQL Server 2008 or 2012
- EF 5.0 under .NET 4.5, with Dapper
- Implementation of Repository pattern (this one <http://code.google.com/p/ef4prs/>)
- DI with [Autofac](#)
- Automapper
- WCF Service Layer (for future mobile implementation)

Checking the flow (correct me if something is wrong): **Controller** calls **ApplicationService**, that calls **a BusinessLayer**, that calls **DAL** with UnitWork/Repository, that execute queries over **EF** or **Dapper** (is it correct to query Dapper from a specific method at Repository?), then the result is automatically mapped to a **DTO** and returned to **Controller**, that copy what's needed to a **ViewModel** and returns a View.

The problem here is performance, as I said, the site is planned to have high traffic. In this case, any of the items listed above could reduce performance? Or this combination leaks something more? Should I discard the EF, and use just Dapper? I'm afraid the service layer could reduce the performance because of the traffic.

And finally, I don't know if this architecture is unnecessary, or just poor.

That's a lot of questions, but the focus is to know a great and not "over architected" solution for a medium-sized web site.

A1:

down
voteaccepted

Your question is fairly subjective as there are many possible configurations that can all work well. I can give you some recommendations though.

Mixing and matching EF with Dapper can be a bit of a minefield. In theory, you should be able to fetch objects with Dapper and then Attach them to the DbContext and update them. However, in my experience that often doesn't work. We started out with EF, then slowly moved to Dapper for fast querying and I figured we could continue to use EF for updates/inserts but I ended up rolling my own insert/update tracking (surprisingly easy) and thus we're slowly phasing out use of EF.

In hindsight, I would suggest picking one and sticking with it. EF should be pretty fast under .NET 4.5. Not as fast as Dapper though, so the pure Dapper route isn't a bad one to take.

Other technologies you could consider:

- ServiceStack (webservice) <http://www.servicestack.net/>. Highly recommended, low configuration, fast and easy to use.
- ASP.NET MVC Web-API (webservice) <http://www.asp.net/web-api>. I have no experience with it.
- ThisMember (mapper, *disclaimer: my own library*) <https://github.com/JulianR/ThisMember/wiki>. Quite a lot faster (10-100x) than AutoMapper and easier to use in my opinion.

182.<https://stackoverflow.com/questions/2613348/wcf-service-layer-in-n-layered-application-performance-considerations>

T: WCF Service layer in n-layered application: performance considerations

Q: When I went to University, teachers used to say that in good structured application you have presentation layer, business layer and data layer. This is what I heard for more than 5 years.

When I started working I discovered that this is true but sometimes is better to have more than just three layers. Two or three days ago I discovered [this article](#) by John Papa that explain how to use Entity Framework in layered application. According to that article you should have:

- UI Layer and Presentation Layer (Model View Pattern)
- Service Layer (WCF)
- Business Layer
- Data Access Layer

Service Layer is, to me, one of the best ideas I've ever heard since I work. Your UI is then completely "diconnected" from Business and Data Layer. Now when I went deeper by looking into provided source code, I began to have some questions. Can you help me in answering them?

Question #0: is this a good enterprise application template in your opinion?

Question #1: where should I host the service layer? Should it be a Windows Service or what else?

Question #2: in the source code provided the service layer expose just an endpoint with WSHttBinding. This is the most interoperable binding but (I think) the worst in terms of performances (due to serialization and deserializations of objects). Do you agree?

Question #3: if you agree with me at Question 2, which kind of binding would you use?

A: Question #0: is this a good enterprise application template in your opinion?

Yes, for most middle-of-the-road line-of-business applications, it's probably a good starting point.

Question #1: where should I host the service layer? Should it be a Windows Service or what else?

If you're serious about using WCF services, then yes, I would recommend self-hosting them in a Windows service. Why? You don't have to have IIS on the server, you don't have to rely on IIS to host your service, you can choose your service address as you wish, and you have complete control over your options.

Question #2: in the source code provided the service layer expose just an endpoint with WSHttpBinding. This is the most interoperable binding but (I think) the worst in terms of performances (due to serialization and deserializations of objects). Do you agree?

No, the most interoperable would be a basicHttpBinding with no security. Any SOAP stack will be able to connect to that. Or then a webHttpBinding for a RESTful service - for this, you don't even need SOAP - just a HTTP stack will do.

What do we use??

- internally, if Intranet-scenarios are in play (server and clients behind corporate firewall): always netTcp - it's the best, fastest, most versatile. Doesn't work well over internet though :-((need to open ports on firewalls - always a hassle)
- externally: webHttpBinding or basicHttpBinding, mostly because of their ease of integration with non-.NET platforms

A2: Did your teachers also tell you why you should create such an architecture ;-) ? What I am missing in your question are your requirements. Before any of us can tell you if this is a good architecture or template, we have to know the requirements of the application. The non functional requirements or -illities of an application should drive the design of an architecture.

I would like to know what is the most important non functional requirement of your application? (Maintainability, Portability, Reliability or ...). For example take a look at http://en.wikipedia.org/wiki/ISO/IEC_9126 or <http://www.serc.nl/quint-book/>

I think that we architects should create architectures based on requirements from the business. This means that we architects should make the business more aware of the importance of non functional requirements.

Question #0: is this a good enterprise application template in your opinion?

You use the layers architecture pattern, this means that layers could evolve independent of each other more easily. One of the most used architecture patterns, note that this pattern also has disadvantages (performance, traceability).

Question #1: where should I host the service layer? Should it be a Windows Service or what else?

Difficult to answer. Hosting a service in IIS has two advantages, it scales easier and traceability is easier (WCF in IIS has loads of monitor options). Hosting a service in a Windows Service gives you more binding options (Named Pipe binding/ TCP binding).

Question #2: in the source code provided the service layer expose just an endpoint with WSHttpBinding. This is the most interoperable binding but (I think) the worst in terms of performances (due to serialization and deserializations of objects). Do you agree?

Performance wise the WSHttpBinding costs more, but it scores high on interoperability. So the choice depends on your non-functional requirements.

Question #3: if you agree with me at Question 2, which kind of binding would you use?

Named Pipes and TCP binding are very fast. Name Pipe binding should only be used when communicating in a single machine. TCP binding could be an option but you have to open a special port in the firewall.

A3: Here are my 5 cents:

0: yes

1: I would start by hosting it in IIS because it's very easy and gets you somewhere fast.

2: If you need security then definitely yes, go with WSHtpBinding (or maybe even wsFederationHttpBinding if you want some more fance security). It performs quite fast in practice even though, as you say, it does have some overhead, and can be quite hard to call from other platforms (such as java).

3: N/A

Finally, remember to define your services' data-contract objects in a separate assembly that can be referenced both from the service dll *and* the consumer in your ui layer.

183. <https://stackoverflow.com/questions/20489018/which-dependency-injection-frameworks-are-best-for-asp-net-mvc-4>

T: Which dependency injection framework are best for ASP.NET MVC 4?

Q: I am new to Dependency Injection and working on a project developed in ASP.NET MVC 4. So, I came across with the use of Dependency Injection and curious to know which frameworks have good performance and support for ASP.NET MVC 4.

I am creating a multi-layered architecture using Repository Pattern, UnitOfWork, and Service Layer as a business logic. So, I want dependency injection. I don't have much idea as of now on other requirements, I think it should support MVC 4.

Proper Question : Which Dependency injection frameworks are best for ASP.NET MVC 4? I came across Simple Injector but somewhere it was mentioned that it does not support MVC 4.

A: [Simple Injector](#) definitely supports MVC4. They got a quick start package for MVC. It states that it's for MVC3, but it works just fine for MVC4 too.

I used it recently in a project and it works like a charm, I like it for it's simplicity. Don't expect tons of conventions and hidden configurations, you just have to create a container and register the dependencies explicitly.

A2: What would be the best framework is a matter of what requirements you and/or your project have.

Ninject supports MVC4. I'm using this in a couple of projects, both MVC and WebAPI.

[Ninject website](#)

[Using Ninject with WebAPI](#)

[Using Ninject with MVC4](#)

Google has a lot of hits for this.

184. <https://stackoverflow.com/questions/42859126/database-replication-why-and-how>

T: Database Replication –Why and How?

Q: I am struggling to understand how to implement database replication.

I have currently setup a master-slave replication of MySQL database.

I understand how transactional events are replicated to the slave with the binary log.

I have search everywhere for some proper information about the implementation, but everybody makes it sound like black magic!

I found this link: https://docs.oracle.com/cd/E17276_01/html/gsg_db_rep/Crepadvantage.html

It states all the good things that we all know about data replication, such as: Improved reliability, read performance, transactional commit performance etc.

However, nobody mentions how to actually achieve all of this good stuff. I cannot see how MySQL server can do all of this by itself, there must be some underlying implementation.

I am not looking for a specific implementation, I am just looking for some kind of design pattern for implementing replication properly.

My best guess is that you devide your database access into two categories, read and write. All writes goes to the master and all the reads goes to the slave.

But how do you improve the reliability if the master suddenly shutdown? Do you reroute all your trafic to the slave? And if so, is this rerouting done in a layer outside of the application? And can you write to the slave and syncronize it back to the master once it is back online?

185. <https://stackoverflow.com/questions/36456127/three-tier-architecture-using-wcf/36459681#36459681>

T: Three tier architecture using WCF

Q: I have an app structured in two tiers (presentation and business logic in the client (WPF using MVVM) and data in one SQL server), but I'm facing the problem that it uses too much RAM in the client due to the need of a large collection of objects to manipulate.

So I thought of changing into a three-tier architecture, adding a service in a server to process all the business logic and provide the clients only what they need to display using WCF in order to lower its requirements in memory.

My question is about how to properly do this. Communication between this server and the data (in SQL server) is pretty straight-forward, but what should I send from the server to the client?

For example, following a MVVM approach, should I send (from the server to the client) the models, the viewmodels, or what? If the.viewmodel's properties reference the model and I only send a List of ViewModels, would the client be able to read the info?

Can you provide me with some real world examples of this?

A: Consider adding a **service layer** in conjunction with **business objects** to carry data from the server to the client.

From Microsoft's [Microsoft Application Architecture Guide](#):

Custom Business Objects. These are common language runtime (CLR) objects that describe entities in your system. An object/relational mapping (O/RM) technology such as the ADO.NET Entity Framework (EF) or NHibernate can be used to create these objects

Your question, "*should I send (from the server to the client) the models, the viewmodels, or what*" is mixing the responsibility of the UI pattern (MVVM) with sending data from the server to the client.

By adding a service layer you can avoid the memory issues and manage the burden of carrying around objects. Consider using an Object Relational Mapper for these objects like Microsoft's Entity Framework or, for improved performance, a light weight ORM like [StackOverflow's own Dapper.net](#). Finally with [careful utilization of delayed query execution](#) with IEnumerable you should be able to solve your performance problems. A high-level discussion is helpful at this stage as there are many directions you can take this design. For further guidance in designing such a system, refer to Microsoft's Application Architecture Guide, [Chapter 5: Layered Application Guidelines](#). While the image below may describe more layers than you need, it is a helpful reference. The service layer can manage the business objects that are presented to the client:

186. <https://stackoverflow.com/questions/15435177/whats-the-better-practice-for-testing-code-which-relies-on-a-db-mocks-and-stub/15435746#15435746>

T: What's the better practice for testing code which relies on a DB? Mocks and Stubs? Or seeded data?

Q: Seems like forever I've read that, when testing, use a mock database object or repository. No reason to test someone else's DB code, right? No need to have your code actually mess with data in a database, right?

Now lately I see tests which set up a database (possibly in-memory) and seed it with test data, just for running tests against.

Is one approach better than the other? If tests with seeded data are worth running, should one even bother with mock databases connections? If so, why?

A1: There are a lot of ways to test code that interacts with a database.

The repository pattern is one method of creating a facade over the data access code. It makes it easy to stub/mock out the repository during test. This is useful when a piece of business logic needs tested in isolation and dummy values can help test different branches of the code.

Fake databases (in-memory or local files) are less common because there needs to be some "middle-ware" that knows how to read data from a real database and a fake database. It usually just makes sense to have a repository over the whole thing and mock out the repository. This approach is more feasible in some older systems where there is an existing infrastructure. For instance, you use a real database and then switch over to a fake database for test performance reasons.

Another option is using an actual database, populating it with bogus data. This approach is slower and requires writing a lot of scripts. However, this approach is fairly common as part of integration testing. I used to write a lot of "transactional" tests where I used a database transaction to rollback changes after running my tests. I'd write one large test that collectively performed all of my CRUD operations on a particular table.

The last approach makes sense when you are testing the code that converts SQL results into your objects. Your SQL could be invalid (or you use the wrong stored procedure name). It is also easy to forget to check for nulls, perform an invalid cast, etc. when mapping to objects. This code should be tested at some point. An ORM can help alleviate a lot of this testing.

I am typically pretty lazy these days. I use repositories. Most of my data layer code is touched when performing actual integration tests (hitting a real database with dummy data), so I don't bother testing individual database calls (no more transactional tests). I also use ORMs for doing most of my SELECT statements. I think a lot of the industry is moving towards this more lazy approach.

A2: You should use both.

The business services should rely on DAOs, and be tested by mocking the DAOs. This allows for fast, easy to implement, easy to maintain tests.

The DAOs unique responsibility is to contain database access code (queries, etc.), and should also be tested. So you should use a test database, with test data, and check that their queries return/save what they're support to return/save.

I'm not a big fan of using an in-memory database, different from the one used in production. The behavior of some queries, constraints, etc. will be different from database to database, and you'd better be sure that the code will work on the production database, and not in an in-memory database used only by tests.

187. <https://stackoverflow.com/questions/2246251/how-do-i-improve-asp-net-mvc-application-performance>

T: How do I improve ASP.NET MVC application performance?

Q: How do you improve your ASP.NET MVC application performance?

A: A compiled list of possible sources of improvement are below:

General

- Make use of a profiler to discover memory leaks and performance problems in your application. personally I suggest [dotTrace](#)
- Run your site in Release mode, not Debug mode, when in production, and also during performance profiling. Release mode is much faster. Debug mode can hide performance problems in your own code.

Caching

- Use `CompiledQuery.Compile()` recursively avoiding recompilation of your query expressions
- Cache not-prone-to-change content using `OutputCacheAttribute` to save unnecessary and action executions
- Use cookies for frequently accessed non sensitive information
- Utilize [ETags](#) and expiration - Write your custom `ActionResult` methods if necessary
- Consider using the `RouteName` to organize your routes and then use it to generate your links, and try not to use the expression tree based `ActionLink` method.
- Consider implementing a route resolution caching strategy
- Put repetitive code inside your `PartialViews`, avoid render it xxxx times: if you end up calling the same partial 300 times in the same view, probably there is something wrong with that. [Explanation And Benchmarks](#)

Routing

- Use `Url.RouteUrl("User", new { username = "joeuser" })` to specify routes. [ASP.NET MVC Perfomance by Rudi Benkovic](#)
- Cache route resolving using this helper `UrlHelperCached` [ASP.NET MVC Perfomance by Rudi Benkovic](#)

Security

- Use Forms Authentication, Keep your frequently accessed sensitive data in the authentication ticket

DAL

- When accessing data via LINQ [rely on IQueryable](#)
- [Leverage the Repository pattern](#)
- Profile your queries i.e. [Uber Profiler](#)
- Consider second level cache for your queries and add them an scope and a timeout i.e. [NHibernate Second Cache](#)

Load balancing

- Utilize reverse proxies, to spread the client load across your app instance. (Stack Overflow uses [HAProxy \(MSDN\)](#)).
- Use [Asynchronous Controllers](#) to implement actions that depend on external resources processing.

Client side

- Optimize your client side, use a tool like [YSlow](#) for suggestions to improve performance
- Use AJAX to update components of your UI, avoid a whole page update when possible.
- Consider implement a pub-sub architecture -i.e. Comet- for content delivery against reload based in timeouts.
- Move charting and graph generation logic to the client side if possible. Graph generation is a expensive activity. Deferring to the client side your server from an unnecessary burden, and allows you to work with graphs locally without make a new request (i.e. Flex charting, [jqbargraph](#), [MoreJqueryCharts](#)).
- Use CDN's for scripts and media content to improve loading on the client side (i.e. [Google CDN](#))
- Minify [-Compile-](#) your JavaScript in order to improve your script size
- Keep cookie size small, since cookies are sent to the server on every request.
- Consider using [DNS and Link Prefetching](#) when possible.

Global configuration

- If you use Razor, add the following code in your global.asax.cs, by default, Asp.Net MVC renders with an aspx engine and a razor engine. This only uses the RazorViewEngine.

- ```
ViewEngines.Engines.Clear(); ViewEngines.Engines.Add(new RazorViewEngine());
```
- Add gzip (HTTP compression) and static cache (images, css, ...) in your web.config<system.webServer>  
`<urlCompression doDynamicCompression="true" doStaticCompression="true"  
dynamicCompressionBeforeCache="true"/>` </system.webServer>
  - Remove unused HTTP Modules

A2: The basic suggestion is to follow [REST principles](#) and the following points ties some of these principals to the ASP.NET MVC framework:

1. Make your controllers [stateless](#) - this is more of a '*Web* performance / scalability' suggestion (as opposed to micro/machine level performance) and a major design decision that would affect your applications future - especially in case it becomes popular or if you need some fault tolerance for example.
  - Do not use Sessions
  - Do not use tempdata - which uses sessions
  - Do not try to 'cache' everything 'prematurely'.
2. Use [Forms Authentication](#)
  - Keep your frequently accessed sensitive data in the authentication ticket
3. Use cookies for frequently accessed non sensitive information
4. Make your [resources cachable](#) on the web
  - [Utilize ETags](#)
  - Use expiration
  - Write your custom ActionResult classes if necessary
  - Utilize [reverse proxies](#)
5. Compile your JavaScript. [There is Closure compiler library](#) to do it as well (sure [there are others, just search for 'JavaScript compiler'](#) too)
6. Use CDNs (Content Delivery Network) - especially for your large media files and so on.
7. Consider different types of storage for your data, for example, files, key/value stores, etc. - not only SQL Server
8. Last but not least, test your web site for performance

A3: [Code Climber](#) and [this blog entry](#) provide detailed ways of increasing application's performance. Compiled query will increase performance of your application, but it has nothing in common with ASP.NET MVC. It will speed up every db application, so it is not really about MVC.

A4: This may seem obvious, but run your site in Release mode, not Debug mode, when in production, and also during performance profiling. Release mode is *much* faster. Debug mode can hide performance problems in your own code.

A5: Not an earth-shattering optimization, but I thought I'd throw this out there - [Use CDN's for jQuery, etc..](#) Quote from ScottGu himself: The Microsoft Ajax [CDN](#) enables you to significantly improve the performance of ASP.NET Web Forms and ASP.NET MVC applications that use ASP.NET AJAX or jQuery. The service is available for free, does not require any registration, and can be used for both commercial and non-commercial purposes.

We even use the CDN for our webparts in Moss that use jQuery.

A6: In addition to all the great information on optimising your application on the server side I'd say you should take a look at [YSlow](#). It's a superb resource for improving site performance on the client side. This applies to all sites, not just ASP.NET MVC.

A7: One super easy thing to do is to think asynchronously when accessing the data you want for the page. Whether reading from a web service, file, data base or something else, use the async model as much as possible. While it won't necessarily help any one page be faster it will help your server perform better overall.

A8: 1: Get Timings. Until you know where the slowdown is, the question is too broad to answer. A project I'm working on has this precise problem; There's no logging to even know how long certain things take; we can only guess as to the slow parts of the app until we add timings to the project.

2: If you have sequential operations, Don't be afraid to lightly multithread. ESPECIALLY if blocking operations are involved. PLINQ is your friend here.

3: Pregenerate your MVC Views when Publishing... That will help with some of the 'first page hit'

4: Some argue for the stored procedure/ADO advantages of speed. Others argue for speed of development of EF and a more clear separation of tiers and their purpose. I've seen really slow designs when SQL and the workarounds to use Sprocs/Views for data retrieval and storage. Also, your difficulty to test goes up. Our current codebase that we are converting from ADO to EF is not performing any worse (and in some cases better) than the old Hand-Rolled model.

5: That said, Think about application Warmup. Part of what we do to help eliminate most of our EF performance woes was to add a special warmup method. It doesn't precompile any queries or anything, but it helps with much of the metadata loading/generation. This can be even more important when dealing with Code First models.

6: As others have said, Don't use Session state or ViewState if possible. They are not necessarily performance optimizations that developers think about, but once you start writing more complex web applications, you want responsiveness. Session state precludes this. Imagine a long running query. You decide to open a new window and try a less complex one. Well, you may as well have waited with session state on, because the server will wait until the first request is done before moving to the next one for that session.

7: Minimize round trips to the database. Save stuff that you frequently use but will not realistically change to your .Net Cache. Try to batch your inserts/updates where possible.

7.1: Avoid Data Access code in your Razor views without a damn good reason. I wouldn't be saying this if I hadn't seen it. They were already accessing their data when putting the model together, why the hell weren't they including it in the model?

1. A9: Implement Gzip.
2. Use asynchronous rendering for partial views.
3. Minimize database hits.
4. Use a compiled query.
5. Run a profiler and find out unnecessary hits. Optimize all stored procedures which are taking more than 1 second to return a response.
6. Use caching.
7. Use [bundling minification](#) optimization.
8. Use HTML 5 utilities like session cache and local storage for readonly contents.

188. <https://stackoverflow.com/questions/4808788/asp-net-mvc-performance>

T: ASP.NET MVC performance

Q: What aspects of MVC performance affect your web application performance the most? Database access is usually pointed out as the default culprit but are there other components that have an impact? Do you prioritize the number of concurrent clients, the memory used on the server, the response time, or something else?

This [answer](#) contains some very good general suggestions but I'm looking for specifics of where the framework falls short of your expectations.

A1: The ASP.NET MVC framework is great and sites like this one which is using it are obvious examples. There is nothing in it that affects my applications performance. It just works very nice. What affects performance is poor code or poor architecture conception but that's definitely not something we can blame the framework for. After spending years with ASP.NET webforms I cannot say that the performance of MVC is worst or better, what I can say is that it converted the painful experience of writing web applications into something that brings so much joy. I've been successfully running applications in production since ASP.NET MVC 1.0 and never had any problems.

In your question you mention database access => that's a problem that all web applications have and which is not inherent to the framework being used. Also in heavy traffic sites the usage of caching could improve performance and ASP.NET MVC have some really good caching mechanisms built-in.

So, all I can say is that you and the team delivering this great framework are doing a very good job.

A2: Now that I realize who is asking this question I understand the question better.

The biggest problem I've had with MVC is that RenderPartial can be very slow when you're using embedded resources as views. If I remember this was caused by the VirtualPathProvider not performing that well. We ended up trying to use memoization to speed some calls up but eventually had to start writing directly to the view output stream.

I think we ran into the same issue as the lostechies guys did with a similar take on their input builders only we used it to generate grids.

189. <https://stackoverflow.com/questions/31846988/does-lots-of-controllers-slow-the-performance-mvc>

T: Does lots of controllers slows the performance? MVC

Q: I want to ask a simple question about MVC controllers. I have googled a lot about controllers for "different controllers for each basic table", it cleared a lot of things but i have one question that i couldn't find answer for.

**My question is that if i create controller for each basic table, lets say i have 10 basic tables that would create 10 controllers. So does lots of controller slows the application performance?**

- In case, when going from view to controller.
- In case, when going from controller to another controller.

I am new so kindly be calm :)

A1: Usually, one request is processed by one controller. And if it (cotroller) is small and have a few dependencies - it's quick. When you have one huge controller with many dependencies of other classes that have their own dependencies and so on... it could be a problem.

A2: It depends on the number of calls to controller. If you make frequent call to a controller for 2 to 3 table so it may get slow. Instead group that 3 table in one controller and call that. If your application needs to work in individual table than its fine, You will get response quicker. But if your application needs content from 2 to 3 tables than you have to call that 3 controller. So here the better way is to group that in one controller. Hope you got the point

190. <https://stackoverflow.com/questions/18483760/performance-in-mvc-web-application>

T: Performance in MVC web application

Q: I am struggling to get some performance in my MVC application. I am loading a partial page (popup) which is taking hardly 500ms. But each time the popup loads it also downloads 2 jQuery files as well. Is it possible to use the jQuery from cache or from parent page?

I have attached the image in red which shows 2 additional request to server.

A1: In order to improve the performance you can try with the following approaches:

1. see if your application server supports GZip and configure the application/server to return the responses always archived in Gzip
2. Use minified version of JQuery
3. there are also Packing libraries where you can pack all the imported resources, such as CSS files and JS files, and the browser will do only 1 request per resource type. For instance, in Java we have a library called packtag.

In general, I recommend you using Google Chrome browser and its performance analyzer. It will give you good hints.

A2: Does the popup use an iframe or does its content just get added to the DOM of the current page?

If it gets added to the current page you could try just adding the script references to the parent page instead. It might not always be the best idea if the parent page has no need for those two files, but if the parent page also uses the jQuery validation then the popup will be able to use the parent's reference to the script file.

For an iframe I'd suggest looking at Gzip and minification to make the scripts load faster.

191. <https://stackoverflow.com/questions/3239727/spring-mvc-3-0-with-annotations-performance-tuning>

T: Spring MVC 3.0 with Annotations performance tuning

Q: Spring MVC 3.0 with Annotation seems like a great framework for the enterprise web development. However, the issue of performance tuning often comes up when you deal with any web applications, and I am wondering how the use of Annotations affects the strategy for improving performance. For example, would the Annotation-based validations slow down the system? Are the annotated classes, controllers, beans performing as well as those defined with the XML? Would the fact that the Annotations in Spring 3.0 MVC allow such dynamic and flexible request mappings can potentially make the performance measurement and tuning more difficult?

A: In my opinion annotation approach must have exactly the same performance as XML approach. In both cases Spring creates some BeanFactoryPostProcessor instances and another kinds of helper objects which use different sources of information (XML or annotations), but do exactly the same thing: update bean definitions, create proxies around beans, create some infrastructure objects and so on.

Anyway, @skaffman is right. You could try both approaches and do some profiling.

192. <https://stackoverflow.com/questions/30618599/mvc-application-performance>

T: MVC application performance

Q: I created an ASP.NET MVC 4 web application that running on my local machine(windows 8 64bit)and IIS 7.5, I need to measure the performance of the application (Memory usage, CPU usage,...) any help regarding tool or any way helps me to get my target? and whats is the normal values for Memory and CPU usage for good performance application?

193. <https://stackoverflow.com/questions/29817640/how-to-improve-the-performance-of-asp-net-mvc-web-application>

T: How to improve the performance of ASP.NET MVC web application?

Q: How to improve the performance of an ASP.NET MVC Web application?

Which are the fields I should take more care?

In my web application contains **Database connections, API and Image Parsing** etc.

A1: Find the bottleneck and remember to optimize a common use case instead of something that can be optimized but isn't used yet. If you don't know Amdahl's law you should have a look at it. Set your goal to run 1000 times faster, check loops in loops and/or if you fetch more data than needed. Caching can also drastically improve performance. A good book about this is called "Creating faster websites" and "Even faster websites" which tells you a lot of how to optimize for the web.

194. <https://stackoverflow.com/questions/221944/is-there-a-performance-difference-between-asp-net-mvc-and-web-forms>

T: Is there a performance difference between asp.net mvc and web forms?

**Q: Possible Duplicate:**

[ASP.NET MVC Performance](#)

I know there is a learning curve, but what about performance? It seems to me that web forms would be less performant, but I havent tried MVC yet to know for sure. What is everyone else experiencing?

A1: The thing about WebForms is that it's very easy to make a page that performs really bad, because it encourages you to do a lot of simple updates server-side that really should be done client-side. If you're paying attention to your postbacks and ViewState then WebForms isn't so bad. Also, MVC has the *potential* for better performance because it takes fewer steps during a page load, but *realizing that potential* can require a lot of discipline by the programmer, just like web forms.

A2: This is almost a duplicate question. Here are some similar discussions:

[ASP.NET MVC Performance](#)

[What are the key differences between ASP.NET webforms and MVC](#)

[Biggest advantage to using ASP.Net MVC vs web forms](#)

A3: This is debatable because both of them have different performance pros and cons, for example ASP.net MVC gives you control over the HTML/JS that gets to the browser, so you can minimize the amount of data on wire to make the whole application weight less, however ASP.net MVC routing have so much dependency on Reflection, which is relatively slower than fetching a file from the disk which Web Forms is doing.

<https://stackoverflow.com/questions/5169155/improving-asp-net-mvc-startup-performance>

T: Improving ASP.NET MVC startup performance

Q: I'm trying to improve the speed at which my MVC2 app is starting up.

I did a first round of performance sampling, and it appears that the

[MvcAreaRegistration.RegisterAllAreas](#)

is taking up most of the startup time.

I read [here](#) that you can manually register the area's as well, and I would like to try that out, but I'm not sure how the syntax works on that page.

So my (first) question woud be: how can I register my Area's manually?

A: Try [this super handy area registration utility](#). Not only does it make registration easier, but also way faster since it doesn't scan every loaded assembly for areas.

195. <https://stackoverflow.com/questions/9106377/improving-the-performance-for-the-asp-net-mvc-3-application>

T: Improving the performance for the asp.net MVC 3 application

Q: I am working on an asp.net MVC 3 web application, i have the following two questions about the performance of my mvc application:-

1. currently i am implementing all the business logic in one model repository class , expect that the repository implementation is quit huge (in regards to the number of lines of code), i am not having difficulties in maintaining this repository class. But my question is WILL having one repository class that implement all the business login for all entities can negatively affect the application performance comparing to having more than one repository?
2. currently i am adding the data annotation for the entities properties to implement client side validation and helper methods in partial classes and metadattypeof as i am using Db first approach

A: No, it will matter FAR more the type of activity in your methods. This can get quite difficult to deal with, why not transfer your business logic out to another class.

196. <https://stackoverflow.com/questions/6465204/performance-of-asp-net-mvc-routing>

T: Performance of ASP.NET MVC routing

Q: Does anyone know, is routing processing time valuable in a comparison with the total request time? Will there be a large performance difference between an application with 20 and 100 (probably more) routings? Will be grateful for a link with the routings mechanism description.

A1: Take a look [here](#). Please note that this is an old answer from 2008, but I would guess it still holds true. In particular note the bit about using named routes.

In other words, if you know which route you will be using, then you can jump straight to the correct route with code like this: RedirectToRoute("routeName", viewData); and it won't waste time trawling through routes until it finds the correct one. This may seem a bit cumbersome, but it's better than hardcoding the routes as, if you change the way of generating your routes, this code will still work, whereas a hard coded route would break.

A2: I would venture to say no, the time is insignificant compared to the overall processing time of the request in most scenarios.

There are a lot of variables that might be worth considering if you are going to benchmark this. For example, how simple/complex are those routes? Do they have constraints with regex on them? et cetera.

197. <https://stackoverflow.com/questions/7529362/how-to-improve-spring-mvc-performance>

T: How to improve Spring MVC performance?

Q: **Are there best practises how to improve the performance of spring webapps?**

I use ehcache for static content, try to load JavaScript at the end of my app but the app doesn't run smooth yet. For a simple registration only the GET-request to map the url and initialize session and bean lastet over 7 sec.

Sure you can optimize a lot for specific, but I'd like to know about general performance issues and how to handle those.

*Patterns, best practises and so on are very welcome here.*

A: In general, I recommend:

- build a test environment where you can execute the application and get at the inside
- Write repeatable performance testing scripts, focusing both on absolute performance (e.g. "how long does it take to render this page") and performance at scale (e.g. "how does performance degrade under load?")
- glue a profiler into your test environment. It's been a while since I worked on Java apps, but there are lots of them available.
- run performance test whilst running your profiler. Work out what the bottleneck is. Fix the bottleneck.  
Rinse. Repeat.

I generally recommend NOT to have the test rig be similarly specified to production, because it makes it very hard to create enough load to stress the system. It's also very expensive.

If you have a "production-like" environment to test on, do it now - ideally, you'll get similar results as on the test environment, but not always; if at all possible, install the profiler and see where the bottleneck is.

Once you've done that, you can deploy the optimized app to your production environment.

A2: Create performance-tests (like with [jmeter](#)). Profile your application, either with a full-blown profiler or by instrumentation. If you are using spring (and spring-configured datasources), I like [javamelody](#) a lot which is a simple plug-in that instruments and compiles performance-statistics of your application.

Run the test, check the profiling information, identify bottlenecks, optimize the worst offenders. Repeat until satisfied.

There is no inherent performance problem with Spring MVC. Performance issues comes from other areas. Bad SQL queries, slow external integrations, excessive JSTL crazyness in your views etc etc.

A3: VisualVM is very useful for analyzing. Can be downloaded from [link](#). Memory Pools and Visual GC plugins which are not installed by default, also useful to monitor memory usage and GC activity.

198. <https://stackoverflow.com/questions/28042317/will-performance-of-website-be-affected-due-to-having-no-mvc-architecture>

T: will performance of website be affected due to having no MVC architecture?

Q: I have a php web app. But i have kept all the program files(css, html, php, js) in a single folder. I have not given architecture like MVC. Will this affect the performance of the website, and slows down the application?? Little puzzled. It will be great if anyone can give an explanatory. Thanks!

A: if only talking about performance, most mvc frameworks like the one i am using yiiframework has caching mechanism and various plugins to compress js and css. So personally i dont think mvc structure impacts the performance, but the extra stuffs packed with mvc frameworks.

199. <https://stackoverflow.com/questions/1919743/performance-wise-is-mvc-better-than-web-forms-in-asp-net>

T: Performance wise is MVC better than web forms in ASP.NET

Q: We are going to develop a website in ASP.NET. So is it better to use MVC or web forms.

A1: It depends on what kind of site you want to build and your knowledge and experience creating websites.

If you know your stuff and are confident in your ability to work "close to the metal" (as it were) I would imagine that you could build a faster website using ASP.NET MVC since you would be able to optimize your site to have as little overhead as possible. However it is more than possible to build a very fast site using standard ASP.NET as well so it really depends on exactly on the requirements of your project.

A2: Personally, I don't think there are big performance gap between asp.net mvc and web form. Because they actually employ the same underlying engine. In most cases, what makes performance a problem is how developers write their code, and the structure of the application. Usually, people tend to compare mvc and web form on the elegance, maintainability. <http://weblogs.asp.net/shijuvarghese/archive/2008/07/09/asp-net-mvc-vs-asp-net-web-form.aspx>

A3: My completely unscientific opinion: Yes; ASP.NET MVC is faster than web forms.

ASP.NET MVC gives screen pops on the order of 1 to 2 seconds. Web forms is more like 3 to 5 seconds.

I don't know if they switched to ASP.NET MVC when they did the lightweight version of the MSDN library, but the speed improvement is similar to what I described. And let me tell you, the usability improvement is like night and day.

A4: Web Forms and MVC each have their strengths. Web Forms typically has the familiar code-behind style of coding where you hook up a handler for something like a button click and write the code to handle it. MVC has a more separations of concerns style of coding and is generally more unit testable.

It all depends on your coding preferences and time required to deliver the project with respect to learning curves.

I would imagine this question has been answered a million times on this site and many other blogs.

200. <https://stackoverflow.com/questions/4269955/best-practices-and-tools-for-improving-web-servers-performance-in-asp-net-mvc>

T: Best practices and tools for improving web server's performance in asp.net mvc?

Q: Before the question here is what we tried to test the performance website. We simulated 80 users simultaneously on the website using [JMeter](#). So, I am working on database issues and other problem. But one of the problems was the web server performance was not good and it was maxing out. So , I am in the process of improving the web server's performance and have downloaded [Redgate Performance profiler](#) and also [dottrace](#). I was going to get into using these but I before that I thought of asking all you guyz who have done this before since I am newbie in this area what steps should I take additionally. Any advice or steps to be taken or any other tools you can suggest will be of great help. Basically I am just trying to know the best practices and tools to be used when profiling an asp.net mvc application.

A: There can be a million reasons why you're experiencing slow performance. Maybe it's just some method/page that takes long time to execute or consumes too much memory or did you mean that the overall performance is not good. Maybe you just need to upgrade your hardware, who knows. I would definitely try to locate the bottleneck by running a few counters in Windows Performance Monitor for CPU, RAM, Network, disk system on web server and db server while running JMeter. This should give you some ideas what could be wrong.

201. <https://stackoverflow.com/questions/5074856/how-i-can-optimize-performance-in-asp-net-mvc-based-web-application>

T: How i can optimize Performance in asp.NET MVC based web application

Q: How i can improve the performance of my asp.net mvc application [built in 3 razor]

well i want to do something to enhance the performance of my website by doing following things.

the page have much image [small images] are i can optimize them then client browser easily download them and trying to get them after page load.

because all css are not use on every time. in IE i found that most of css is unusable for page. like various jQuery or css plugin framework file not used in every page.

well are i can merge all css or js file then browser never send request to get css or js from server.

what i do then performance can be improved. are i should use

A: You may consider trying the [CSS sprites](#) technique - combining all (or most) of your images in a single one and applying them as CSS background. This will reduce the number of HTTP requests for images to just one (the sprite image itself).

Also consider minifying and combining your CSS and JavaScript files. There are [lots](#) of tools on codeplex which do that. Most important thing here is to set up expiry headers so the browser will cache the resources and never ask for them again.

You might also want to get rid of some background images and replace them with CSS background gradients.

202. <https://stackoverflow.com/questions/294582/php-5-reflection-api-performance>

T: PHP 5 Reflection API performance

Q: I'm currently considering the use of Reflection classes (ReflectionClass and ReflectionMethod mainly) in my own MVC web framework, because I need to automatically instantiate controller classes and invoke their methods without any required configuration ("convention over configuration" approach).

I'm concerned about performance, even though I think that database requests are likely to be bigger bottlenecks than the actual PHP code.

So, I'm wondering if anyone has any good or bad experience with PHP 5 Reflection from a performance point of view.

Besides, I'd be curious to know if any one of the popular PHP frameworks (CI, Cake, Symfony, etc.) actually use Reflection.

A1: Don't be concerned. Install [Xdebug](#) and be sure where the bottleneck is.

There is cost to using reflection, but whether that matters depends on what you're doing. If you implement controller/request dispatcher using Reflection, then it's just one use per request. Absolutely negligible.

If you implement your ORM layer using reflection, use it for every object or even every access to a property, and create hundreds or thousands objects, then it might be costly

A2: Sometimes using something like `call_user_func_array()` can get you what you need. Don't know how the performance differs.

A3: CodeIgniter definitely uses Reflections. And I bet the others also do. Look into Controller class in the system/controller folder in ci installation.

203. <https://stackoverflow.com/questions/27631490/what-is-the-use-of-repository-and-why-do-mvc-developers-create-repository>

T: what is the use of repository and why do mvc developers create repository?

Q:

I have seen in many **MVC project** concept of **Repository** but I don't know why many mvc developers use **repository**.

What is the advantage of creating **repository** ?

What is the use of **repository**?

If it improves **performance** then how it improves **performance**?

Are there any **guidelines** to create **repository**??

A1: The concept of repositories is referred to [DDD](#).

It is best to read the [book](#) about DDD by Eric Evans.

In short, the repository allows you to hide details of loading objects from a database. This is especially useful for complex composite objects.

A2:

1. A: Advantage of using Repository : Clean code, strongly typed view.
2. Use of Repository: Repository class may expose DB Table structure or it may be view model that can be passed to view to render data.
3. No performance gain.
4. Guidelines
  - i. Create repository to represent table in database, columns will be properties of that repository.
  - ii. Create repository which to bind strongly typed view. Its properties will be all attribute you want to display using view.

204. <https://stackoverflow.com/questions/31622302/is-it-a-good-practice-and-can-it-improve-the-performance-when-we-use-the-model-d>

T: Is it a good practice and can it improve the performance when we use the Model directly in the view, following MVC structure, PHP?

Q: I am working with Yii framework 2.0. But this question is for MVC in general. I understand how MVC works, but I am wondering whether it is a good practice and can it improve the performance of a website when we use a Model directly inside a view without passing it through a controller. To me, I think it might improve the performance because the controller does not need to process the model and pass it to the view. But I am not sure about that. I have read some article related to this. But each has his own opinion. Hope some senior PHP developers can give me some advice to improve me.

A: MVC is not about performance. It's about architecture. Some kind of methodology. In your case improvement of performance will be scanty.

If you think in other way - you should forget about OOP and think about procedural.

My advice will be not to use models in views directly.

A2: The benefit of an architectural style is that it provides defined roles for different components of your application. There is a lot of debate on where the actual work is done in the "MVC" architecture on the web, should it be done in the controller or in the model (the right answer is the model) but I think everyone agrees that the role of the view layer should be only presentation.

205. <https://stackoverflow.com/questions/33088507/is-caching-thousands-of-user-ids-in-session-variables-bad-for-performance-in-as>

T: Is caching thousands of user id's in session variables bad for performance in ASP.NET MVC?

Q: If I want to cache say 2 ids in a session variable for each user and there will be a possibility of thousands or more users online at once, will this affect my performance of the site?

A: From a memory perspective that is 2 integers (8 bytes) with 50,000 active users. That is only 400KB. From a speed perspective, the session is a hash table with fast lookup. You will spend more time doing actual work than ASP.NET will spend retrieving the session.

A2: If the session state mode is InProc then there should be no negligible impact to performance. You will notice an impact to performance if you are using a session state mode of StateServer or SQLServer due to the creation of network requests to retrieve the ids from the remote state server or SQL server.

206. <https://stackoverflow.com/questions/42810200/asp-net-mvc-performance-implication-of-having-large-variable-names>

T: ASP.NET MVC Performance Implication of having large variable names

Q: While it is ideal to avoid large variable names, small ones do not capture the essence of maintainability.

Where is the tradeoff between variable sizing on a typical IIS/ASP.NET setup with code readability, maintainability & understandability.

A: As never said.... Variable name lengths have absolutely no impact on run time performance because they simply are not part of the runtime code.

207. <https://stackoverflow.com/questions/5195447/how-does-a-node-js-mvc-work>

T: How does a Node.js MVC work?

Q: I'm really interested in systems written in node.js. Specifically using it to create an MVC application.

I was thinking about the differences between designing a node.js MVC and doing the same in PHP. Since PHP is loaded and interpreted at runtime, a change to one of my controllers or views will be reflected in live server performance as soon as the file on the server changes.

I'm wondering though, since node.js is compiled, is an application restart required every time you push changes?

If not, does MVC effect server performance overall, since the server has to read the files at request-time versus having the whole application sitting in memory? Or do perhaps have it all wrong and I'm missing the point entirely? (if so please educate me 'cause I'm dying to know!)

A: A typical node.js MVC application would store the model data in memory and on some kind of saved database like mongoose.

Every time a model changes it goes through your js and saves to the database. It shouldn't need restarting at all.

If you change your code you do indeed have to restart the server. I presume there are various programs out there to stop this from happening.

Although it's not Recommended

These are also Relevant: EventedIO

A2: Check out Express for a take on Node framework development. You can see some MVC there. The HTTP url parsing available in Node really makes writing a router easy for tossing requests to 'controllers' and requiring in models is easy.

Node can use a variety of databases from SQL (Postgres, etc) to No-SQL (CouchDB, Mongo, etc)

Here is an example of an already available "restart-node-on-changes" add-on

Here is a list of plugins/modules for Node

208. <https://stackoverflow.com/questions/5874448/best-practices-for-incorporating-wcf-into-an-mvc-middle-tier>

T: Best practices for incorporating WCF into an MVC middle tier

Q: I was wondering if some one has implemented a 3 tier application using MVC and WCF as the middle tier? Were there any performance issues/drawbacks rather than implementing a typical middle tier using .dll's. I was envisioning a Middle tier of WCF which would access the DAL (linq to SQL), any advice/links are greatly appreciated!

A1: 3 tier application with MVC and WCF generally means:

- Front-end ASP.NET MVC where in simplest scenario controller calls proxies of WCF services.
- Back-end/middle-tier WCF exposing your business logic / data access
- Database server hosting your database

Where should you use this? Only when you really have to - you have strict requirement for that. This of course has huge performance impact because front-end uses remote call for every business operation. Remote call can be either between processes on the same machine but most often to the process on another server (in another network). It also requires better design of interactions to reduce number of calls to minimum as well as using asynchronous communication to invoke multiple calls in the same time if needed.

A2: If you develop the web site which intensive use AJAX (per jQuery.ajax for example) you can implement it in the following way:

- Front-end can be made with respect of ASP.NET MVC. The data for the corresponding Views will be requested per AJAX.
- WCF published on the same web site as the ASP.NET MVC (see here an example) can provide JSON data for all AJAX requests. WCF can be seen as middle tier component which implement the business logic and get the data needed from the database server.

At such architecture of the application the ASP.NET MVC will be reduced to V (Views) using master pages. It can be generated different views depend on the user roles. The Model and the most Controller actions will be

moved in the WCF. WFC methods could be tested with unit tests exactly so good as controller actions. If you will need some other data like dynamically generated pictures (Charts for example) or dynamically generated Excel or WinWord files you can return all the data from WFC methods exactly so easy like you can do this from the MVC controller actions.

At such design of your application I see no performance or other disadvantages. Both View of ASP.NET MVC and WFC have many caching possibilities which you can use on demand.

209. <https://stackoverflow.com/questions/15814384/performance-difference-between-client-side-jqgrid-vs-server-side-jqgrid>

T: Performance Difference between client side jqgrid vs server side jqGrid

Q: I am working on an MVC project where I use [jqGrid for ASP.NET MVC](#). However I am told by that the [pure-jquery-client-side version \(jqGrid\)](#) is better in performance. Is this true? To me they both seem to be doing the same stuff, just that the code is in different places- all the bulk work is still done using ajax. any advise would be appreciated.

EDIT- most places I use the grid has less than a 100 rows, page size 30, about 10-12 columns, mostly strings and dates. Only one page I use a grid with 500 rows but that will be used rarely.

A: I don't think that you should rewrite your existing code, but I can agree that in case of usage less than 1000 rows of data the usage of loadonce: true is real alternative.

The design of jqGrid is oriented on server side sorting, paging and filtering/searching. So most users who start to use jqGrid in version less than 3.7 have already good implementation of backend. SQL Server with native code should be sure more quickly as JavaScript code were originally designed as interpreter language. On the other side current versions of web browsers contain quickly JavaScript engine. Every new version improve more and more performance of JavaScript.

It could be important for the user *the total time* of the paring, sorting or filtering operation. It includes the round trip time to the web server. One can better do exact measure in productive environment to compare performance of local grids with grids with pure remote datatype ("json" or "xml" without usage of loadonce). The rough rule which I use myself is:

- if the number of rows under some 1000 rows I use loadonce: true and so client side paging, sorting and filtering of data
- if the total number of rows larger as 10000 I use always server side paging, sorting and filtering

Your environment (network, Round trip time to the server and so on) could be other. So the edge when you should better user client side holding of data and when server side holding could be other. Nevertheless *the usage of loadonce: true could be really very effective* in the practice.

I personally don't use commertial version of jqGrid which you referenced. So I have to write backend side myself. In case of usage of loadonce: true the server code is very simple. It's easy to debug and to maintain.

210. <https://stackoverflow.com/questions/46368174/how-do-i-reuse-generalize-similar-code-to-optimize-performance-net-mvc>

T: How do I reuse/generalize similar code to optimize performance (.NET MVC)

Q: I am working on 5 different projects which basically do the same things in the background. 90% of the server side code of all the projects is same (including method names, calls to database). I guess the person before me have copied and pasted the code to achieve the same functionality. Since majority of the code is similar for all 5 projects I am planning to optimize/reuse/generalize the code. For first I thought of creating DLL, but again including DLL in all projects will not make it generalized. I also thought of using WebAPI for the common functions but not sure whether I can achieve my goal. Can you please suggest the best thing that I can do in my scenario.

211. <https://stackoverflow.com/questions/1541964/how-can-i-profile-an-asp-net-mvc-view>

T: How can I profile an ASP.NET MVC View?

Q: I'm trying to improve the performance of an ASP.NET MVC app. Pages take about 700 msec to display, and I know that my controller takes about 200 msec. This means the View is taking 500 msec. How can I profile a View?

I don't know regular ASP.NET -- perhaps there are standard things everyone else is aware of?

My View iterates over my Model and displays a table of about 25 rows. I'm surprised it takes 500 msec.

A: If you are using the default view engine (the web forms view engine), you may be able to use the standard asp.net tracing to see what is happening in the page [http://msdn.microsoft.com/en-us/library/y13fw6we\(VS.85\).aspx](http://msdn.microsoft.com/en-us/library/y13fw6we(VS.85).aspx).

212. <https://stackoverflow.com/questions/24941468/can-spring-mvc-hibernate-validation-be-a-substitute-for-javascript-validation>

T: Can Spring MVC/Hibernate validation be a substitute for Javascript validation?

Q: I am new to Spring MVC. I came across the validations provided by hibernate-validator and Spring tag. I have done only a little bit of web programming (Perl) where I had done Javascript validations on the front-end combined with back-end validations to keep out invalid data.

Seems to me that with the validations provided by Spring MVC, one could do validations only on the back-end. What would be different is that all validations would have to wait until the user submits the form. Also, since there would be no front-end validations, performance could be an issue. What I am asking is what is the right approach to form validations while using Spring MVC.

A: Backend validation only does work. While validation only on the client does not work, because it is insecure.

But usability often becomes an issue with Backend validation due to the performance.

You can still validate on the fly on the backend, by calling your backend onBlur but now your application tightly couples frontend and backend together. Frameworks like JSF do this, and IMHO it is a really bad idea.

Some frameworks (also JSF) try to automate the validation on the frontend based on annotations in the backend. But this can only work as long as you stick to a limited set of prepared annotations, so again not a solution for the problem.

So I'd say: stick with the usual approach of having frontend validation based on javascript and backend validation with whatever tool you happen to use. Everything else is either severely limited or gets overly complicated fast.

A2: Sry, but the "right approach" here, as for **all** (client/server) Validations, regardless of the programming language, the framework etc., is to rely on frontend **and** backend-Validation, because frontend-only is simply insecure (read [here](#) or [here](#) for more).

e.g. use for Frontend some JS/jQuery-plugin, for Backend SpringMVC/hibernate @Valid-Annotation with the corresponding checks at your entity. Use Ajax-calls or something similar if you don't want to wait until submit is pressed. [Here](#) is an example (untested )

213. <https://stackoverflow.com/questions/20695202/does-long-polling-have-performance-issue>

T: Does long-polling have performance issue

Q: I'm going to use long-polling in my asp.net mvc application. Some of the connections will probably be pending for response for more than 10 minutes. I know the connections will be "hung up" so they won't occupy the connections in IIS connection pool for a long time(correct me if I'm wrong). But with the amount of user grows, the concurrent connections will be more and more, the web server will have more "background" threads. Will it cause performance issue? If yes, what's the approximate order of magnitude that the server can handle? And what other *better solutions* should I take? Thanks.

214.<https://stackoverflow.com/questions/9868271/bad-performance-in-a-99-read-only-nhibernate-web-application>

T: Bad performance in a 99% read-only NHibernate web application

Q: I am currently investigating a ASP.NET MVC web application which is reported to have poor performance under load. (But load is only a few requests per second).

We are using MySQL + NHibernate + Castle ActiveRecord for the mapping. A NHibernate session is opened at the beginning of every session and kept open in view.

I already optimized the data access pattern to avoid Select N+1 problems where possible.

Now what I'm thinking about is.. on each request a database transaction is opened and committed at the end. And in 99% of our requests (MVC actions) no data has to be written to the database.

1. Is it possible and do you see benefit in closing sessions/transactions earlier or even mark sessions as read-only?
2. Could database locking be a bottleneck and if so is it possible to explicitly avoid locking at least for the read-only transactions?

A1: You should verify that your application is not loading huge amount of data from DB. Even with all select n+1 resolved you can load millions of records and it is going to be very slow.

Verify your pages with [NHibernate profiler](#). It will come up with optimization suggestions. If not, probably NH is not your bottleneck.

A2: If you only have few requests per second, then the overhead of opening transactions is not the reason for the poor performance. Try to let NHibernate log all the SQL that is sent to the server. This can give you some idea of why the thing is slow. Probably it is sending a billion queries for each HTTP request or else some well-chosen indices on your tables could probably help you.

215.<https://stackoverflow.com/questions/32663623/performance-tuning-saving-records-exponentially-grows-every-500-records>

T: Performance Tuning: Saving records exponentially grows every 500 records?

Q: I wrote a class to read in a CSV file that houses 4k records, 72 col wide. The 'read()' into the List takes literally a second, maybe...

Once the loop executes successfully, I call db.dispose();

I haven't built too many classes outside of the MVC controller structure because I'm new to this so go easy on me ;). I'm assuming that I'm tying up precious resources using this approach which is causing the exponential processing time issue.

Any suggestions on how to improve performance? Thanks in advance!

A: This credit should really go to Atoms for pointing out the "AutoDetectChangesEnabled" reference. I found a great article by Rick Strahl here; <http://weblog.west-wind.com/posts/2013/Dec/22/Entity-Framework-and-slow-bulk-INSERTs> which explains it well!

My 15 min processing just got knocked down to 45 seconds wooot!!!

Thanks!

216.<https://stackoverflow.com/questions/16734271/should-i-use-custom-model-binder-to-bind-view-model-to-entity>

T: Should I use custom model binder to bind view model to entity?

Q: Just some idea to make more use of custom model binder. I am currently still using IMapper interface to do so, though wondering whether part of the purpose of custom binder is to mapping view model or input model to business entity? I can see there might be some limitations if i use MVC custom binder. What is the advantage to use the custom binder in MVC? Will my app gain better performance?

A: Short answer would be **No, you should not**

ModelBinder by itself is part of ASP.NET MVC infrastructure. If you would take a look at ASP.NET MVC pipeline ([PDF](#)) you would see that it's job is to convert a posted web form data (a string basically) or query string from URL to an instance of particular class.

ASP.NET MVC framework has a [DefaultModelBinder](#) that is suitable for 99% of cases. Custom model binders could be used in situations where standard data conversion fails e.g. mapping \$ 1,234.56 from a textbox to a decimal value of 1234.56

Moreover ModelBinder implements IModelBinder interface with a single [BindModel\(\)](#) method. This method expects parameters that would be hard to 'hand-craft' to make any use of them and are totally not relevant to your scenario.

What you are really looking for is

- either custom object mapping between viewmodels and business objects where you manually assign one object property values to another
- or taking advantage of libs/frameworks such as [Automapper](#) or [ValueInjecter](#) which take care of object mapping hassle away from you
- or a mix of both

217. <https://stackoverflow.com/questions/22131962/is-the-mvc-model-appropriate-for-a-basic-solitaire-game>

T: Is the MVC model appropriate for a basic solitaire game?

Q: I'm trying to write a basic solitaire app for Android, just for practice, but I want to use the best design I can. I've written code in Java, but nothing for Android yet. For the GUI, I figure I can either use the MVC model entirely and make view classes that are very similar to classes I've already written, or I can make some of those classes into view classes to avoid duplicating code and possibly improve performance. The plan I have that doesn't use MVC completely is to make the Card class, which just saves the rank and suit of the card as well as whether it's facing up or not and is mostly for data, into a subclass of the Android View class, just adding methods for drawing and other necessities. Either way, I'm going to make a custom view class for cards.

So, my question is whether it's worth the duplicate code and virtually identical data in order to use MVC. I'm also open to ideas for an alternative design; I just want to learn. Thanks in advance!

A: Just to answer your question:

So, my question is whether it's worth the duplicate code and virtually identical data in order to use MVC. It's all up to you, Google's Documentation recommends avoid object creation exactly like this kind if possible, so If you consider the benefits of having the MVC implementation worth you should go for it, but take on count that programming for mobile devices involve constraints in memory and performance, if the design starts impacting the performance of your application even when the code is "scalable, extendible, etc..." it might not be the way to go, in case of mobile designs I always go for a good programming advice I took from a Book "Make code usable before making it reusable" but always avoid to do a disaster, there's no hard rules in software, you could implement a light version of MVC that meets the balance between having readable code and good throughput code.

218. <https://stackoverflow.com/questions/194674/how-to-cache-images-in-memory-on-the-web-server-for-an-asp-net-mvc-web-app>

T: How to cache images in memory on the web server for an ASP.NET MVC web app?

Q: I am working on a web application with many images, using ASP.NET MVC. I want to be able to cache the images in memory to improve the performance, but I would like to hear what is the best way to do this.

- 1) The images are accessible from URL, like <http://www.site.com/album/1.jpg>. How are the images stored in memory? Are they going to be in a form of memory stream?
- 2) How to access the image from memory and send to the web page? Now the web pages will use the image URL to directly embed the image in a tag.

A1: Won't the webserver and downstream caches be handling this for static resources anyway? Not sure there's many performance gains to be had, but knowing nothing of the app or setup I could be wrong.

To implement I'd setup a page that took an image filename and served it either from disk or from the asp.net in memory cache.

A2: If the images are just static files on disk, then Beepcake is right that IIS will already be caching frequently used images and serving them from memory. Using separate caching servers shouldn't be any quicker than IIS serving an image from memory - it's got more to do with scalability. Once you have a large server farm, it means you have a group of servers just dealing with your code and a group of servers just dealing with static images. Also, if you have too much content for one server to cache it all then you can route requests so that each of your ten servers caches a different 10% of your content. This should be much better than just having each server cache the same most-used 10% of the content.

A3: If you want really good performance, I'd suggest Amazon CloudFront. Edge caching will give you better performance than memory caching, and CloudFront runs nginx, which is significantly better than IIS at static files (among other things).

Setting up edge caching is very easy - you log in, and get an domain to use instead of your own for image URLs.

A4: Thanks for the response. I think I was thinking the wrong direction. I just found out Flickr is using Squid to cache images.

#### 219. <https://stackoverflow.com/questions/18838878/can-i-cache-https-resources-in-browser>

T: Can I cache https resources in browser?

Q: I am currently working on improving the performance of my asp.net mvc 4 application. The entire site is in https so all static resources such as javascript, css, images etc are supplied over https.

I have read different feedback in that its not possible to cache such resources in the clients browser - is this correct? Is there a way around it?

A: Yes

Default is yes for IE and Firefox. Believe same for Chrome.

To check settings.

IE : Options, Advanced, "do not save encrypted pages to disk"

Firefox : about:config, browser.cache.disk\_cache\_ssl

#### 220. <https://stackoverflow.com/questions/2287961/curious-whats-currently-the-recommended-way-of-coding-rest-web-services-in-c>

T: Curious: What's currently the recommended way of coding REST web services in C#?

Q: So, what do the experts recommend? WCF Rest Toolkit? ADO.NET (now WCF) Data Services AKA Astoria? Hand rolling it using ASP.NET MVC? Other?

Requirements are fairly vanilla: HTTP GET/POST for a small number of resource types, XML and JSON output, needs to live in the same appdomain with a SOAP ASMX web service.

My criteria are:

- A) performance
- B) development complexity (including the learning curve)
- C) maintainability

A1: If you already have your data in a structured form in a database like SQL Server, and you want to expose those bits of data (e.g. your customers, their orders etc.), then the WCF Data Services is probably one of the most efficient and productive ways to expose your data. It handles a lot of the underlying goo for you and lets you concentrate on what you want to expose, and what to hide. And it even supports things like querying in the query strings, and inserts and updates quite easily.

If you have more non-structured data, both bare-bones WCF with the REST starter kit or ASP.NET MVC seem to be quite valuable choices. Haven't done much myself with either of the two, but both are quite current, quite productive for developers and should fit nicely in your environment.

So I guess in your position, I'd check out WCF Data Services first and use it, if it fits the bill - and if not, choose between WCF REST Starter Kit (which also works with classic ASP.NET webforms, or winforms, or console apps, or WPF, or Silverlight) - or check out ASP.NET MVC if you're going that way already in your project.

A2: The best framework for REST services I have seen is OpenRasta, which is built from the ground-up to enable REST simply. <http://trac.caffeine-it.com/openrasta>

Building RESTful services with OpenRasta is much simpler than with WCF in my experience. This is also then reflected in the ease of maintenance. I haven't tested performance, but have never noticed it to suffer in this area, and because of the clean architecture I would not be surprised if it were quicker.

Some other links for you:

<http://codebetter.com/blogs/kyle.baley/archive/2009/04/19/openrasta-or-how-to-speak-rest.aspx> <http://blog.huddle.net/we-love-openrasta> <http://www.vimeo.com/3385419>

I haven't used the Data Services, but from what I've read I don't think they count as truly RESTful, but they may meet your requirements. I don't know.

A3: If you use the .NET 4 framework REST has much better support using RouteHandlers. If you are looking to implement on earlier versions, I would just implement your own HTTP handler and use IIS6 wildcard routing (aspnet\_isapi.dll) to process your requests.

With the REST starter kit you are limited to having a .svc file, but if you implement your own handler you can parse the requests manually and have much more granular control over the restful service. There is some additional complexity but its mostly around deployment.

221. <https://stackoverflow.com/questions/44117115/what-are-the-cons-of-the-riblet-architecture-in-uber>

T: What are the cons of the riblet architecture in uber?

Q: I am studying the current architecture of uber rider app and I got to know the current rider app was evolved from mvc to a specific architecture called riblet, which is designed on top of viper by Uber themselves. As I understood reblets is independently testable pieces that each have a single purpose. I'm aware that the new architecture is capable of handling performance and the scalability. I am interested in knowing the cons of the riblet architecture

A: Okay. I found some **cons of the riblet architecture**. I will post them here to discuss with anyone who is interested. The main cons are as follows,

- Since there is a higher number of independent riblets communicating through their interfaces, there is a probability of failure of a particular interface compared to a system with fewer components.
- Yes testing a single riblet is easy yet it makes integrations and handling the requests among riblets more complicated.

- Changing the technology stack in the long run is difficult

222.<https://stackoverflow.com/search?page=32&tab=Relevance&q=performance%20MVC>

T: Profiling web app requests

Q: I am building a web app and one of the tasks is to improve performance. I want to know of any tool that can be used for timing web pages.

For example I need to be able to document to the managers that a particular page did take 5 seconds to load and now takes 1 second.

Are there any tools that can help with this? It is not a publicly accessible web site and is written in ASP.NET MVC.

A1: I handle this by logging response times in the access log. Apache supports this, so you could proxy through a proxy server. IIS may support the same in a custom log format. However, logging on the server side only covers how fast the page is delivered.

Perceived response time is highly dependent on proper HTML and CSS. Providing sizes for included content can speed rendering time for the page significantly. It can allow the visible portion of a page to render and stabilize before the page had finished downloading.

Download times for included content such as CSS, script libraries, and images can also have a significant impact on perceived response.

Client side web testing tools may provide a better solution for this kind of effort. Done correctly, they will also demonstrate that you haven't broken the web site.

A2: Chrome and Safari can measure the page load time with their development tools. Fiddler also can do this, albeit it does not give you as nicely aggregated picture. I suspect Firebug also can do this, but I never used it, so can't vouch for it.

Note that these are for manual measurement. There are more sophisticated tools, if you want to do automated perfect testing that will run multiple scenarios, aggregate the data and compare it to a baseline to give you a delta of the changes. If you live in Microsoft world, you can Use Visual Studio integrated test tools, or the standalone Web Capacity Analisys Tool. If you live in the open source world, take a look at Apache JMeter. There are also number of third-party tools, showing when you search for "web page performance testing".

223.<https://stackoverflow.com/questions/28320189/one-web-application-or-multiple-web-applications-when-using-multiple-databases>

### **T: One web application or multiple web applications when using multiple databases?**

Q: I'm developing an ASP.NET MVC 4 web application hosted on IIS which will be using multiple databases on a single SQL Server 2014 instance (each database for a different company). The web application will be used for analysing and summing large amounts of business data.

What is the best practice in this kind of situation? Will there be performance issues if only one web application and pool is used with multiple databases? One database may have 1-20 users.

Which one would be a better choice, A or B?

A) 1 web application and 10 databases

B) 10 web applications and 10 databases

A1: Your question doesn't belong to **MVC** at all.

If you have large amounts of data and you worry about performance, then you should think about how to store and query data at the database level. And you may interested in this kind of questions:

1. What provider use to query data? (pure ADO.NET or an ORM like Linq-to-SQL or EF)
2. Should I have all databases in one SQL Server instance, or can I use linked servers or even union data on web server side?
3. Should I have my databases files on different hard drives?

Answering these questions:

1. ADO.NET is always faster than ORMs just because they all use ADO.NET at their core. But it's harder to maintain ADO.NET queries in future
2. Linked servers are slower especially if you have your database on different machines (you will transfer your data by net and it is not fast if the is a large amount of data)
3. In the performance way it's better when your database files stored on different hard drives

Answer to your question now will be obvious, I think :)

Create one web application.

224. <https://stackoverflow.com/questions/23017233/should-we-build-our-signalr-solution-into-a-self-hosted-app-or-continue-to-use-i>

T: Should we build our SignalR solution into a self hosted app or continue to use it directly within our MVC app?

Q: We've currently got our SignalR 2.x Hub built directly into our MVC Web application. It basically works and now are thinking towards performance and scalability.

In terms of performance and scalability, is it better to have our SignalR hub be self hosted in its own app than be built into the MVC app directly?

What is the best strategy for building out a highly performant/scalable SignalR solution, especially as we scale out our application across a web farm?

A1: If you plan to scale signalR you will need to incorporate some sort of back-plane, this is needed if using a load balancer so if one client connects to one of the servers all of the other servers can send message to that particular client. The available back plane support by SignalR is sql, azure and redis. If performance is an issue I will suggest Redis see [here](#). and also [here](#) for more performance oriented configurations.  
That being said SignalR should be hosted in its own app behind its own load balancer, that will give more control over its scalability.

225. <https://stackoverflow.com/questions/29127307/evaluating-differences-between-ejb-enterprise-application-and-spring-mvc-framework>

T: Evaluating differences between EJB Enterprise application and Spring MVC framework?

Q: Suppose I have to create a shopping cart website, it should accept lots of requests and process their requests without any performance issue. Which method I can use EJB Enterprise application or Spring MVC framework..?

A1: I don't think the two are mutually exclusive. Here is a good discussion on coderanch that really helped me.

<http://www.coderanch.com/t/317507/EJB-JEE/java/EJB-MVC-pattern>  
Hope this helps.

A2: The well asked question IMHO would be Spring MVC vs JSF as the view part of the Java EE stack is currently JSF.

IMHO both are server centric (pages are built on server side) and quite obsolete now, I would personally go on a server part exposing a rest API consumed by a html5/javascript client.

Both Spring and Java EE stacks are well suited for building rest services (Using Jax-RS for Java EE or [one of these approaches](#) for Spring).

I would personally go with the Java EE stack as I prefer by far CDI to spring DI anyway just keep in mind that Java EE is the standard way but spring probably evolve faster.

Have a look to [this](#) before choosing.

226. <https://stackoverflow.com/questions/901920/advantages-and-disadvantages-of-using-mvc-design-pattern-model-view-controller>

T: Advantages and disadvantages of using MVC design pattern

Q: I am at the point in my design where I am contemplating dropping the MVC design for performance reasons, not sure if straight out PHP pages with header/footer includes would out perform my MVC setup (using PHP/Zend). I have a feeling it would.

Comments?

A1: What's the value of your time? Of your productivity? Of your code's maintainability?

vs. What's the cost of an additional server?

A2: I'm familiar with MVC from its original Smalltalk-80 context. The decision on whether to use MVC or something else is about clarity of the code, not performance. If there are particular problems with the performance of MVC in PHP, I don't know about them.

But again, the primary reason to move toward MVC is that separation of concerns is an important value in ensuring that software is supportable and maintainable over time.

A3: [This article](#) discusses MVC, and its inventor's new paradigm DCI that is possible going to be a challenger for traditional OO.

A4: It depends on what you're building. MVC can certainly be overkill for some things, and not even applicable to others. Weigh that against future maintenance, working with other developers, how much of the MVC design pattern are you going to be rewriting on your own, etc.

227. <https://stackoverflow.com/questions/21688196/mvc-folder-structure-structure-primarily-by-business-module-rather-than-m-v-c>

T: MVC folder structure - structure primarily by business module rather than M/V/C?

Q: I am designing a complex web based business solution. My Domain, Reports and Processes projects are structured around business modules (3-4 levels deep). Note that our domain models are held in Domain, and the WebUI need only contain ViewModels.

Aside from the problem of customizing the MVC routing/mapping, can you see any problems with this approach?

Given there will be many Views folders, could there be a performance concern with MVC having to search 500+ folders to find the relevant view?

A: Aside from the problem of customizing the MVC routing/mapping, can you see any problems with this approach?

Might lead to some pretty large project and it might be difficult to navigate for a newcomer. You could consider externalizing some of the logic in separate assemblies to avoid having a single monolith application. Consider ASP.NET MVC Areas.

Given there will be many Views folders, could there be a performance concern with MVC having to search 500+ folders to find the relevant view?

No, when running in release mode (debug="false"), ASP.NET MVC caches the location of the views and the lookup is pretty fast.

228.<https://stackoverflow.com/questions/13657457/reflection-and-performance-in-web>

T: Reflection and performance in web

Q: We know Reflection is a quite expensive engine. But nevertheless ASP.NET MVC is full of it. And there is so much ways to use and implement additional reflection-based practices like ORM, different mappings between DTO-entities-view models, DI frameworks, JSON-parsing and many many others. So I wonder do they all affect performance so much that it is strongly recommended to avoid using reflection as much as possible and find any another solutions like scaffolding etc? And what is the tool to perform server's load testing?

A: I have thought about this question myself, and come to the following conclusions:

- Most people don't spend their days resubmitting pages over and over again. The time the user spends reading and consuming pages which at worst contain a few Ajax calls is minimal when taken into context with the time spent visiting an actual website. Even if you have a million concurrent users of your application, you will generally not have to deal with a million requests at any given time.
- The web is naturally based on string comparisons... there are no types in an HTTP response, so any web application is forced to deal with these kinds of tasks as a fact of everyday life. The fewer string comparisons and dynamic objects the better, but they are at their core, unavoidable.
- Although things like mapping by string comparison or dynamic type checking are slow, a site built with a non-compiled, weakly-typed language like PHP will contain far more of these actions. Despite the number of possible performance hits in MVC compared to a C# console application, it is still a superior solution to many others in the web domain.
- The use of *any* framework will have a performance cost associated with it. An application built in C# with the .NET framework will for all intents and purposes not perform as well as an application written in C++. However, the benefits are better reliability, faster coding time and easier testing among others. Given how the speed of computers has exploded over the past decade or two, we have come to accept a few extra milliseconds here and there in exchange for these benefits (which are huge).

Given these points, in developing ASP.NET MVC applications I don't avoid things such as reflection like the plague, because it is clear that they can have quite a positive impact on how your application functions. They are tools, and when properly employed have great benefits for many applications.

As for performance, I like to build the best solution I can and then go back and run stress tests on it. Maybe the reflection I implemented in class X isn't a performance problem after all? In short, my first task is to build a great architecture, and my second is to optimise it to squeeze every last drop of performance from it.

229.<https://stackoverflow.com/questions/3298387/performance-improvement-for-insert-statement>

T: Performance Improvement for Insert Statement

Q: On my ASP.NET MVC application I'm running a couple of inserts at once that can insert 10000 or more lines and update a few others. This process is taking a long time but I can't escape the insert because that's exactly what I was asked to do. Right now I'm running Sql Server Profiler and it takes almost 20 minutes to insert this bunch of rows. How could I possibly improve the performance of this action?

(I'm using Linq-to-Sql to insert the data into the database.)

A1: Linq-to-sql really wasn't designed for inserting that many records to the database in one batch. It will do it insert statement by insert statement which is really slow. I'd recommend that anywhere where you know you'll

need to support this many inserts that you use the `SqlBulkCopy` object instead of your Linq-to-sql classes. You could even still use your same L2S classes if you need them for object validation, but then just dump them into a `DataTable` in 1000 row chunks and let `SqlBulkCopy` do your actual inserts. You could even google L2S and `SqlBulkCopy` and see what's out there as far as extension methods or other integration. You aren't the first one to run into this problem.

A2: What DAL do you use EF, L2S, ADO.net or something else? Insert shouldn't take so much time to complete. You can insert them to local cache, and submit changes later.

230. <https://stackoverflow.com/questions/4214413/best-option-to-custom-authentication-using-asp-net-mvc-cache-cookie>

T: best option to custom Authentication using ASP.NET MVC

Q: I am a bit lost using Authentication with MVC...

I'm looking for the best option to use in a big **E-Commerce** site, where the performance is top priority...  
The two options I'm looking until now are :

- Create a `FormsAuthenticationTicket` and encrypt it into a **cookie**, like implemented here : [Cookie implementation](#)

A: A more *MVCish* way to achieve this is to write a custom `AuthorizeAttribute` and perform this in an overriden `OnAuthorization` method instead of using Application `AuthenticateRequest`.  
This being said I think that your implementation is quite good. As an alternative of storing the additional information into the cache you could store it in the `userData` part of the authentication ticket if this information is not very large of course. Both approaches are viable. If you decide to go with caching I would recommend you offloading it to dedicated cache servers instead of storing it in the memory of the web servers.

231. <https://stackoverflow.com/questions/11129337/is-it-wise-to-make-every-class-loaded-automatically>

T: Is it wise to make every class loaded automatically

Q: i'm programming an MVC and i need an advice, is it wise to make every class loaded automatically including controllers,models ,core classes using `spl_autoload_register` or this may make issues or a slow performance.

A: In most cases - Yes, it is. Loading classes manually as you guess will increase performance, but a little and only in that cases where you have, for example, a library that consist from a lot of files (PHPExcel for example), but even in this cases it's more preferable to use Autoload.

In total: in most cases (especially for conventional sites) manual loading is micro-optimization.

The best way to deal with this feature - launch a benchmark if it seems that the performance drops a problem.  
The benchmark is the best way because all depends on the architecture framework

A2: This probably depends on many factors, but I have used frameworks where I load every class automatically (from a relatively large autoload function that looks in broad places) as well as a *lot* of nested includes. I have never noticed a performance problem with autoloading like that at all. It makes things significantly simpler since you don't have to worry about includes conflicting either.

As I said, though, it may depend. It's up to you to test out which method is faster with benchmarking. If you have a preferred method in terms of implementation that is slower, you will have to make the decision of whether or not the speed difference is enough to use an inferior but faster implementation.

232. <https://stackoverflow.com/questions/21059879/nhibernate-vs-entity-framework-6-performance-for-big-number-of-users>

T: NHibernate vs Entity Framework 6 performance for big number of users

Q: I'm building big web application that should communicate with the database very often. I'm wondering what library should I use for communication NHibernate or Entity Framework 6?

Here is my application specs:

- **Users:** The application built for big number of users, lets start with 100,000 users registered. 50,000 users online, every user can send up to 1 message at second. **15,000 messages got sent every second.**
- **Memory:** It's very important to keep memory in normal state so I suppose that I should use LazyLoad?
- **The database:** The database structure is very complicated.
- **Users engine:** Currently I'm using ASP.NET MVC 5 Identity with Entity Framework 6 UserStore.

Important things:

- **The comfort is very important to me!**
- **Code First:** I hate when code gets generated.
- **Performance:** The performance is the most important thing here!

A: As someone who is using NHibernate for several years I might not be the right person to help you choose between EF or NHibernate but here are some general pieces of advice that I've learned these years:

-**Be in control** : I mean choose an ORM that let you control every aspect of its functionality.Fortunately for us , NHibernate is one of them. You can call SPs and other Database objects and map their result to your objects.You can write interceptors to intercept NHibernate functionality and so on.

-**Avoid general ORM issues from the start**:one of them (which has a big impact on performance) is [SELECT N+1](#).

-**Use specific profiler to see how your ORM is working**: I think this is really important for us to be able to see how the ORM is working and what queries are actually running in the back.

-**Use cache whenever possible**: I don't know about EF but Nhibernate has a second level cache mechanism that you can use to cache ferequently read and static data in memory to gain a better performance

-**Have a plan for load testing and stress testing your application**: No matter which ORM you choose , there will be times that you should increase the performance of your application.I think the best way to see how an application is working on a large scale is to somehow simulate it and try to tweak it so that it works in its best condition.

-**Have a Plan B** : ORMs are designed to help us to solve the dilemma of storing data in tables and using them as objects in our application.Thus they are doing something extra for us and they tend to be slower than using data in tabular format.So there are times that it would be better to use a plain tabular format in our application instead of converting it to objects (Take showing a list of information for instance)

P.S. This might be off topic but have you consider using a NoSql database instead of a relational one ?

233.<https://stackoverflow.com/questions/9868271/bad-performance-in-a-99-read-only-nhibernate-web-application>

T: Bad performance in a 99% read-only NHibernate web application

Q: I am currently investigating a ASP.NET MVC web application which is reported to have poor performance under load. (But load is only a few requests per second).

We are using MySQL + NHibernate + Castle ActiveRecord for the mapping. A NHibernate session is opened at the beginning of every session and kept open in view.

I already optimized the data access pattern to avoid Select N+1 problems where possible.

Now what I'm thinking about is.. on each request a database transaction is opened and committed at the end. And in 99% of our requests (MVC actions) no data has to be written to the database.

1. Is it possible and do you see benefit in closing sessions/transactions earlier or even mark sessions as read-only?
2. Could database locking be a bottleneck and if so is it possible to explicitly avoid locking at least for the read-only transactions?

A1: You should verify that your application is not loading huge amount of data from DB. Even with all select n+1 resolved you can load millions of records and it is going to be very slow.

Verify your pages with [NHibernate profiler](#). It will come up with optimization suggestions. If not, probably NH is not your bottleneck.

A2: If you only have few requests per second, then the overhead of opening transactions is not the reason for the poor performance. Try to let NHibernate log all the SQL that is sent to the server. This can give you some idea of why the thing is slow. Probably it is sending a billion queries for each HTTP request or else some well-chosen indices on your tables could probably help you.

234. <https://stackoverflow.com/questions/7461187/profiling-slow-zend-framework-mvc-setup>

T: Profiling slow Zend Framework MVC setup

Q: I am struggling with poor performance in Zend MVC. I set up a single controller, which only does die(), and I enabled xdebug, and pulled up webgrind on my request which tells me: (The above pretty much tells me it's the bootstrap firing up classes defined in my application.ini - but I have no idea which ones are slow)

What's a good way to pinpoint exactly what step in the code which is taking the bulk of the processing time?

A1: You should be able to expand webgrind output to locate what is your slower function call. Alternatively you could use [function trace feature](#) of Xdebug during your profiling session to get more informations on your function calls.

Generally speaking you should use cache wherever is possible. Memcache is faster than APC as Zend\_Cache backend, but you still need APC extension installed (even in development mode) to get a great speedup of your code. I've benchmarked its impact on Zend Framework Quick Start [on my blog](#) (that post is in Italian, but benchmark data are in English) and the result is pretty impressive, a 3x speedup for the home page. I've applied the cache idea also for the Zend\_Application config file (which in your example take half of the profiling time). I discussed it [here](#) with Matthew Weier O'Phinney, Zend Framework project leader. What I've done is to override the default Zend\_Application\_loadConfig method with a custom one which caches the result of the parsed file. You can find my class which implement this strategy [here on github](#).

A2: After having stripped the require\_once of the library as explained in the official performance guide, you should install an opcode cache, like Zend Server CE, APC, or eAccelerator, even on your dev machine. Also, some resource plugins you may configure in your application.ini may require data caching in order to perform well, like Zend\_Db, Zend\_Loader, etc. (I won't explain the difference with opcode caching here) Don't forget that in production you will (and I really hope so) use opcode and memory caching, so you need to benchmark in close conditions.

In development you will certainly define a cache that invalidates very fast, so always refresh your page at least two times in a row before looking at the ms.

And then you can start to worry about your "real" bottlenecks.

Ok that was about ZF bootstrap performance. But your question was about profiling code. I use non-free tools for it, but **Xdebug** combined with **Kcachegrind** does it also quite well: <http://xdebug.org/docs/profiler>

235. <https://stackoverflow.com/questions/43390539/should-i-resize-the-images-at-server-side-or-use-css-for-the-mvc-application>

T: Should I resize the images at server side or use css for the MVC Application

Q: I develop a MVC + Angular js Ecommerce site with huge number of images been loaded. I have a few queries regarding the performance of the site.

1. There is huge number of images been loaded. Shall I create thumbnails of different size needs and then show them or should i resize with css or any other technique.
2. How can i cache the images for the site.

A: If you care about performance and load times, you should create thumbnails server side. Css will only scale the image to your desired width but will still load the bigger one.

I suggest to make your thumbnails and then use those different image sizes for your different needs (smaller ones for product lists, bigger ones for product pages...).

You could even make use of different image src's for the same place toggling them depending on device width so you go even further improving load times on mobile devices. You could achieve this via `ng-src` or even with css with `srcset`

236. <https://stackoverflow.com/questions/16448264/performance-improvement-of-page-where-million-records-are-present>

T: Performance improvement of page where million records are present

Q: I need some suggestion how to improve the performance of the application, I'm developing MVC 3 ASP.NET Application. From the controller , I'm pulling 50,000 records of type string, All the items i.e 50,000 are added to a HTML Div dynamically using Jquery.

I see there is considerable amount of time is taken while adding above radio button to parent control i.e HTML DIV

The parent HTML DIV has Check box, on checking that, all the child box must be selected. I see there is considerable amount of time for checking all items

All these items are in Scroll Viewer, Is there a way to improve user experience, Like loading data on Scroll basis some thing like Data Virtualization of **Silverlight** in HTML 5.

I Check all items and Drag on to another part of page, which make Browser to non responsive mode. Can anyone provide me best user experience of these many records with improve Query performance

A1: You should create a documentFragment and add the nodes there. And after you finish add the documentFragment to the DOM. Also, it's more efficient to use createElement than to use strings. There are a lot of jsperf tests to prove that and there you can also find ways to do it in the most efficient way.  
To prevent the browser from completely freezing for a long period of time, you should break your iteration in batches of...1000 item (pure guess). And call that function as many times as you need to finish the job. Keep a counter outside it. Call it with `setTimeout(renderMore, 0)`. At least this will keep the window from freezing.  
Depending on your UI and workflows, there might be some other improvements you can apply. But you didn't provide much info about that.

A2: Basically, to display large dataset, try this:

- 1) Store it in browser memory, use `sessionStorage()` or `localStorage()`
- 2) Minimize DOM, do not write ALL data to DOM, dynamically add & remove the elements.
- 3) Allow dataset to be searchable, this means a filter function that trims the dataset.

Another recommended way of resolving this is to use [Megalist](#), require jQuery and works well for tablet or mobile.

237. <https://stackoverflow.com/questions/3390716/how-do-i-improve-performance-of-wcf-web-service>

T: How do I Improve performance of WCF Web Service?

Q: I have an MVC application that calls several different web services. While running load tests on the application, I noticed that performance (both throughput and response times) degraded quickly as the concurrent users increased. By process of elimination, I stripped everything out except for a single dummy call to the web service which just returns an empty object and produces a tiny bit of html.

Hitting that test page from another server (using Pylot) with 100 concurrent users, I peak at around 9,000 requests per minute. By comparison, a static html (~70k) peaks at around 20,000 requests per minute. I also created another test page that calls another service (running Solr) and peak at 18,000 requests per minute for a simple query.

I know that it's hard to interpret much from these "results", so I'm looking for any information on how to tune a WCF Web Service for optimum performance under load.

A: I did a bunch of performance work on our WCF services a while back, mainly in terms of increasing the level of currency going through our app. I put the stuff I learnt in a blog post which hopefully you will find useful:

<http://theburningmonk.com/2010/05/wcf-improve-performance-with-greater-concurrency/>

Also, check out the links to Dan Rigsby and Scott Weinstein blog posts at the bottom of the page, they did some really good posts some time ago on improving WCF performance too which I found really useful.

A2: Unless you provide more detail I can't be sure, but are you running out of process space in MVC or in WCF? You could easily run out of processing space in MVC if you are not using an MVC AsyncController. Issuing an WCF request will consume the IO thread of the UI and block / queue other calls after thresholds have been met.

<https://stackoverflow.com/questions/25887623/analyse-c-sharp-method-call-bottle-neck-in-mvc-application>

T: analyse C# method call bottle neck in MVC application

Q: I have a performance issue with a method call on a dll I have written. The following line gets called

```
lineManage.GetEnquiryLines(ident,null);
```

When calling it from a unit test project the code executes in {00:00:00.5339113}, however when I call the same method from my MVC application it seems to add another two seconds to the time to execute. Both are being run on the same machine.

Does anyone know of any way of identifying what's causing the bottle neck. I've tried using the profiler in visual studio, but that hasn't helped.

238. <https://stackoverflow.com/questions/15036174/multiple-web-roles-inside-one-cloud-service>

T: Multiple web roles inside one cloud service?

Q: In my mvc application adding one web role(same project with another web role) in service definition file, but am getting an error like "No Project Associated with(webrole name)".

My query is,

1) Is there any chance to run the one project with two web roles?

2) Presently my application is working one web role with one instance and VMsize="small".but my application running with low performance.

3)Is there any chance to increase the application performance by increasing the number of instance in the role?

A: The error "No Project Associated with ..." means that you have specified the existence of another web role, but there is no project in your solution (ASP.NET webproject, MVC project) that should be deployed as that webrole. Make sure you have two web projects in your solution, when using two web roles.

As an alternative you can deploy to web projects in a single web role.

Increasing the VM size gives your web role more resources (CPU speed, RAM, ...) to perform, which might increase the performance experience for visitors.

Using more instances won't make the application faster, but since all requests are shared amongst the instances, you can serve more users at the same time.

239. <https://stackoverflow.com/questions/11790744/wcf-or-normal-bll-which-one-is-a-better-solution>

T: WCF or Normal BLL which one is a better solution?

Q: we are going to develop a big web application in MVC 3, and need to improve the Performance and speed of the application, so we have decided to use WCF. But is there a good way to write all our business logic in WCF ? What is a good way to use WCF effectively?

One more problem is that there are a large number of classes, so a large number of service references will need to be added to the project.

### How can i effectively implement WCF for good performance?

A1: No, it is not better performance to add distribution layer into your app, otherwise, it will slow down performance, more complicated. The first rule of distribution **is not distribution** because you have to deal with: serialization, security....

Think about why you need to make your app distributed, do your app need to be public as services and consume from iSO, Android or WPF. If not, don't use, go ahead with business layer as DLL.

A2: Having an extra physical tier will harm rather than increase raw performance of a request but it may increase scalability and can give you extra options in terms of security architecture. For raw throughput you should use an in memory DLL.

However, you can keep your options open by programming to an abstraction to get the data and then put an in-memory DLL or WCF proxy behind the abstraction if other requirements warrant it

240. <https://stackoverflow.com/questions/23506633/signalr-hub-self-host-or-not>

T: SignalR hub self-host or not?

Q: I'm working on a project where a SignalR hub starts up 12 short-running threads (new Thread()). Each thread reports to the client on completion using websockets. The threads are not CPU-intensive, instead they get some information from other web-services.

Now my dilemma is this: Should I create a stand-alone self-hosted signalR hub application that is run as a service or should I just include the hub in my asp.net MVC project?

What is best performance wise?

A1: The correct way to do this in .net 4.5 onwards is to do this **single threaded asynchronous**.

**ASP.Net should NEVER be creating new threads**. There are huge performance implications when explicitly using threads with ASP.Net.

Also you should know that *threads are an abstraction of limited CPU resources* (you noted as much by stating that your threads are not CPU intensive). In .net 4.5 onwards, that should tell you that you should NOT be using threads. [Instead, in this case you should be using a threadless I/O api to call your webservices](#). I would advise you use the TAP (aka async await)pattern, which is basically .net 4.5.

This should allow you to scale with a moderately powerful machine to thousands of concurrent request.

If you have all of this in place, using TAP, ASP.Net MVC/IIS will play well with massive parallelization and "threading". In this case I would **advise highly against using a windows service**, as you will have better stability with IIS as your bootstrapper (handling lifetime, and restarting your service if it dies).

A2: If performance is an issue I would use Thread Pool and not new Thread.

And i will host is a windows service , becuase that would give me more control in term of resources to allocate to the threads.

241.<https://stackoverflow.com/questions/16417054/nhibernate-should-have-only-one-work-query-inside-session-or-multiple-query>

T: Nhibernate should have only one work query inside session or multiple query?

Q: I am very confusing about design pattern with Nhibernate and worried about performance, scalability.

should we put one query inside Nhibernate session or multiple query both select and insert inside session.

I now using session per request in ASP.NET MVC, this design make the one session associate with select, insert,update delete.

I would be grad if you can give me some add vice or unit or work session.

A: Using only one query in each session would completely negate all features and meanings of a session. Take change tracking for example: NHibernate needs to flush the same session that loaded/inserted the entity to know what changed.

Using session per request is perfectly fine and most likely the most common pattern when using NHibernate in ASP.NET.

242.<https://stackoverflow.com/questions/39664595/mvc-website-on-azure-super-slow-on-first-load-of-each-page>

T: MVC website on Azure super slow on first load of each page

Q: I'm having a major issue with performance on an MVC site we are developing. When the site is hosted in Azure, the rendering phase of views takes a huge amount of time the first time a page is loaded, we're talking 15-60s per page. Subsequent loads of the same page thereafter are nice and fast, as one would expect. This is a trace from Glimpse for a hit on a page for the first time:

As you can see from the graph, the Razor rendering seems to be the main offender. I've read lots of things about pre-compilation of Razor views and I've tried implementing this but it made no difference for us at all. I'm also engaging with the Azure Web App devs who pointed fingers at Glimpse being an issue, but I've tried the app without Glimpse installed and it's still as slow as usual.

I'm getting pretty stuck here...any ideas?

A: I found a solution for faster startup time of MVC apps, most notable on Azure App services. The trick is to precompile the views, so App services doesn't have to do that for every view that is needed at the time of the request.

The summary of my findings:

Add this to the **MSBuild** arguments and you'll have a ASP.NET MVC 5 that will start up faster and every new page will load faster.

/p:PrecompileBeforePublish=true /p:UseMerge=true /p:SingleAssemblyName=AppCode

More information can be found here: <http://blog.deltacode.be/2017/01/08/fix-slow-startup-of-asp-net-mvc-5-on-azure-app-services/>

A2: Is it the first time loading each page, or the first time hitting the site after inactivity?

The IIS takes a while to boot up after you upload new files to the app container. So the first page hit after you've updated the app will be slower. Also Azure Web Apps get dehydrated after a period of inactivity. This also causes the first page hit to be very slow if the page hasn't been accessed in a while.

To combat this, in the **Application Settings** for the web app, you can find a setting called **Always On**, which basically pings your page every couple minutes to keep the app hydrated and responsive.

243. <https://stackoverflow.com/questions/25963795/issues-with-creating-application-as-a-web-service-vs-regular-mvc>

T: Issues with Creating application as a Web Service vs Regular MVC

Q: I am working on a web application. The requirement is that in the future the application may also be used by other web application and mobile application.

My idea was to build the whole business logic layer as rest web service and build web client to consume this.

Later I can use the same thing in case I want to build a mobile client or give it to external parties. This saves me from writing a separate api code.

1. Is this the correct way?
2. Will it have any performance impact?
3. What is the primary reason of not adopting such an approach.?

I am using Java ,spring MVC,spring,hibernate and Mysql as the development stack

A: This question as-is is too broad, but the pattern you're discussing is a very workable design. It does have some performance penalty, but it also makes your code more decoupled, easier to test, and easier to scale horizontally. If you look for resources on "microservices", you'll probably see the sort of design patterns you're looking for.

244. <https://stackoverflow.com/questions/20783009/portlet-development-performence-issue>

T: Portlet development performance issue

Q: I am creating a portal project on websphere portal server. This project will be developed with the feature of virtual portal. There will be 60-70 portlets deployed on virtual portals. I have decided to develop portlets using spring mvc framework. Please someone suggest me that would it be fine to use spring for portlet development as there will be 60-70 portlets on the portal server and as many spring context and associated beans? will there be performance overhead due to those many numbers of contexts and beans.

If there are issues then what can be other options. Any help will be highly appreciated.

A: In case of Spring, all Beans are loaded at application's first start only and after that they are reused...addition to it Spring is efficient in managing beans

245. <https://stackoverflow.com/questions/6292867/high-performance-middleware-communication-for-distributed-application>

T: High performance middleware communication for distributed application

Q: I am designing a distributed architecture where we will have a web front end (probably ASP.NET MVC and eventually ExtJS as well), then certain number of application modules as backend services, my idea is to be completely free to deploy these .NET services in one or two or 3 different servers so I can distribute work load among several machines.

Which technology should I use to write and communicate among those back end services?

for example, if I write .NET WCF wrappers for my business logic (.NET class libraries) I believe I can change the binding and use named pipes for high performances in the same box or when deploying in multiple servers I just change the bindings in the configuration file to use netTCP and everything should work hopefully.

About the WCF services in themselves, better to host them in IIS or in a custom written windows service?

My point is to really get the highest possible performances and design an architecture scalable and reliable with no compromises on network traffic or delays, that's why I am thinking about WCF vs xml web services, to use binary transfers instead of SOAP.

A: "Highest possible performances" is a nebulous target, you never really know what the highest possible target is for a system. All you can do is measure and test, to see if your system meets your performance requirements.

I recommend using WCF and IIS, to start with. Better still, try a fraction of your system, as a proof of concept for chosen technologies. Then profile to see where/what is too slow for your requirements. WCF/IIS approach gives the easiest implementation and maintainability. Then if you find that IIS is causing too many limits (and cannot be configured to remove those limits, IIS has a lot of config), then you can do self-hosting for your services. Also, if SOAP is using too much bandwidth for your requirements, then try binary transfers. If you can implement a fraction of your system upfront to do these tests, then you can avoid some rework.

A2: Do you want API to help you build service layer quickly, manage service layer, reconfigure service layer easily, etc. or do you need to build high performed service layer where everything unneeded must be avoided?

WCF is generic (unified), configurable and highly extensible API to build service layer. But these configuration, extensibility, unification have costs. The first cost is complexity of the API which is quite funny because when API is not extensible developers complain about it and when it is extensible developers complain about its complexity and performance impact.

Yes all these stuff has performance impact. There is a lot of layers in WCF and lot of things are sometimes handled less efficiently to maintain unified model, extensibility, configuration, etc.

If you really need high performed service layer where every single performance decrease matters then you must build your own hardcoded communication layer following exactly requirements and expectations your client have. Even that highest possible performance is nothing. If the client have a requirement for the performance he must specify the requirement in measurable way - for example:

- the system must be able to serve xxx concurrent requests
- the average time of serving the request must be xxx ms
- the highest time of serving the request must be xxx ms

There is also no need to optimize the application for requirements which haven't been defined

246. <https://stackoverflow.com/questions/8183590/clear-an-object-from-the-browsers-cache-in-mvc>

T: Clear an object from the browser's cache in mvc

Q: I have a MVC application in c#. I have a page which contains numbers of images. Once the page is loaded then all the images are being stored in the browser's cache. But when I change the image, it does replace the old images. Since the old and new image has the same name and the images are being fetched from the browser's caches. However, if I refresh the page with Ctrl+F5 then it renders the new images. Is there any way so that I can delete only that old image from the browser's cache? I can not delete all the cache of the browser, since its contains many images which should be cached. Only that images should be deleted from the cache which is getting changed.

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Thank you very much for all of your replies. There are some point which I should mention here: 1. I can not use query string because that single page contains many section with different images and that particular image is rendering in the different sections. 2. I can not add the new guid or datetime with the image's url because if I do

this then every time whenever page is being refreshed a new server call will happen and images will come from the server and that page rendering the same image in many places.

So to reduce the server call and to make the performance fast, I have to remove only that image from the browser cache.

A1: Does the image have a unique value like a version or created datetime? If so you could add it to the filename or as a querystring. The browser would cache the images but a new value in the QueryString would request the new image.

A2: not possible without going through a whole lot of trouble, believe me, you really just want to hit ctrl+f5 here ;)

A3: If your saving a new image, say for example a new profile image for the user, you can use a Guid.NewGuid() as the file name (or part of the file name) in order to guarantee a unique image that will be reloaded in the browser.

247. <https://stackoverflow.com/questions/18081020/entity-framework-5-query-runs-slowly>

T: Entity Framework 5 query runs slowly

Q: The first time I run a query it takes about 10 seconds to execute, but when I refresh the page the second time it takes less than a second to execute.

I have run Visual Studio's Performance Analysis tool to see where is the problem and it seems that the GetExecutionPlan() method is consuming most of the time.

I guess the plan is being cached since the second time the query is run (on a page refresh) the query is executed really fast (less than a second).

I understand that the performance of first page load is limited since the query is really complicated (the SQL code dumped to DB is about 4k lines long). But the problem is that if I return to the page in an hour or so the query is slow again. It seems like the execution plan cache is cleared somehow? I've checked IIS settings and all application pool recycling setting are turned off.

Just to be clear, I'm not looking for methods to optimize my queries, I'm wondering why my query behaves strangely: first load slow, second load fast and load after one hour again slow.

Any ideas?

A: There's an internal class System.Data.Common.QueryCache.QueryCacheManager in EntityFramework.dll v5.0.0.0, which does what it says, but is a bit complex.

**Here's what I'm pretty sure about:** There is a timer which is started (if not already running) when a plan is added to the cache. The timer triggers a sweep of the cache every 60000 milliseconds (1 minute), and the cache is then actually swept if there are more than 800 plans cached. Plans which have not been re-used since the last sweep are evicted from the cache. If the cache has fewer than 800 plans in it, the sweep is skipped and the timer is stopped.

**Here's what I'm not so sure about:** There's part of the cache sweep I don't quite understand, but I assume it's clever. It looks like the algorithm makes it harder for a plan to stay in the cache the more sweeps it lives through, by bitwise shifting its hit count rightward by increasing amounts each sweep. On the first and second sweep it gets shifted 1, then 2, then 4, up to 16. I'm not sure what the reason for this is, and I'm having a hard time figuring out exactly how many times a plan needs to be used for it to stay in the cache more than 5 minutes. I'd appreciate it if anyone could give more information about 1) exactly what it's doing, and 2) what the rationale might be for doing this.

Anyway, that's why your plan isn't being cached forever.

248. <https://stackoverflow.com/questions/1035642/asp-net-mvc-vs-webforms-speed-and-architecture-comparison/1035854#1035854>

T: ASP.NET MVC vs WebForms: speed and architecture comparison

Q: I had an argument with one of my friends who is an architect at a pretty large internet company. Basically he was saying that ASP.NET MVC is not for large-scale enterprise applications, that it is not as flexible as WebForms, and that an MVC app will be slower than a web forms app.

From my own experience working with MVC, I can say that it is more flexible and it is lighter weight because there is no page life cycle, viewstate, etc.. It should thus load faster at the very least. As far as I know, MVC is designed for medium to large scale traffic.

What do you guys think? Has anyone compared speed and performance? And is ASP.NET MVC better for large scale apps than ASP.NET WebForms?

In short, between these two choices, which would you choose to use for a large scale enterprise application?

A1:

- A: Development Speed: WebForms
- Performance Speed: MVC
- Ease of Use: WebForms (Typically)
- Unit Testing: MVC (Typically)

A2: This site is a best example of ASP.net MVC's performance and scaling

Some features which I think which is necessary for Enterprise and which MVC provides are

1. **Unit testing** - even though it takes time to implement this initially it saves lots of time in the future
2. **Separation of Concerns** - this really improves development and modification speed
3. **Performance** - since both MVC and Webforms use the same ASP.net as the core framework and MVC is lighter and HTTP compliant it gives you better performance

A3: I think MVC is a lighter framework, and more performant because it doesn't do a lot of the things that the WebForms framework does out of the box, like viewstate for example. I don't think it would be fair to say that MVC is not for larger scale applications, as it probably scales better than WebForms would in terms of performance. In terms of out of the box features, WebForms does more for you because it handles state between posts for you, via viewstate, etc.

I don't have any links to performance comparisons with me, but I would be extremely surprised if there aren't any out there. Even microsoft probably has some.

A4: The groupthink and cargocult programming is strong in this thread. Your architect friend is both right (probably for the wrong reasons) and wrong at the same time.

that it is not as flexible as WebForms

This is just silly. You can do anything with anything. They are both incredibly flexible. In terms of flexibility MVC is likely the clear winner here as you can easily achieve Aspect Orientated Programming (AOP) using ActionFilters. Another reason MVC is likely the winner here is that dependency injection is thought of in MVC. You can have inversion of control and dependency injection in WebForms but it requires complex implementations involving the Model-View-Presenter pattern.

MVC app will be slower than a web forms app.

This is invalid to claim, as written. Any application can be written slower comparatively as it's a complex process involving many aspects to reach an end product. However, in terms of raw speed. **Webforms is substantially faster.** <https://stackoverflow.com/a/20253243/37055>

it is lighter weight because there is no page life cycle, viewstate, etc.. It should thus load faster at the very least. This is also an invalid statement to make. Page life cycle is irrelevant in all aspects because there are corollary life cycles in MVC in regards to controllers and action filters. View state is interesting... if you choose to stuff

100s and 1000s of kilobytes of data into view state requiring every postback to the server to have 1MB-5MB request, yes it will obviously be faster to do nearly anything differently. This isn't webforms fault, nevertheless webforms allows you to fall into the pit of failure very easily with viewstate.

is ASP.NET MVC better for large scale apps than ASP.NET WebForms?

No. Yet the answer to this question "is ASP.NET WebForms for large scale apps than ASP.NET WebForms ?" The answer is also **No**. The answer is no, because the answer is always **it depends**. Every framework has pros/cons and you need to measure those, there is not definitive answers.

If you're building a content driven site who's job is to have the fastest possible page load times such as [www.microsoft.com](http://www.microsoft.com) then you might very well choose webforms.

which would you choose to use for a large scale enterprise application?

First, you very likely don't have this problem. You would not be in a position to ask this question if you were truly responsible to architect a large scale enterprise application. (or the hiring process didn't actually require large scale development experience).

In terms of a large scale application the framework you choose is almost meaningless. Large scale applications are built on queuing. They will leverage tools such as MSMQ either directly or through a servicebus such as: Mass Transit, Azure Service Bus, or NServiceBus. Only with queuing can you reach the scale to handle millions of requests the way Amazon, Ebay and every other major player does.

249. <https://stackoverflow.com/questions/3304588/store-user-profile-pictures-on-disk-or-in-the-database>

T: Store user profile pictures on disk or in the database?

Q: I'm building an asp.net mvc application where users can attach a picture to their profile, but also in other areas of the system like a messaging gadget on the dashboard that displays recent messages etc.

When the user uploads these I am wondering whether it would be better to store them in the database or on disk.

### Databse advantages

- easy to backup entire database and keep profile content/images with associated profile/user tables
- when I build web services later down the track, they can just pull all the profiile related data from one spot(the database)

### Filesystem advantages

- loading files from disk is probably faster
- any other advantages?

Where do other sites store this sort of information. Am I right to be a little concerned about database performance for something like this?

Maybe there would be a way to cache images pulled out from the database for a period of time?

Alternatively, what about the idea of storing these images in the database, but shadow copying them to disk so the web server can load them from there? This would seem to give both the backup and convenience of a Db, whilst giving the speed advantages of files on disk.

### Infrastructure in question

- The website will be deployed to IIS on windows server 2003 running NTFS file system.
- The database will be sql server 2009

### Summary

Reading around on a lot of related threads here on SO, many people are now trending towards the SQL Server FileStream type. From what I could gather however (I may be wrong), there isn't much benefit when the files are quite small. FileStreaming however looks to greatly improve performance when files are multiple MB's or larger.

As my profile pictures tend to sit around ~5kb I decided to just leave them stored in a filestore in the database as varbinary(max).

In ASP.NET MVC I did see a bit of a performance issue returning FileContentResults for images pulled out of the database like this. So I ended up caching the file on disk when it is read if the location to this file is not found in my application cache.

So I guess I went for a hybrid; - Database storage to make baking up of data easier and files are linked directly to profiles - Shadow copying to disk to allow better caching

At any point I can delete the cache folder on disk, and as the images are re-requested they will be re-copied on first hit and served from the cache there after.

A1: Actually your datastore look up with the database may actually be faster depending on the number of images you have, unless you are using highly optimized filesystem engine. Databases are designed for fast lookups and use a LOT more interesting techniques than a file system does.

reiserfs (obsolete) really awesome for lookups, zfs, xfs and NTFS all have fantastic hashing algorithms, linux ext4 looks promising too.

The hit on the system is not going to be any different in terms of block reads. The question is what is faster a query lookup that returns the filename (may be a hash?) which in turn is accessed using a separate open, filesend close? or just dumping the blob out?

There are several things to consider, including network hit, processing hit, distributability etc. If you store stuff in the database, then you can move it. Then again, if you store images on a content delivery service that may be WAY faster since you are not doing any network hits on yourself.

Think about it, and remember bit of benchmarking never hurt nobody :-) so test it out with your typical dataset size and take into account things like simultaneous queries etc.

**A2: Store references to the files on a database and store the files themselves on disk.**

This approach is way more flexible and easier to scale.

You can have a single database and several servers serving static content. It will be much trickier to have several databases doing that work.

Flickr works this way.

Hope it helps.

250. <https://stackoverflow.com/questions/137755/how-is-a-real-world-simulation-designed>

T: How is a real-world simulation designed?

Q: I am fascinated by the performance of applications such as "Rollercoaster Tycoon" and "The Sims" and FPS games. I would like to know more about the basic application architecture. (Not so concerned with the UI - I assume MVC/MVP principles apply here. Nor am I concerned with the math and physics at this point.)

My main question deals with the tens or hundreds of individual objects in the simulation (people, vehicles, items, etc.) that all move, make decisions, and raise & respond to events - seeming all at the same time, and how they are designed for such good performance.

**Q: Primarily, are these objects being processed in a giant loop, one at a time - or is each object processing in its own thread?** How many threads are practical in a simulation like this? (Ballpark figure of course, 10, 100, 1000)

I'm not looking to write a game, I just want the design theory because I'm wondering if such design can apply to other applications where several decisions are being made seemingly at the same time.

A: There are two basic ways of doing this kind of simulation [Agent Based](#) and [System Dynamics](#). In an agent based simulation each entity in the game would be represented by an instance of a class with properties and

behaviors, all the interactions between the entities would have to be explicitly defined and when you want these entities to interact a function gets called the properties of the interacting entities gets changed. System Dynamics is completely different, it only deals with sums and totals, there is no representation of a single entity in the system. The easiest example of that is the Predator and Prey model.

Both of these have advantages and disadvantages, the System Dynamics approach scales better to large number of entities while keeping runtime short. While there are multiple formulas that you have to calculate, the time to calculate is independent of the values in the formula. But there is no way to look at an individual entity in this approach. The Agent based approach lets you put entities in specific locations and lets you interact with specific entities in your simulation.

FSMs and [Celular automata](#) are other ways in how to simulate systems in a game. E.g. in the agent based approach you might model the behavior of one agent with a FSM. [Simcity](#) used Celular automata to do some of the simulation work.

In general you will probably not have one big huge model that does everything but multiple systems that do specific tasks, some of these will not need to be updated very often e.g. something that determines the weather, others might need constant updates. Even if you put them in separate threads you will want to pause or start them when you need them. You might want to split work over multiple frames, e.g. calculate only updates on a certain number of agents.

A2: The source code to the original Simcity has been open sourced as [Micropolis](#). It might be an interesting study.

A3: Until very recently, the game's logic and management was in a single thread in a big finite state machine. Now, though, you tend to see the different pieces of the game (audio, graphics, physics, 'simulation' logic, etc) being split into their own FSMs in threads.

Edit: Btw, threads are a very bad way of having things in a simulation happening at the 'same time' -- it leads to race conditions. It's common that when you want to have things going on at the 'same time', you simply figure out what needs to happen as you iterate over your data and store it separately, then apply it once all the data is processed. Rince, repeat.

A4: In addition to the suggestions posted I would recommend browsing the simulation tag at sourceforge. There are a variety of simulation project at varying levels of complexity.

#### [Sourceforge](#)

Also I recommend the following book for a basic overview, While it is focused on physics it deals with issues of simulation.

#### [Physics for Game Developers](#)

251.<https://stackoverflow.com/questions/1114166/i-created-my-own-view-state-facility-for-mvc-good-or-weak-practice>

T: I created my own view state facility for MVC. Good or weak practice?

Q: Ok, I admit it - I wrote my own view state facility for ASP.NET MVC. I am interested in others' critique, especially given all the view state bashing associated with WebForms. On the other hand, in *Pro ASP.NET MVC Framework* (p405-406) Steven Sanderson says "I feel that as a general web design pattern, [ViewState] is completely sound: web developers have always preserved data in hidden form fields; this just takes it to the next level by formalizing that technique and providing a neat abstraction layer." Given my specific problem, it seemed like a reasonable approach to create such a lightweight abstraction layer while retaining MVC's strengths of transparency and testability.

In question form:

- Is using ViewData the best or at least a strong way to solve my problem?
- Are there serious weaknesses (e.g., performance, security) in my specific approach?

- How well does the approach fit with the MVC design esthetic?
- Is there a better solution? If so, what is it and why?

I am writing a secure interface to administer users/roles/accounts - that sort of thing. Data retrieved from the database has a identity token and a timestamp used for optimistic concurrency control. For operations like editing, the identity and timestamp have to be associated with the client operation, which calls for some sort of client-side persistence. The timestamp is a key driver of this client-side persistence, since updating a record requires checking the retrieval timestamp against the current timestamp to see if another user has updated it since it was originally retrieved. The integrity of the timestamp must be preserved since a malicious user could overwrite database records by manipulating it.

The usual persistence options are ViewData, TempData, and session state. I didn't seriously consider other options such as writing my own database facility. I chose ViewData since the data can be retained for more than a single round-trip (e.g., the state is retained even if a client jumps to another page and back) and because I wanted to avoid a lot of session data management. My thinking is that the approach will be fairly low overhead and secure, if only select data are stored in ViewData and if it is protected with a HMAC (hashing code message authentication) code.

In practice, I use a pair of functions Encode/Decode to serialize the data and calculate the HMAC code, and an Html helper Html.FormState() to store the serialized data on the form. (The Encode/Decode API is a little more involved than I show, enabling me to store multiple objects, etc.) I also pass the state back into the action method as an argument. This maintains a design with a functional flavor and thus promotes testability. Here's a sample (the inline assignment to ViewData is just for illustration):

A: The question is reasonable.

Web applications are going to need to store data between requests that's associated with either the user, or the specific request. The typical mechanisms -- hidden form values, server side state, and cookies -- all have their advantages and disadvantages.

When storing information specific to a given request, I tend to default towards hidden form values, because it offers the best scalability (no server-side information store). The downside is, of course, that the page can become bloated if you aren't careful about exactly how much information you store. You also need to ensure that the posted-back data is valid, since it could be tampered with by bad guys (digital signatures and encryption both being reasonable solutions).

So to me, your solution seems perfectly reasonable. I have done similar things in the past (with my Dynamic Data for MVC sample), even going so far as to build a custom model binder which allowed me to get access to the deserialized object directly in my action methods (which made unit testing them simpler, since they weren't relying on having encrypted data in form fields).

252. <https://stackoverflow.com/questions/4508690/scalability-of-a-php-application>

T: Scalability of a php application

Q: I built my application using cakephp. It works fine. My application still in beta with 3000 beta users(invites based). I am want to expand it for bigger end user base.

Few things about my app.

1) I am using mysql database table has around ~ 25000 records. 2) Multiple models and many multiple hasMany and belongsTo and HABTM relationships

First Question. 1) How I can I improve my site performance. 2) What is result limit from queries on the database(10s). 4) Should I move application to newer technology or framework.

The number of records and relationships are growing.

I started app in cakephp less than three months back with little (MVC) knowledge. It is amazing easy to build and test applications. I would recommend it to friends anyday.

I appreciate any help.

A: A quick google search resulted in the following sites, all dedicated to speeding CakePHP up considerably. In addition, here are my thoughts on Cake's speed:

1. Make sure you're using the latest Cake release. The update from Cake 1.2 to 1.3 yielded about a 20% speed boost for my biggest app.
2. Make sure you have caching turned on (for most read-intense applications, this will help massively).
3. If you have a LOT of models that are related, but infrequently used, try loading those models lazily. Remember that Cake isn't really built for speed. The other answers here are good for generic situations, but with CakePHP, the bottleneck is usually with the web layer. So one (fairly simple) way to scale out is to load your pages through a proxy server that passes requests to a backend processing farm.

Also, I highly recommend that you profile your code. This means using an IDE like Zend, where you can insert breakpoints to determine the slow sections of your code. At a minimum, install the Cake debug toolbar, which will show you execution times for major sections of your app (request handler loading, controller execution, view render time, etc.)

Results for google search on "optimizing CakePHP for speed":

- Good CakePHP specific tips: <http://www.endyourif.com/optimizing-cakephp-websites/>
- Lazy Load models: <http://bakery.cakephp.org/articles/Frank/2010/08/10/optimizing-model-loading-with-lazymodel>
- More Cake Tips: <http://www.pseudocoder.com/archives/2009/03/17/8-ways-to-speed-up-cakephp-apps/>

#### A2: How I can I improve my site performance?

Hard to say without knowing where the bottleneck is. One approach would be to:

1. Start by optimising your SQL queries, enable slow query logging and examine them, properly index columns, and change SQL server's configuration if needed.
2. Profile PHP execution, analyse report and make sure to refactor the code where needed.
3. Introduce caching, flat files, SQL caching, APC, Memcache etc. (just don't use all of them together :)
4. Optimize server configuration, including software and hardware.
5. Move to several servers.

#### What is result limit from queries on the database(10s)?

You mean execution time? As fast as possible :) But then again, depends on the query itself. If the query is executed once every day, it can be slower than if it is executed with every request. Time depends on first question/answer above.

#### Should I move application to newer technology or framework?

This one is hard to answer. Again, depends on what the problems are and whether you can identify and fix them. If you can solve them by optimizing queries and database, caching etc., then the problem is not in the framework. I strongly advise to think about it thoroughly before switching to another technology or rewriting the code.

253. <https://stackoverflow.com/questions/221944/is-there-a-performance-difference-between-asp-net-mvc-and-web-forms/221947#221947>

T: Is there a performance difference between asp.net mvc and web forms?

Q: I know there is a learning curve, but what about performance? It seems to me that web forms would be less performant, but I havent tried MVC yet to know for sure. What is everyone else experiencing?

A: This is almost a duplicate question. Here are some similar discussions:

[ASP.NET MVC Performance](#)

[What are the key differences between ASP.NET webforms and MVC](#)

## Biggest advantage to using ASP.Net MVC vs web forms

A2: This is debatable because both of them have different performance pros and cons, for example ASP.net MVC gives you control over the HTML/JS that gets to the browser, so you can minimize the amount of data on wire to make the whole application weight less, however ASP.net MVC routing have so much dependency on Reflection, which is relatively slower than fetching a file from the disk which Web Forms is doing.

254. <https://stackoverflow.com/questions/5242244/microsoft-enterprise-library-opinions>

T: Microsoft Enterprise Library Opinions

Q: Has any one used Microsoft's Enterprise Library, if so what parts of it did you use?

I am using building a website (I guess the client app type is not important, it can be a Windows app as well) with all the architectural layer, and I am specifically interested in the exception handling, logging and caching blocks for now. Any one used these, what were the good and bads of your experience with, any alternatives that you rather decided to use? Performance is a thing that I am also interested in.

I am looking for a decent exception handling framework which is how I came across the exception handling block. Anything other out there?

Is it a wise idea to use the data access block with an MVC application seeing that everybody is the repository pattern with an ORM framework?

I am still researching frameworks, so I would like to hear as many opinions.

A1: For Exception Handling we initially used ELMAH and Log4NET.. but later shifted to Enterprise Library as the client wished to use a more robust and enterprise ready solution. By no means I am saying that ELMAH or Log4NET is not enterprise ready however EntLib does gives you more power. You can read another post here for more details: [ELMAH vs Enterprise Library Exception Handling Block](#)

Is it a wise idea to use the data access block with an MVC application seeing that everybody is the repository pattern with an ORM framework? - I would not recommend using DAB if you are using repository pattern with an ORM framework.. Especially with EntityFramework the whole point of having a DAB goes for toss.

For Caching - I would recommend using Caching app block to start with and check if Velocity comes in by the time you plan to deploy...

255. <https://stackoverflow.com/questions/6716288/what-hosted-server-configuration-do-i-need-for-a-medium-scalable-web-application>

T: What hosted server configuration do I need for a medium-scalable web-application? I know this is off topic now and I will close

Q: I have a Microsoft ASP.NET MVC web application with SQL Server 2008. Currently running on a single server, performance is reasonable. However I now need to deploy the same application to support much higher volumes - 10,000 basic orders per week.

I believe that I will need a separate database server and one or two web-servers.

If I host at somewhere like 1&1 or Rackspace I presume they will advise. However I would like some idea before I start any discussions.

One area I'm not sure about is the windows server versions I should be using, CPU/memory requirements, whether these hosting providers offer load-balancing and kinds of costs involved.

Any help appreciated :-)

A: Hm, a final answer does not seem to be possible here. What I'd do:

1. understand and document your non-functional requirements. E.g. what does 10,000 orders per week mean? Think of transactions/second, concurrent/users, required uptime, storage
2. You are in the good position of having an application available. Perform a benchmark (load test) to define your current state baseline and to answer the question of how many orders you can accommodate today. If you gathered this information you can perform some analysis and see where your bottleneck is. Maybe you can increase throughput by e.g. optimizing some SQL queries, etc.
3. Verify that your application architecture supports scale-out. Maybe you have things like schedulers which you have to synchronize in a clustered environment. Another example is direct file system access from within your web server which may require you to have shared storage (SAN, etc.)

**Regarding versions/CPU/memory:** I really cannot answer this question. Performing your baseline test enables you to get an idea of what you need. Software versions really depend on what you do in detail and what your environment supports.

In general I cannot see a reason to not using W2K8R2 and SQL2008, but again, it depends mainly on your application architecture. Maybe you use certain components not available/supported any more on the newer MSFT software stack. If this is a Microsoft shop you could have a look at Microsoft Azure.

256.<https://stackoverflow.com/questions/20150378/should-i-use-hilo-with-nhibernate>

T: Should I use HiLo with NHibernate?

Q: I am creating a ASP.NET MVC website where people can save their bookmarks. There is no limit on the number of bookmarks each user can store so the database tables may grow quite large.

Many to many relationship:

- A bookmark can have many tags
- A tag can have many bookmarks

My tables use identity to generate ids in a MSSQL database. When I insert a bookmark with NHibernate this results in multiple requests to the database. Up to 10 requests. I know there are alternatives to generate ids like HiLo, but I am not sure if I really need it.

This article suggests using HiLo in case of a greenfield application:

<http://nhibernate.info/blog/2009/03/19/nhibernate-poid-generators-revealed.html>

Questions:

- Should I use HiLo in my situation?
- Are there any disadvantages of using HiLo?
- In what situations are these multiple requests to the database going to hurt performance?

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Questions:

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- Are there any disadvantages of using HiLo?
- In what situations are these multiple requests to the database going to hurt performance?

257. <https://stackoverflow.com/questions/2979672/linq-to-sql-and-realtime-data>

T: Linq to SQL and Realtime Data

Q: I have an application that needs to constantly (every 50ms), call to an MVC action, and pickup/drop off data.

I am using Linq to SQL and MVC because of how simple they are to implement, and I know that they aren't perfect when it comes to performance, but it works relatively well, but the best speed I can get with my current approach is 200ms (without requests overlapping).

Each call to the site will create a new instance of the datacontext, query/insert it and return that data.

Is there a way to have the datacontext static, but submitchanges say every 5 seconds, so that i am pretty much hitting an in-memory version of the data?

**Edit:**

I built a completely disconnected architecture that contains all the same properties and objects of my context, and I statically declare that object on application\_start(), and on every X requests, a thread is spun to attach all the disconnected objects and store it to the database.

This has successfully reduced my round-trip time to only 100ms, a great improvement, but it is still lacking from what it needs to be for "real-time"

I'm getting to the level of micro-optimization, but I can't seem to push it any faster.

A1: `DataContext` is meant to be created each time you go to the database. That shouldn't be a bottleneck. If you're concerned about expensive creation of database connections, that might not be a problem. There is a small connection pool so the connections are reused by subsequent calls.

What you can do to improve performance (I haven't heard a word it is poor right now) is to replace the auto-generated SQL with stored procedures. You will save a little bit on recreation of an execution plan.

A2: I don't think that creating a LINQ context/querying is your bottleneck here. There is a slight overhead in using it (just like any ORM), but it shouldn't be significant to you unless you are creating a LOT of contexts and complex query trees.

My guess would probably be that LINQ is not generating the query that you are expecting. It may actually generate a bunch of queries if you are not careful, and try to fetch from several tables. If you want to find out what queries it is running you can use

```
context.Log = Console.Out; // Or some other stream
```

You can also use the excellent [LINQPad](#) to try out your queries. If this is not the problem you should profile your code using a profiler, I personally like [dotTrace](#).

A3: `CompiledQuery` may help with performance. But it will never be faster than classic ADO.NET. If performance is main concern, any ORM is very bad choice.

You can always mix them (Linq2SQL + ADO.NET) to achieve optimal performance.

258. <https://stackoverflow.com/questions/3831898/moving-c-sharp-in-process-functions-to-sql-server-clr-functions>

T: Moving C# in Process Functions to SQL Server CLR functions

Q: What are the limitations, unexpected pitfalls and performance traits of moving from in process C# code to SQL CLR Functions?

We currently have several data heavy processes that run very fast using in process C# Asp.net MVC project without using a db at all. Performance is very important. The application uses a static in memory cache and performs complex operations to arrive at a final result. Cache updating is a bit of a pain and we are considering moving some of these processes to SQL Server queries that would just output the final result so that less data caching is needed at the c# app level. The processes are complex and we know that moving to the database would require extensive use of SQL Server CLR functions.

We see a lot of advantages in leveraging the database, but the required use of CLR functions gives pause for a few reasons:

**No Azure:** SQL CLR functions are [not supported by Azure](#),

**High Testing Cost:** the SQL CLR functions could be slower and testing will take significant work

**Small User Base:** An hour of googling reveals that use of CLR functions is somewhat uncommon which makes community support (and possible MS support) a concern.

I would love to hear from someone who has moved a C# app from in process to CLR functions.

In your answers please assume that custom SQL CLR functions are required.

A: Your

- Compile
- Install
- Test
- Debug

Process is a lot harder with Sql Server CLR functions – I think you should automate as much of this as possible.

You may also need to get the agreement of a DBA every time you wished to update a function.

However after saying that “take your code to your data” can still be a very good option at times.

A2: You might be able to do it in Azure if you install SQLServer yourself and license it separately like it was on-premise, rather than taking their managed SQLServer environment options with the incremental upcharge for including SQLServer-as-a-service. But then configuring all the other infrastructure around supporting the database would be on you (backups, HA, etc.)

259.<https://stackoverflow.com/questions/7983270/azure-architecture-handling-security>

T: azure architecture - handling security

Q: Planning to migrate our existing application to Azure. Our existing architecture with security flow is as follows

- ASP MVC 3.0 UI layer that takes user name password from the user We are planning to migrate the UI layer onto a compute cloud. and will be accessible at say uilayerdomainname.com which would have a SSL cert.
- WCF REST webservices layer that amongst other things does authentication as well. This is currently on say servicename.cloudapp.net. (We could map it to servicelayername.com and get a SSL for that domain name as well).
- SQL Azure database

The UI layer sends the credentials to the service layer which authenticates it against the SQL azure database.

Question

- Both the WCF compute cloud and UI Layer are on the same region in Azure. Would the communication between these two be prone to man in the middle attacks? Does my WCF compute cloud need SSL as well? We do have two domain names with SSLs and so could just map the services to one.
- Is there any way I can restrict traffic between the UI layer and the WCF compute cloud - allow only the UI layer to access the services layer?
- Would the performance be better if I publish both the WCF services and UI layer on the same instance? It sort of shoots down the nice layered architecture but if it improves performance I could go with it. We don't want to jump through too many hoops to accomodate the app to Azure lest it becomes difficult to migrate out of it.

A: If you host your services in a Worker Role, then they can be available only to your Web Role. You can also host it elsewhere and monitor requests in code. Azure Roles in the same deployment can communicate with one another in a very specific way that is not available outside of the deployment.

In Azure deployments, you need to very specifically define your public endpoint because the roles are hosted behind a load-balancer. If you host your WCF service from within a worker-role it will not be accessible publicly.

Hope this helped

A2: If you configure the WCF service and UI layer to only communicate through internal endpoints then the communication is private. There is no need to purchase or configure an SSL certificate for the WCF service unless it is made public.

Further, the only traffic between these internal endpoints will be between your instances -- so, the traffic is already restricted between your UI layer and the WCF service.

This is the case for both Web roles and worker roles: you can configure a Web role hosting your WCF service to have a private internal endpoint.

Depending on the architecture of your system you *may* see better performance if you have the UI and WCF layer on the same machine.

If your interface is "chatty" and calls the WCF service several times for each UI request then you'll definitely see a performance improvement. If there's just one or two calls then the improvement is likely to be minimal compared to the latency of your database.

260. <https://stackoverflow.com/questions/2246251/how-do-i-improve-asp-net-mvc-application-performance/2246404#2246404>

T: How do I improve ASP.NET MVC application performance?

Q: How do you improve your ASP.NET MVC application performance?

A: A compiled list of possible sources of improvement are below:

#### General

- Make use of a profiler to discover memory leaks and performance problems in your application. personally I suggest [dotTrace](#)
- Run your site in Release mode, not Debug mode, when in production, and also during performance profiling. Release mode is much faster. Debug mode can hide performance problems in your own code.

#### Caching

- Use `CompiledQuery.Compile()` recursively avoiding recompilation of your query expressions
- Cache not-prone-to-change content using `OutputCacheAttribute` to save unnecessary and action executions
- Use cookies for frequently accessed non sensitive information
- Utilize [ETags](#) and expiration - Write your custom `ActionResult` methods if necessary
- Consider using the `RouteName` to organize your routes and then use it to generate your links, and try not to use the expression tree based `ActionLink` method.

- Consider implementing a route resolution caching strategy
- Put repetitive code inside your PartialViews, avoid render it xxxx times: if you end up calling the same partial 300 times in the same view, probably there is something wrong with that. [Explanation And Benchmarks](#)

## Routing

- Use Url.RouteUrl("User", new { username = "joeuser" }) to specify routes. [ASP.NET MVC Performance by Rudi Benkovic](#)
- Cache route resolving using this helper UrlHelperCached [ASP.NET MVC Performance by Rudi Benkovic](#)

## Security

- Use Forms Authentication, Keep your frequently accessed sensitive data in the authentication ticket

## DAL

- When accessing data via LINQ [rely on IQueryable](#)
- [Leverage the Repository pattern](#)
- Profile your queries i.e. [Uber Profiler](#)
- Consider second level cache for your queries and add them an scope and a timeout i.e. [NHibernate Second Cache](#)

## Load balancing

- Utilize reverse proxies, to spread the client load across your app instance. (Stack Overflow uses [HAProxy \(MSDN\)](#)).
- Use [Asynchronous Controllers](#) to implement actions that depend on external resources processing.

## Client side

- Optimize your client side, use a tool like [YSlow](#) for suggestions to improve performance
- Use AJAX to update components of your UI, avoid a whole page update when possible.
- Consider implement a pub-sub architecture -i.e. Comet- for content delivery against reload based in timeouts.
- Move charting and graph generation logic to the client side if possible. Graph generation is a expensive activity. Deferring to the client side your server from an unnecessary burden, and allows you to work with graphs locally without make a new request (i.e. Flex charting, [jqbargraph](#), [MoreJqueryCharts](#)).
- Use CDN's for scripts and media content to improve loading on the client side (i.e. [Google CDN](#))
- Minify [-Compile-](#) your JavaScript in order to improve your script size
- Keep cookie size small, since cookies are sent to the server on every request.
- Consider using [DNS and Link Prefetching](#) when possible.

## Global configuration

- If you use Razor, add the following code in your global.asax.cs, by default, Asp.Net MVC renders with an aspx engine and a razor engine. This only uses the RazorViewEngine.

- ```
ViewEngines.Engines.Clear(); ViewEngines.Engines.Add(new RazorViewEngine());
• Add gzip (HTTP compression) and static cache (images, css, ...) in your web.config<system.webServer>
<urlCompression doDynamicCompression="true" doStaticCompression="true"
dynamicCompressionBeforeCache="true"/> </system.webServer>
• Remove unused HTTP Modules
• Flush your HTML as soon as it is generated (in your web.config) and disable viewstate if you are not using it <pages buffer="true" enableViewState="false">
```

A2: [Code Climber](#) and [this blog entry](#) provide detailed ways of increasing application's performance. Compiled query will increase performance of your application, but it has nothing in common with ASP.NET MVC. It will speed up every db application, so it is not really about MVC.

A3: This may seem obvious, but run your site in Release mode, not Debug mode, when in production, and also during performance profiling. Release mode is *much* faster. Debug mode can hide performance problems in your own code.

A4: Not an earth-shattering optimization, but I thought I'd throw this out there - [Use CDN's for jQuery, etc..](#) Quote from ScottGu himself: The Microsoft Ajax [CDN](#) enables you to significantly improve the performance of ASP.NET Web Forms and ASP.NET MVC applications that use ASP.NET AJAX or jQuery. The service is

available for free, does not require any registration, and can be used for both commercial and non-commercial purposes.

We even use the CDN for our webparts in Moss that use jQuery.

261.<https://stackoverflow.com/questions/6421536/replacing-struts2-with-spring-mvc/6421631#6421631>

T: Replacing Struts2 with spring mvc

Q: I've seen plenty of questions about the difference between Struts2 and Spring MVC. But my question is the following:

I have a large-scale web app that needs reworking and its based on Struts2. What I want to do is integrate Hibernate + Spring + Spring Security + Potentially Spring DM (since we want to make it as modular as possible).

Now as you can see its already a lot of reworking, so I am wondering IF in case I leave Struts2 (to reduce a tiny bit my rework) would this cause a significant performance issue in the future?

My question is mainly a continuation the [question](#) asked by others before. However what I am interested in is not if its possible, more like what would cost in terms of performance if I keep Struts2.

A: I don't see "performance" as a key factor in the decision of replacing Struts2 with Spring MVC.

If your application currently has performance issues, I doubt that the core Web framework being used (Struts2 or Spring MVC) are the cause of it.

Most likely it's going to be the usage of the framework, or something unrelated to it (backend processing, database queries,...).

If your application doesn't have performance issues, replacing a technical component like Struts with Spring MVC will not influence it. Neither frameworks have major issues and are used in production environments without known performance issues.

The decision to switching to another framework should be based on other factors (support model, community support, functionalities offered by the framework, strategic architectural alignment,...)

A2: I don't think that can be answered without making performance test and profiling, because any performance bottlenecks would likely be in your use of the frameworks rather than in the frameworks themselves.

I'd strongly recommend testing before making estimations about the performance.

Also if you're going to switch to Spring MVC only on performance grounds my advice would be: don't do it.

A3: My advice: *If the application is not broken, don't fix it.* Look at the cost to replace Struts2 to Spring MVC and the benefits (include the revenue generation too). If the ROI is less than expenses, then don't do it.

262.<https://stackoverflow.com/questions/19044234/how-to-improve-performance-of-asp-net-mvc-web-api/21774621#21774621>

T: How to improve performance of ASP.NET MVC WEB API?

Q: I am developing web api in Visual studio 2012 and returning JSON result for each api call.

How to improve performance of WEB API?

A: You should keep following things in your mind while designing a web API:

HTTP Compression — HTTP compression can be used both for response bodies (`Accept-Encoding: gzip`) and for request bodies (`Content-Encoding: gzip`) to improve the network performance of an HTTP API

HTTP Caching — Provide a `Cache-Control` header on your API responses. If they're not cacheable, "`Cache-Control: no-cache`" will make sure proxies and browsers understand that. If they are cacheable, there are a variety of factors to consider, such as whether the cache can be shared by a proxy, or how long a resource is "fresh".

Cache Validation — If you have cacheable API hits, you should provide `Last-Modified` or `ETag` headers on your responses, and then support `If-Modified-Since` or `If-None-Match` request headers for conditional requests. This will allow clients to check if their cached copy is still valid, and prevent a complete resource download when not required. If implemented properly, you can make your conditional requests more efficient than usual requests, and also save some server-side load.

Conditional Modifications — `ETag` headers can also be used to enable conditional modifications of your resources. By supplying an `ETag` header on your GETs, later POST, PATCH or DELETE requests can supply an `If-Match` header to check whether they're updating or deleting the resource in the same state they last saw it in.

Chunked Transfer Encoding — If you have large content responses, `Transfer-Encoding: Chunked` is a great way to stream responses to your client. It will reduce the memory usage requirements (especially for implementing HTTP Compression) of your server and intermediate servers, as well as provide for a faster time-to-first-byte response.

Statelessness — Always keep application servers state-free so that they can be easily and painlessly scaled.

Bulk Operations — Most clients will perform better if they can issue fewer requests to fetch or modify more data. It's a good idea to build bulk operations into your API to support this kind of use case.

A2: I just did a test, using the nuget package `WebApiContrib.Formatting.Protobuf` and the filesize decreased from 9,5 mb (json) to 3,35 mb (protobuf) for 25000 objects.

Also, you can use SQL instead of EntityFramework for large queryresults.

If you use AutoMapper to convert from your POCO to DTO, you could manually set the properties (much faster serialization)

And minimize your Filters and HttpModules, the lighter it is, the faster it goes.. (eg. Authentication filter, ...)

A3: Performance depends on what you are doing with the Web API framework. Maybe you should look at a MVC profiling tool : <http://msdn.microsoft.com/fr-fr/library/2s0xxa1d.aspx>

A4: First of all, your architecture matters. 80% root causes of the performance issues are architectural. We are not aware of your architecture.

From my point of view, reverse proxy can be used to facilitate load balancing over the application server clusture. On the application server layer, do you have clustering strategy? Do you have caching strategy to avoid visiting database?

.....

In general, you need to balance architecture scalability, reliability, extensibility, security, availability, and performance.

263. <https://stackoverflow.com/questions/1876696/when-is-the-mvc-pattern-appropriate/1883712#1883712>

T: When is the MVC Pattern appropriate?

Q: Note: I'm not referring to any particular framework's interpretation of MVC

If I'm designing a rich client Silverlight application for instance, that involves a relatively complex UI behavior such as dragging and dropping rows between two GridViews populated by a dynamic user-defined query, would this be an appropriate pattern to use?

Certain UI behaviors (such as dropping a row on another valid row) would also lead to business rules being applied and the model being updated accordingly. If MVC isn't a good fit for this type of application; what would be a good way to structure this?

EDIT: Re-reading my original question, it seems a bit general; I'll break it down into a more directed question:

**Is there an upper-limit on granularity of user interaction where the MVC pattern is not appropriate?
ie. A UI that would involve a controller action having to handle something on mouse_move, mouse_button_up, etc...**

A1: One of the things that you'll find very early on in Silverlight development is the power of binding and you'll find yourself wanting to abstract your logic completely away from the view. While it's similar to MVC, there's a better way to handle it in Silverlight. It is for this reason that if you're building a Silverlight application, you'd be better off looking into the [MVVM Pattern](#). The [MVVM Light Toolkit](#) is one of my favorite implementations of this pattern. It's definitely worth checking out if you're building any Silverlight or WPF applications.

A2: The MVC framework is a good candidate when you want to separate the UI from the business rules from the underlying data. This allows for a very nice modular architecture wherein you can swap out the UI or Data layer without too much hassle.

Sounds like you are already thinking in terms of MVC therefore it should be a good fit. Have fun with it!

A3: MVC pattern is useful if your application model fits the MVC model... it's that simple. However, if your user interface is built using the usability models of Søren Lauesen or similar, you would usually have multiple controllers for a single GUI etc. Also, if your user interface is seriously simple, MVC may be overkill. Performance requirements or programmer productivity may in some cases also make MVC less useful.

There are some apps, for which MVC is a very good model, throughout. And there are some apps, where MVC doesn't make sense at all.

264. <https://stackoverflow.com/questions/21365021/layered-and-pipe-and-filter>

T: Layerd and Pipe-and-Filter

Q: I'm a bit confused in which situations these patterns should be used, because in some sense, they seem similar to me?

I understand that Layered is used when system is complex, and can be divided by its hierarchy, so each layer has a function on different level of hierarchy, and uses the functions on the lower level, while in the same time exposes its function to higher level.

On the other hand, Pipe-and-Filter is based on independent components that process data, and can be connected by pipes so they make a whole that executes the complete algorithm.

But if the hierarchy does not exist, it all comes to question if order of the modules can be changed?

And an example that confuses me is compiler. It is an example of pipe-and-filter architecture, but the order of some modules is relevant, if I'm not wrong?

Some example to clarify things would be nice, to remove my confusion. Thanks in advance...

A: Maybe it is too late to answer but I will try anyway. The main difference between the two architectural styles are the flow of data.

On one hand, for Pipe-and-Filter, the data are pushed from the first filter to the last one. And they WILL be pushed, otherwise, the process will not be deemed successful. For example, in a car manufacturing factory, each station is placed after one another. The car will be assembled from the first station to the last. If nothing goes wrong, you will get a complete car at the end. And this is also true for compiler examples. You get the binary code after the last compiling process.

On the other hand, Layered architecture dictates that the components are grouped in so-called layers. Typically, the client (the user or component that accesses the system) can access the system only from the top-most layer. He also does not care how many layers the system has. He cares only about the outcome from the layer that he is accessing (which is the top-most one). This is not the same as Pipe-and-Filter where the output comes from the last filter.

Also, as you said, the components in the same layer are using "services" from the lower layers. However, not all services from the lower layer must be accessed. Nor that the upper layer must access the lower layer at all. As long as the client gets what he wants, the system is said to work. Like TCP/IP architecture, the user is using a web browser from application layer without any knowledge how the web browser or any underlying protocols work.

To your question, the "hierarchy" in layered architecture is just a logical model. You can just say they are packages or some groups of components accessing each other in chain. The key point here is that the results must be returned in chain from the last component back to the first one (where the client is accessing) too. (In contrast to Pipe-and-Filter where the client gets the result from the last component.)

A2: 1.) *Layered Architecture* is **hierarchical architecture**, it views the entire system as -
hierarchy of structures

The software system is decomposed into logical modules at different levels of hierarchy.

where as

2.) *Pipe and Filter* is a **Data-Flow architecture**, it views the entire system as -
series of transformations on successive sets of data

where data and operations on it are independent of each other.

265. <https://stackoverflow.com/questions/3623172/why-is-mvc-so-popular>

T: Why is MVC so popular?

Q: I was originally going to make this a longer question, but I feel like the shorter I make it, the better you'll understand what I mean.

- The MVC architectural pattern has 3 dependencies. The View depends on the model. The Controller depends on the View and Model. The Model is independent.
- The Layers architectural pattern defines $N - 1$ dependencies, where N is the number of Layers.

Given three Layers: Model, View, and Controller, there are only 2 dependencies, as opposed to 3 with traditional MVC. The structure looks like this:

View ---> Controller ---> Model
[View depends on Controller, Controller depends on Model]

It seems to me that this style accomplishes the same goals *and* produces looser coupling. Why isn't this style more common? Does it truly accomplish the same goals?

Edit: Not ASP.NET MVC, just the pattern.

With regard to griegs's post:

- As far as mocking, Layers still allows you to use the Command Processor pattern to simulate button clicks, as well as any other range of events.
- UI changes are still very easy, perhaps even easier. In MVC, the Controller and View tend to mesh together. Layers creates a strict separation. Both Layers are black boxes, free to vary independently in implementation.

- The Controller has 0 dependencies on the View. The View can be written, and time can still be saved with loose coupling.

A1: Because you decouple the interface from the controller making changes easier.

Also consider the scenario where you need to get started on a project but the artwork won't be ready for weeks or months. Do you wait or do you write all the code required for the pages and simply then wire up the view to the controller.

At least that's what we did and we saved months.

Also it made UI changes easier to cope with because there wasn't any code in our aspx pages that did anything.

Our tests were also better as we could mock up anything including button clicks etc.

And if you're talking about the asp.net-mvc framework, there is no code in the aspx files and no viewstate etc.

A2: In proper MVC the controller doesn't depend on the view afaik. Or maybe I'm not understanding it correctly.

The model defines the data.

The view defines what the output looks like.

And the controller is a translator from a model-understood grammar to view-understood grammar.

So essentially the controller is independent. The view is independent. And the model is independent.

Yes? No?

A3: I think I'm understanding your point:

Yes you can make the View only depend on the Controller only by making the Controller transform (using PHP as an example) the Model objects to non-Model objects like simple arrays.

As we already know, performing this transformation can be more effort than it's worth if the decoupling isn't actually needed. If the View uses the Model objects then it has this dependency. However, this can be relieved a bit by having the View depend solely on the Controller for its required input, which can be Model objects.

The Symfony PHP framework promotes this style of skinny controller shuffling between Model and View. You can still directly call upon the Model layer to retrieve objects within the View layer but it's strongly urged against for the coupling issues you bring up. Within the View you can call `include_component()` which actually goes back up to the Controller if you need to query the Model.

A4: I'll be bold, and try to explain why your method didn't catch on.

The MVC pattern basically requires the view and model layers to agree on an API. Since one serves the other and there are no dependencies inside the code it leaves the controller to behave generically, all it needs to do is take a certain structure in the view layer and call the matching API on the model layer.

You'll note that agreeing on an API between the view and model isn't really such a big deal it has to happen anyway. And what you get is good separation between back-end front-end development.

In your proposed solution a lot of development is required on the controller side. The controller will be required to understand all the elements in the view and to map them to the specific calls required on the model layer. Since the controller is a single access point connecting many views to many models this can quickly get out of hand and end up being an incomprehensible controller module.

Look at some Struts2 examples to see what I mean...

A5: I haven't gotten back to this in a long time, mostly because I was still thinking. I was unsatisfied with the answers I received, they didn't really answer my question.

A professor, recently, did steer me in the right direction. Essentially, he told me this: Layers which separate Model, View, and Controller **is** MVC. In the vanilla MVC architectural pattern, the dependency between the View to the Model is often not used, and you effectively end up with Layers. The idea is the same, the naming is just poor.

A6: In my opinion ,you'd better try it in your programme , you can use ruby on rails ,or codeigniter(for php),these great framework may be helpful to your understanding the MVC.

266.<https://stackoverflow.com/questions/1113464/what-other-mvc-like-design-patterns-architectures-are-there-for-highly-flexible>

T: What other MVC-like design patterns/architectures are there for highly flexible applications?

Q: A while back i read somewhere about how to improve upon the MVC pattern to accomodate the highly flexible and layered (web)applications we see today. (and to my frustration, i can't seem to find that article again)

For example, some of the Google applications like GMail or even a browser like Firefox.

It consists of components that can be extended and completely replaced. Users can choose the user interface or theme they like, has some kind of plugin system, etc etc...

Owokay I know, this is how big/great applications are build. That's why i ask this question.

Could you provide me with resources or insight in what patterns are used or how these applications are build architecturally...

A: guess you are talking about software architecture (in contrast to hardware or system architecture).

Possibly the most important rule (I wouldn't call it pattern) is seperation of concerns. Meaning one component should handle exactly one task, only that task and the complete task. If you stick to that (which is harder than it seems). You'll have the basis for the plugability you mentioned, e.g. exchanging the UI. If your UI layer really does only UI, it can be replaced by something completely different.

If you are really talking big, like the mentioned GMail the concept of 'eventually consistent' becomes important. Classical applications are structured in a way that the user performs an action, say pressing a button. The application processes that action (e.g. saving data from a form in a database). And refreshes the GUI when it is done (e.g. replacing the 'save' button with an edit button). This linear processing has the benefit, that the user always sees a consistent state. If he turns around and searches the database he'll find his data right there. But this doesn't scale to well, when you have extremely high load on the system, because the optimum database for saving, is most of the time not the perfect database for searching. So some application do something like this: When the user hits the save button, the store the data in the fastes way possible (e.g. a database optimised for updates), set a marker that further processing is needed and refresh the gui. Now a separate process comes along to process the saved data, e.g. by updating special indexes or by storing it in a separate database that is optimized for searching. This second process might gather changes for many actions in order to improve performance.

With this design you can scale further, because you are separating concerns: storing and searching data are two different tasks, so they are split in two different component, which can in this extrem case work in parallel. For the user this means he might not immediately find the stuff he just saved, but he eventually will. Hence 'eventual consistency'

Edit: I forgot about the resources. Great books about application architecture are: Martin Fowlers 'Patterns of Enterprise Application Architecture'. For Patterns in general of course: 'Design Patterns' for Patterns concerning Messaging Architecture

'http://www.amazon.de/s/ref=nb_ss_eb?_mk_de_DE=%C5M%C5Z%D5%D1&url=search-alias%3Denglish-

[books&field-keywords=Enterprise+Integration&x=0&y=0](#). I can't recommend any books on scalability, but 'Building Scalable Web Sites' was recommended to me. The architecture of various big applications (e.g. Twitter) is a topic of talks, presentations and papers, so you'll get lots of resources when you google > architecture twitter <.

A2: [Model View Presenter](#) (MVP), it is often confused with MVC, but I find it much more flexible, although it could possibly benefit from an additional controller component. I can't tell you if its more beneficial in large-scale applications, but its definitely a MVC-like pattern. Other MVC variants exist, such as the [Model View ViewModel](#) (MVVM), but that one's more specific to Microsoft's WPF.

267. <https://stackoverflow.com/questions/37227835/can-someone-explain-why-mvc-is-superior-to-three-tier-architecture/37244197#37244197>

T: Can someone explain why MVC is superior to Three Tier Architecture?

Q: Three tier... front-end, business logic, data backend. Clean What does MVC bring to the table?

A: MVC is a pattern used to make UI code easier to maintain. you can encapsulate business logic in Service Layer and data access to data layer.

In larger applications MVC is the presentation tier only of an N-tier architecture.

Conceptually the three-tier architecture is linear. However, the MVC architecture is triangular: the view sends updates to the controller, the controller updates the model, and the view gets updated directly from the model.

268. <https://stackoverflow.com/questions/15833202/which-layer-should-test-in-n-layer-architecture>

T: Which layer should test in n-layer architecture

Q: We use n-layer architecture in our application. Suppose we use 3 layer application and use MVC pattern for Presentation Layer, Which Layer should test? How can find testability point in my application?

1. Presentation Layer?
2. Business Layer
3. Data Layer
4. All of them?

A1: Only test the layers you want to be sure work. All 3 of the above seem to be things it would be important to have working. You wouldn't want to remove any of them.

Trying to find testability points in existing software where it hasn't been designed for can be a challenge. There's a good book, [Working Effectively with Legacy Code](#), where legacy is defined as code without tests, that talks about this issue. Basically, if you don't design for testability, it's can be hard to shoe-horn it in, you'll probably need to refactor.

The trick is going to be adding test infrastructure to the code: mocks, stubs, and other test components to allow you to isolate just the bits under test. This is helpful when you test a DB, you really don't want to run a real query, it'll just take too long and you want the tests to be FAST. Dependency Injection can be helpful for the more static languages, like C++/C and Java.

A2: What is a "unit", in the context of unit-testing? It is whatever you identify as a unit, as the smallest testable part of your code.

These days, most people choose the class or method as their unit. If you do the same, all your layers will contain units that you can unit test, so the answer to your question is to test all of them.

269. <https://stackoverflow.com/questions/1054603/patterns-for-non-layered-applications>

T: Patterns for non-layered applications

Q: In Patterns of Enterprise Application Architecture, Martin Fowler writes:

This book is thus about how you decompose an enterprise application into layers and how those layers work together. Most nontrivial enterprise applications use a layered architecture of some form, but in some situations other approaches, such as pipes and filters, are valuable. I don't go into those situations, focussing instead on the context of a layered architecture because it's the most widely useful.

What patterns exist for building non-layered applications/parts of an application? Take a statistical modelling engine for a financial institution. There might be a layer for data access, but I expect that most of the code would be in a single layer. Would you still expect to see Gang of Four patterns in such a layer? How about a domain model? Would you use OO at all, or would it be purely functional?

The quote mentions pipes and filters as alternate models to layers. I can easily imagine a such an engine using pipes as a way to break down the data processing. What other patterns exist? Are there common patterns for areas like task scheduling, results aggregation, or work distribution? What are some alternatives to MapReduce?

A: I think what Fowler means is that in a layered application the focus is on organizing "vertical" de-coupled communications between layers.

Another architecture is SOA (Services Oriented), where the focus it on organizing "horizontal" de-coupled communications between components. (Within a component the implementation may use either model). This is nothing new. Other instances of this horizontal pattern are COM/ COM+, CORBA, workflows, and now "messaging" or ESB architectures.

270. <https://stackoverflow.com/questions/14950917/n-tier-architecture-with-mvc4>

T: N-tier architecture with MVC4

Q: We are following N-Tier Architecture pattern for our ASP.NET web apps. We are using these layers DAL,BAL, Business Objects and Common. Now we are moving to ASP.NET MVC4.

1. Can we still use these N-Tier architecture with MVC?
2. Is that meaningful mixing together?

A: Yes you can still use this. Why wouldn't you? It is alway better to sepperate all you layers. Your business layer is only responsible for you business logic. So how would you otherwise share your business logic over two type of clients? Think in a MVC website and WCF service layer or a Mobile application.

We developing in MVC for a long time now and always use this approach.

271. <https://stackoverflow.com/questions/6173196/can-we-follow-multiple-design-patterns-in-one-application/6173399#6173399>

T: Can we follow multiple design patterns in one application

Q: I am just learning design patterns and I have few questions

- 1) Can I have multiple design patterns in the application?
- 2) What are good or advised design patterns for ASP.NET B2C applications?

A: Design patterns is used to solve specific programming problems. They are not used to architecture your applications.

1) Can I have multiple design patterns in the application?

Yes. See above.

2) What are good or advised design patterns for ASP.NET B2C applications?

Guess you are asking if there are any existing frameworks available to create a website which is easy to extend and maintain?

Use [layered architecture](#) where you isolate each layer by using the [Separated Interface](#) pattern. For the database, use [Repository pattern](#) (easiest way to archive that is to use a ORM like [nhibernate](#)). As for the webSite, use [ASP.NET MVC](#).

272.<https://stackoverflow.com/questions/3390023/what-are-the-biggest-advantages-to-moving-from-n-tier-to-soa>

T: What are the biggest advantages to moving from n-tier to SOA?

Q: At my company we are currently using the classic n-tier architecture using NHibernate as our persistence layer with fat objects. Seeing many issues with this pattern, such as full hydration of the object graph when entities are retrieved from the database we have been looking in to other alternatives.

In this process we have moved to a more scalable Command and Query architecture, and now we are looking into the viability of SOA.

In your experiences, what are the biggest advantages of SOA over n-tier. Have you encountered any major hurdles?

And advice and reading material would be helpful.

A: Besides scalability, SOA offers architectural flexibility. If you decide at some point to move your application from WebForms to Silverlight, both can take equal advantage of a well-designed SOA interface.

You can also decide at some point down the road to offer a new service that takes advantage of some of the features and/or data in your current offering. You just build a new application that is authorized to access your existing interface and away you go.

273.<https://stackoverflow.com/questions/19517757/how-can-i-use-mvc-pattern-with-3-layer/19517911#19517911>

T: How can I use MVC pattern with 3-layer?

Q: I would like to separate my MVC (.Net) website in different projects following 3-layer architecture:

- Data Access: Model
- Business Logic: Repositories
- Presentation: Controller, View

Is my structure correct?

A: MVC and a layered architecture can be used in different ways, so it's not about right or wrong here. The common ground is that the view part is always in the presentation layer.

Then you can have your controllers either in the presentation layer or in the business layer. For simpler applications, there is sometimes no distinction between a business layer and the controllers.

There can be several model parts in a tiered application. The data access layer definitely needs a model. This model can be shared among the layers, or can be transformed into different models that may be better suited for the presentation layer.

Often the MVC pattern is used inside the presentation layer only, or rather the presentation layer is realized using the MVC pattern.

274. <https://stackoverflow.com/questions/7655088/three-tier-and-mvp-pattern-in-shopping-website/7655153#7655153>

T: three tier and MVP pattern in shopping website

Q: i'm creating a shopping website using c# and asp.net and i want to use MVP pattern inside of three tier architecture, specifically in the presentation layer. the reason i'm doing this is because i've been read and heard that MVP is a UI pattern however i came across a design problem! if MVP is a UI pattern and it should be used inside of presentaiton layer and so it's not a representation of a database table then what exactly would make up my model??

i suspect that the data from the business layer is making up my model but when i think about it the only thing that is coming to my presentation layer from my business layer is the requested data table. so what would make up the model?

for an example consider the amazon.com as the shopping site that i'm trying to create.

A1: I will probably be in the minority with this, but whenever I talk about the usage of any of the MV* architectural patterns, I often do not apply it at a system wide level, but on a individual component level.

For example, Java Swing UI elements are built using MVC principles. That is to say that MVC is being applied on a component level in the presentation layer.

For your case (using MVP only in well-defined presentation layer), your MVP model could be a shell that interfaces with your business logic layer. Or it could be domain POCOs, that get instantiated by repositories.

A2: The Data Table is your model. Or the way I prefer to think about it is the *entire* business layer is the model, and the UI contains the View and Presenter.

275. <https://stackoverflow.com/questions/7258379/explaining-mvvm-mvc-mvp-for-a-database-developer/7258522#7258522>

T: Explaining MVVM, MVC, MVP for a Database Developer

Q: I am from Database Development / QA background. I have not exhaustively worked on UI projects, Althought I coded DB part of it. I would like to know some basic examples for differences between MVC, MVP, MVVM patters.

On a very high level know after few reads I know

- P - Presentation layer
 - M - Model
 - C - Controller - Interprets presentation layer and sends action to model on what to be presented
- This is on a very high level note. I have not tried creating a basic simple example using MVVM, MVC, MVP.

Would appreciate if you can provide some more clarity on how this is different from typical 3 layered architecture

- UI Layer - ASP / WPF
- Business Layer - Web Services (.NET 2.0/WCF..)
- DB Access Layer - EF, ADO.NET, Stored procedures

A: I think you're confusing Design Patterns with Software Architecture, they are related but different.

A 3-layer architecture consists of UI, Logic, and Persistence code. Using something like MVC or MVVM simply provide a nice way to separate these bits out.

In a 3-layer environment, you might have an MVVM App where the

- Model comes from a WCF
 - The views are all WPF
 - the View-Models are C# classes which translate UI Actions into calls to the WCF Service
- Those three things are simply the UI layer.

The WCF Service is your business logic layer, it exposes the Models that the UI will use, and it performs business logic on the data that it receives from the UI, then if appropriate, it invokes the persistence layer to save the changes into a database.

276. <https://stackoverflow.com/questions/45998405/oracle-soa-and-msa/46539990#46539990>

T: Oracle SOA and MSA

Q: Is it advisable to build the MSA based services on Oracle SOA or any other ESB suite for that matter? Is there any advantage or disadvantage?

If I am using Java, Spring and JPA over a message queue - say - RabbitMQ, I can achieve it in a more controlled environment with less recurring expenses. Of course will end up mixing tools like Drools or JBPM or similar to achieve things that may be OOTB (Out of the box) in the SOA Or ESB Suite. But scaling a specific service without paying licence fee for an additional environment should certainly be a good catch right?

A: Microservices architecture pattern applies to development of backend systems/services, whereas ESB (e.g. Oracle SOA Suite) is intended as an intermediary layer between consumers and backend services. Backend services contain rich application logic, whereas ESB services provide only intermediary functions like routing, transformation, orchestration etc.

ESB is not intended for rich application logic, though it's possible to do that.

Using ESB (e.g. Oracle SOA Suite) to host microservices is achievable, but you will get a big overhead comparing to limited functions and scalability. If you are looking for centralized API management (tracing, security etc.), you can put an API gateway into your architecture instead of full scale ESB.

277. <https://stackoverflow.com/questions/589488/mvp-mvc-vs-traditional-n-tier-approach-for-winform-apps>

T: **MVP/MVC vs traditional n-tier approach for winform apps**

Q: We have a large suite of apps, most are C# 1.1, but at least 10 major ones are in VB6. We are undertaking a project to bring up the VB6 apps to .NET 3.5.

All the c# 1.1 apps are written using a traditional n-Tier approach. There isn't really any architecture/separation to the UI layer. Most of the code just responds to events and goes from there. I would say that from the point of maintainability, it's been pretty good and it's easy to follow code and come up to speed on new apps.

As we are porting VB6 apps, the initial thinking was that we should stick to the existing pattern (e.g. n-Tier).

I am wondering, whether it's worth it breaking the pattern and doing VB6 apps using the MVP/MVC pattern? Are MVC/MVP winform apps really easier to maintain? I worked on a MVC-based project and did not feel that it was easier to maintain at all, but that's just one project.

What are some of the experiences and advice out there?

A1: Dude, if something works for you, you guys are comfortable with it, and your team is up to specs with it. Why do you need to change?

MVC/MVP sounds good... Then why am I still working on n-Tier myself?

I think before you commit resources to actual development on this new way of programming... You should consider if it works for YOUR team.

A2: If you are porting the VB6 apps vs. a full rewrite, I'd suggest to focus on your Pri 1 goal - to get asap to the .Net world. Just doing this would have quite a lot of benefits for your org.

Once you are there, you can evaluate whether it's beneficial to you to invest into rearchitecting these apps.

If you are doing full rewrite, I'd say take the plunge and go for MVP/MVVM patterned WPF apps. WPF will give you nicer visuals. The MVP/MVVM pattern will give you unit testability for all layers, including the visual. I also assume that these apps are related, so chances are you might be able to actually reuse your models and views. (though, I might be wrong here)

A3: MVC in particular does not exclude n-Tier architecture.

We also have ASP.NET 1.1 business application, and I find it a real nightmare to maintain. When event handlers do whatever they like, maybe tweak other controls, maybe call something in business logic, maybe talk directly to the database, it is only by chance that software works at all.

With MVC if used correctly you can see the way the data flows from the database to your UI and backwards. It makes it easier to track the errors if you got the unexpected behaviour.

At least, it is so with my own little project.

I'll make the point once again: whatever pattern you use, stick to the clear n-Tier architecture. 2-Tier or 3-Tier, just don't mess everything into a big interconnected ball.

278. <https://stackoverflow.com/questions/39003006/what-is-the-appropriate-project-architecture-for-large-scale-servicestack-net-p>

T: What is the appropriate project architecture for large scale ServiceStack/.NET projects?

Q: We are in the design phase of setting up an internal enterprise API layer for our company. We are hoping to realize an API that can serve our internal apps as well as our external clients. Our environment is MS heavy, IIS, ASP.NET MVC apps, etc.

We have an existing service layer that was not designed well, so we are trying to do it right this time.

[This question](#) indicated a project breakdown for larger ServiceStack projects that is no longer present in the main documentation. Primarily the inclusion of a separate "Logic" project. We are trying to align this with a lot of what Martin Fowler outlines in Patterns of Enterprise Application Architecture.

Here is what we are considering:

Fowler and others suggest that DTOs and Business Logic should be independent of each other, with Assembly/Factory classes that convert between.

First question: Where do the assemblers live? In the Service Interfaces project? In their own project? Are they necessary for every conversion?

Secondly: Does the client need to convert back to Domain Objects, or does the client just use DTOs to populate screens and send data back to the service? We only want clients dependent on the Service Models class, right?

Thirdly: How do we design the DTOs? Previously, they were pocos that represent one resource (trying to be restful, OrderDTO, CustomerDTO, etc). In practice the data required is complex. We initially thought the clients request whatever they need individually and piece it back together. Fowler indicates that we want to minimize requests to the service, and have dtos that are almost aggregates of the business objects, to try and send it all down at once. So if I have an order and a want the customer tied to it, should I send down a CustomerOrderDTO with everything populated? Or do I send down an order object, and force the client to make another request for the order?

Fourth: Where is it appropriate to use actual C# interfaces? Do we have one for every repository to make them switchable and testable? One for every service interface?

Fifth: Is there no choice but to map at every layer? i.e. SQL to Data layer using ORM. Data Layer to Domain Layer using AutoMapper or ServiceStack mapper. Domain layer to DTO. DTO to ViewModel. ViewModel to Javascript model (e.g. Knockout) It seems like a lot of repetition and boilerplate. Is there a better way?

I'm trying not to make this subjective - but there are very little guidelines for some of the details here - our assumption is there are best practices or intentions that we are missing in the ServiceStack framework to account for these things. Thanks in advance for answering any of these questions.

A: This contains too many broad questions to be able to answer in any depth, Questions should not have multiple disjointed questions covering different topics, you should split this up into multiple focused questions so it's clear what the question is and the answer that it's expecting.

I'd first recommend going through the [Designing APIs](#) section in ServiceStack's documentation which walks through designing APIs with ServiceStack.

Pay special attention to [Software complexity, goals of Services and important role of DTOs](#) as it covers a lot of what you should be thinking about when creating Services. E.g. If you use a [code-first POCO Micro ORM like OrmLite](#) you can re-use the Data Models in your DTOs, ViewModels, Caching Providers, etc. But when you need to you can use ServiceStack's [built-in AutoMapping](#) to easily map between models <-> DTOs. Either way try to avoid having multiple artificial layers and different models in each layer which is a large source of unnecessary friction.

It also highlights that you should be looking to reduce any unnecessary layers/patterns/etc when possible as each time you add a layer you're adding artificial friction so make sure every Layer you add serves a purpose and you can see the value they each add. E.g. I'd recommend against having multiple fine-grained repositories, I'll generally have a repository to cover an entire sub-system of related functionality and would highly recommend against mechanically creating fine-grained repositories based on some arbitrary rule that's not related to your domain, e.g. per Table.

You only need C# interfaces if you have multiple implementations or want to write tests mocking them.

ServiceStack encourages [coarse-grained Message-based Services](#) so instead of client-specific fine-grained RPC Services, try to design generic, reusable, batchful Services that minimize forcing clients to perform multiple, dependent I/O Services and send data clients need in a single Service response when it's cohesive to that request. ServiceStack's [Physical Project Structure](#) is already implemented in most of [ServiceStackVS VS.NET Templates](#) so I'd recommend starting a new project using the most appropriate ServiceStackVS template.

E.g. `{Project}.ServiceInterface` holds the Service Implementation whereas `{Project}.ServiceModel` holds the DTO's in a impl-free Project so the types can be reused.

By just maintaining DTOs in a separate **ServiceModel** project, it eliminates the friction for clients which can reuse the Typed DTOs with any [ServiceStack C#/.NET Client](#) to enable an end-to-end Typed API without effort. Instead of sharing your **ServiceModel** project, clients can also use ServiceStack's [Add ServiceStack Reference](#) feature to import all Types for a remote Service which it can use with the C# Clients to enable a Typed API. To see how and why this works live checkout [Add ServiceStack Reference on Gistlyn](#) which lets you call any remote ServiceStack Service from a browser.

279. <https://stackoverflow.com/questions/24946812/how-to-implement-n-layer-architecture-in-mvc/24977801#24977801>

T: How to implement n-layer architecture in MVC?

Q: I know this question has been asked before. I am only asking so that I can get a better explanation. In my webforms applications, this is how I implemented my projects. The solution had two projects. The first project contains Data Access and Business Logic. The first project is referenced in the second project. The aspx.cs files call the business logic class and the business logic class calls the data access class.

I am trying to follow the same approach in my MVC applicaiton. How would I implement that? Controller calls Model which in turn calls Business logic? This approach would add overhead right?

A: Have your architecture with following things

Data access project - add ORM/ADO.net with repository and unit of work pattern. Repositories can be generated using T4 template from ORM

ViewModel project - have a separate project for Viewmodels (containing properties to be used by view).

Business layer - have classes which contains functions that access repositories from data access layer, join them if needed using LINQ and populate in Viewmodel and return view model object or view model collection to controller.

WEB Project - Controller - access business layer functions using dependency injection and return view model to view View - Access view mode returned by controller

280. <https://stackoverflow.com/questions/13001114/blackboard-or-another-architecture-thoughts-please>

T: Blackboard or another architecture - thoughts please

Q: I have some uni coursework that I am unsure of and seeing as you people all know your stuff, I thought I'd pick your brains once again!

I have to choose a suitable architecture to develop a system that models an emergency call/dispatch service..

- Calls come in from a person in need.
- Telephone operator records details (Name, location etc).
- System dispatches ambulance from nearest hospital.
- System checks medical database
- System passes medical history and patient info onto a PDA/Smartphone within the dispatched Ambulance.
- Paramedics send update with location and actions taken.

I was thinking that a Blackboard architecture would suit this - but the dispatching of data / client request made, when sending info to the ambulance, would contradict the BB architecture.

I can use both classic, hybrid, emerging or experimental architecture patterns - so long as they work and fit the problem..

Can anyone give me some advice, please?

A: Observer, possibly chain-of-responsibility as well.

All entities observe the call. If there's any element of a chain of responders who have to decide on whether to handle or forward a request, you need chain-of-responsibility.

281. <https://stackoverflow.com/questions/29059372/which-architectural-style-and-patterns-would-be-suitable-for-this-system/29061995#29061995>

T: Which architectural style and pattern(s) would be suitable for this system?

Q: Consider the following situation. There is a group of people working on a task (for example, editing a map). Any person is allowed to see the whole map. Every person is considered to be the owner of a certain piece of map they created. If person A created piece of map MA, and person B wants to change that piece, they can edit it locally and then can offer their changes to A. If A accepts the changes, the new MA is distributed to the whole team. B is not allowed to submit changes to MA themselves by definition.

As you can see, it's some sort of collaborative or distributed editing, where every bit of the task has an owner, and others may offer changes, which then should be propagated.

Since I have 0 knowledge about how to properly design a system and which rules should be applied (and our course has 0 material on that as well, which is weird indeed, but that's how it is - meaning, "go figure out yourself"), I would like to ask your opinion on the subject:

- what is the general class of such systems called in software design?
- which styles and patterns should be used in systems like this?

I'm 100% sure that this has been designed before, and that there is a correct implementation that one should use.

P.S. I sincerely hope that this is not going to be closed as homework, since a) I'm not asking you to do it for me, only advice or opinion and b) this is about the only place where I can ask for advice on this topic.

P.P.S. I strongly believe that there are strict rules in OO analysis and design and strict criteria to measure design correctness, hence why I don't want to just make up some random "design" with 0 knowledge, but rather to know how to approach things correctly in the first place. Thank you for understanding.

A: The general architectural pattern for this type of problem is called "blackboard". You can read about it [here](#)

282. <https://stackoverflow.com/questions/5609727/books-specifically-on-software-architecture-and-not-software-design/5609874#5609874>

T: Books specifically on Software Architecture and not Software Design

Q: Can you please suggest some books on Software Architecture, which should talk about how to design software at module level and how those modules will interact. There are numerous books which talks about design patterns which are mostly low level details. I know low level details are also important, but I want list of good design architecture book.

Please also suggest some books which talks about case studies of software architecture.

A1: Where can you get knowledge about software architecture? One place is your experience building systems. Another is conversations with other developers or reading their code. Yet another place is books. I am the author of a book on software architecture ([Just Enough Software Architecture](#)) but let me instead point you to some classics:

- [Software Architecture in Practice \(Bass, Clements, Kazman\)](#). This book from the Software Engineering Institute (SEI) describes how architects should think about problems. It describes the importance of quality attributes (performance, security, modifiability, etc.) and how to make tradeoffs between them, since you cannot maximize all of them.
- [Documenting Software Architectures \(lots of SEI/CMU authors\)](#). The title of this book is a bit scary, because many people are trying to avoid writing shelfware documents. But the wonderful thing about the book is that it describes the standard architectural styles / patterns, notations for describing structure and behavior, and a conceptual model of understanding architectures. All these are valuable even if you only ever sketch on a whiteboard.
- [Software Systems Architecture \(Rosanski and Woods\)](#). Goes into detail about how to think about a system from multiple perspectives (views). What I like particularly is that it gives checklists for ensuring that a particular concern (say security) has been handled.
- [Essential Software Architecture \(Gorton\)](#). Small, straightforward book on IT architecture. Covers the different kinds of things you'll see (databases, event busses, app servers, etc.)

That's just a short list and just because I didn't list something doesn't mean it's a bad book. If you are looking something free to read immediately, I have [three chapters of my book](#) available for download on my website.

A2: I *think* this is the book that came to mind when I first read this question. It talks about various architectural styles like pipes-and-filters, blackboard systems, etc. It's an oldie, and I'll let you judge whether it's a 'goodie'. [Pattern Oriented Software Architecture](#)

I also particularly like these two, especially the first. The second starts to dig into lower level design patterns, but it's still awesome in various spots:

[Enterprise Integration Patterns](#)

[Patterns of Enterprise Application Architecture](#)

I hope these are what you had in mind.

A3: I'm not familiar with books that detail architectures and not design pattern. I mostly use the design books to get an understanding of how I would build such a system and I use sources such as [highscalability](#) to learn about the architecture of various companies, just look at the "all time favorites" tab on the right and you will see posts regarding the architecture of youtube, twitter, google, amazon, flickr and even [this site](#)...

283.<https://stackoverflow.com/questions/11864839/design-patterns-to-make-a-component-extensible-pluggable-without-making-changes/11866223#11866223>

T: Design patterns to make a component extendible, pluggable without making changes to the system that it is attached to

Q: *What are the best **Design Patterns** that can be used here to address the business requirements mentioned below?*

Lets say we have a business requirement to create a single dashboard that can be easily used for different Vehicles such as **Car** , **Boat** and a **Plane** with minimal changes, hence we will need a centralized interface that can be easily customized to communicate both ways with the underlying system (e.g to gather the info on speed, battery, depth, altitude, heat and functionalities like, turn, accelerate, start, stop, brake etc). Dashboard should come with Gauges etc which talk to **something** that again talks to the underlying hardware
Obvious solution is to break down the problem into components (see below), such that minimal changes are required when switching vehicles. in the following solution only the concrete implementation of CentralController needs to be different per vehicle, however what if you have hunders of components to communicate with in a car and then you map all those types to our Application related types, such as HeatInfo used by the HeatGauge might contain info coming from inside, outside and from the engine, hence we are talking to different components in a vehicle and that might differ per vehicle, what are the best practices to go about addressing data mapping here?

- Panel with gauges
- CentralController{ get /set }. CentralControllerImpl
- Vehicle and its components

So it boils down to:

What are the Design patterns out there for creating a simplified API on top of multiple complex API's

Since some of you think the question is vague i will post the real problem here

i have worked on a app that talks to very complex peace of hardware that controls hunders of varieties of sensors and controls, the app i am working on only exposes a few functionalities relevant for some human role responsible for that part.

you should see the hardware being a very complex and large database of information that you manipulate, and the app i am working on only exposes a little information, however that information might need to read hunderds of tables and compile all that information into my view related domain objects, the component that actually does the mapping has been made generic such that the future applications can leverage from it.

and i want to know from you guys what are the best Design patterns out there which can be used to create that generic component easy to work with and extended if required ?

e.g. Visitor + MVC is the most obvious

A: If classes has no differences in data and behavior, why do you need to create different classes? Maybe will be enogh to create single class: **Vehicle**? There no complex problem in requirements, so it seems you do not need patterns.

284. <https://stackoverflow.com/questions/7542424/how-to-organization-javascript-code-in-project-for-maintainability/7542457#7542457>

T: How to organization JavaScript code in project for maintainability?

Q: Am primarily a PHP developer, but of late I've been playing with a lot of JavaScript, mostly in jQuery.

The problem is that the code is getting harder to debug and this made harder because I have event listeners littered across the HTML.

The code handles AJAX calls and DOM manipulation.

A: Separation of concerns

This means you have three types of files, HTML, CSS and JS.

You do not mix any HTML, CSS or JS. Each one of them is in its own file.

Merely by keeping everything separate and *never* using inline javascript or inline CSS you can solve most your code organization problems.

Another technique is packagers and minifiers.

My packagers of choice are [browserify](#) (js) and [less](#) (css)

Packagers mean you have all your code in many files/modules split by good design. Then because sending many small files is expensive you use a build-time packager to turn all your js into one js file and all your css into one css file.

As for JS itself, I tend to go further and use a module loader. Browserify is both a packager and a module loader.

Module loaders mean you define small modules and load/require them when you need to and where you need to.

I also implement event driven architecture and the [mediator](#) pattern to keep my code highly loosely coupled. One could go further and implement something like the [blackboard system](#) but I haven't tried this personally.

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285. <https://stackoverflow.com/questions/169713/whats-the-toughest-bug-you-ever-found-and-fixed/860583#860583>

T: What's the toughest bug you ever found and fixed?

Q: What made it hard to find? How did you track it down?

Not close enough to close but see also

<https://stackoverflow.com/questions/175854/what-is-the-funniest-bug-youve-ever-experienced>

A1: A jpeg parser, running on a surveillance camera, which crashed every time the company's CEO came into the room.

100% reproducible error.

I kid you not!

This is why:

For you who doesn't know much about JPEG compression - the image is kind of broken down into a matrix of small blocks which then are encoded using magic etc.

The parser choked when the CEO came into the room, because he always had a shirt with a square pattern on it, which triggered some special case of contrast and block boundary algorithms.

Truly classic.

A2:

This didn't happen to me, but a friend told me about it.

He had to debug a app which would crash very rarely. It would only fail on Wednesdays -- in September -- after the 9th. Yes, 362 days of the year, it was fine, and three days out of the year it would crash immediately.

It would format a date as "Wednesday, September 22 2008", but the buffer was one character too short -- so it would only cause a problem when you had a 2 digit DOM on a day with the longest name in the month with the longest name.

A3:

Mine was a hardware problem...

Back in the day, I used a DEC VaxStation with a big 21" CRT monitor. We moved to a lab in our new building, and installed two VaxStations in opposite corners of the room. Upon power-up, my monitor flickered like a disco (yeah, it was the 80's), but the other monitor didn't.

Okay, swap the monitors. The other monitor (now connected to my VaxStation) flickered, and my former monitor (moved across the room) didn't.

I remembered that CRT-based monitors were susceptable to magnetic fields. In fact, they were -very- susceptable to 60 Hz alternating magnetic fields. I immediately suspected that something in my work area was generating a 60 Hz altering magnetic field.

At first, I suspected something in my work area. Unfortunately, the monitor still flickered, even when all other equipment was turned off and unplugged. At that point, I began to suspect something in the building.

To test this theory, we converted the VaxStation and its 85 lb monitor into a portable system. We placed the entire system on a rollarround cart, and connected it to a 100 foot orange construction extension cord. The plan was to use this setup as a portable field strength meter, in order to locate the offending piece of equipment.

Rolling the monitor around confused us totally. The monitor flickered in exactly one half of the room, but not the other side. The room was in the shape of a square, with doors in opposite corners, and the monitor flickered on one side of a diagonal line connecting the doors, but not on the other side. The room was surrounded on all

four sides by hallways. We pushed the monitor out into the hallways, and the flickering stopped. In fact, we discovered that the flicker only occurred in one triangular-shaped half of the room, and nowhere else.

After a period of total confusion, I remembered that the room had a two-way ceiling lighting system, with light switches at each door. At that moment, I realized what was wrong.

I moved the monitor into the half of the room with the problem, and turned the ceiling lights off. The flicker stopped. When I turned the lights on, the flicker resumed. Turning the lights on or off from either light switch, turned the flicker on or off within half of the room.

The problem was caused by somebody cutting corners when they wired the ceiling lights. When wiring up a two-way switch on a lighting circuit, you run a pair of wires between the SPDT switch contacts, and a single wire from the common on one switch, through the lights, and over to the common on the other switch.

Normally, these wires are bundled together. They leave as a group from one switchbox, run to the overhead ceiling fixture, and on to the other box. The key idea, is that all of the current-carrying wires are bundled together.

When the building was wired, the single wire between the switches and the light was routed through the ceiling, but the wires travelling between the switches were routed through the walls.

If all of the wires ran close and parallel to each other, then the magnetic field generated by the current in one wire was cancelled out by the magnetic field generated by the equal and opposite current in a nearby wire. Unfortunately, the way that the lights were actually wired meant that one half of the room was basically inside a large, single-turn transformer primary. When the lights were on, the current flowed in a loop, and the poor monitor was basically sitting inside of a large electromagnet.

Moral of the story: The hot and neutral lines in your AC power wiring are next to each other for a good reason.

Now, all I had to do was to explain to management why they had to rewire part of their new building...

A4:

A bug where you come across some code, and after studying it you conclude, "There's no way this could have ever worked!" and suddenly it stops working though it always did work before.

A5: One of the products I helped build at my work was running on a customer site for several months, collecting and happily recording each event it received to a SQL Server database. It ran very well for about 6 months, collecting about 35 million records or so.

Then one day our customer asked us why the database hadn't updated for almost two weeks. Upon further investigation we found that the database connection that was doing the inserts had failed to return from the ODBC call. Thankfully the thread that does the recording was separated from the rest of the threads, allowing everything but the recording thread to continue functioning correctly for almost two weeks!

We tried for several weeks on end to reproduce the problem on any machine other than this one. We never could reproduce the problem. Unfortunately, several of our other products then began to fail in about the same manner, none of which have their database threads separated from the rest of their functionality, causing the entire application to hang, which then had to be restarted by hand each time they crashed.

Weeks of investigation turned into several months and we still had the same symptoms: full ODBC deadlocks in any application that we used a database. By this time our products are riddled with debugging information and ways to determine what went wrong and where, even to the point that some of the products will detect the deadlock, collect information, email us the results, and then restart itself.

While working on the server one day, still collecting debugging information from the applications as they crashed, trying to figure out what was going on, the server BSOD on me. When the server came back online, I opened the minidump in WinDbg to figure out what the offending driver was. I got the file name and traced it back to the actual file. After examining the version information in the file, I figured out it was part of the McAfee anti-virus suite installed on the computer.

We disabled the anti-virus and haven't had a single problem since!!

286. <https://stackoverflow.com/questions/40151216/using-queues-to-create-loosely-coupled-and-higher-reliability-applications-are>

T: Using queues to create loosely coupled and higher reliability applications - are local queues required for reliability?

Q: I read [Queue-Centric Work Pattern \(Building Real-World Cloud Apps with Azure\)](#) which among other things speaks about using queues to increase reliability of applications. First, a tightly coupled application is shown:

The benefit is stated as:

If any of the backend services – such as the SQL database or the queue listener -- go offline, users can still submit new Fix It tasks. The messages will just queue up until the backend services are available again.

My question is - unless the queue exists *local* (and maybe just exist as a set of file system directories w/o a separate queue application running) to the application submitting the queue messages, don't we still have the same reliability issue? Queues can break like database servers can break and the network connecting them can break the same.

(Granted, the article speaks of Microsoft's quoted reliabilities for their various services and shows queues as having slightly better uptime given their SLA's. However, in this example I consider the fact that the application is on Azure and using Azure services to be an implementation detail. I've certainly seen this pattern/architecture generalized.) That's why I get back to my question about the locality of the queues.

A: This is really a discussion question, not a programming question, and it has no real answer. If you can't reach the queue service endpoint, then you'd have to come up with an alternative store for your messages (or drop messages). But just remember that the queue service has an SLA and runs independent of any single VM. Your app will have to provide adequate durability for your local storage, should the queue service be unreachable (and how you accomplish this is entirely up to you and your app)

287. <https://stackoverflow.com/questions/45361739/asp-net-web-api-with-a-message-bus-queue/45584898#45584898>

T: Asp.Net Web API with a message bus/queue

Q: I am currently experimenting with implementing the micro service architecture on a REST service that I will be developing. The REST service will communicate with a third party SOAP service and also another component that I will be creating to perform additional business rules validation. I plan to split the application into three distinct components: the Web API to which clients will send requests, a windows service that will call a third party SOAP service and a windows service to perform business rules validation. I am planning on using a combination of the actor model (Akka.net) along with a message bus (NServicebus or RabbitMQ + Mass Transit).

From what i understand, messaging is meant for fire and forget commands, so it cannot be used by the Web API project as the clients will be expecting a response from the call to the API and I am not sure how I would await receiving the message from the Bus/Queue in the client request to the Web API as there would need to be away for the Web API to listen for an event from the bus in the request.

My question is, Am I correct in my understanding of how messaging queues operate? And, I will have to use an Akka.net based micro service to accept calls from the Web API and return the response to the API?

A1: Technically you can use request-response, see [example here](#). However, that approach should be used with caution, in legacy apps or in specific situations where the situation really requires it. Generally though to fully benefit from messaging, its reliability and scalability, you should redesign your solution to be asynchronous. If you need response then use request-response pattern (i.e. send two one-way messages instead of using callbacks), or look into technologies such as SignalR. [Here](#) and [here](#) are webinars talking about connecting front-end apps with messaging in more detail, I hope you'll find them helpful.

288. <https://stackoverflow.com/questions/5188871/aws-amazon-ec2-spot-pricing/19074676#19074676>

T: AWS Amazon EC2 Spot pricing

Q: I'd like a non-amazon answer to this quandry...

It looks like, via spot instance pricing, you could run an instance for 22 or 23 cents an hour, for as many hours as you want, because the historical charts for hours/days/months show the spot price never goes over 21 (22?) cents per hour. That's like half of the non-reserved instance cost for the same sized instance and its even less than a reserved instance would ever work out to be per hour. With no commitment.

Am I missing something, do I have a complete and total misunderstanding of the spot/bid/ask instance mechanism? Or is this a cheap way to get an 24/7 instance while Amazon has a bunch of extra capacity?

A: **No, you are not missing anything.** I asked the same question many times when I first looked at Spot, followed by "*why doesn't everyone use this all the time?*"

So what's the downside? Amazon reserves the right to terminate a Spot instance at any time for any reason. Now, a normal "on-demand" instance might die at any time too, but Amazon goes to great efforts to keep them online and to serve customers with warnings well in advance (days / weeks) if the host server needs to be powered down for maintenance. If you have a Spot instance running on a server they want to reboot ... they will just shut it off. In practice, both are pretty reliable (but NOT 100%!!), and many roles can run 24/7 on spot without issues. Just don't go whining to Amazon that your Spot instance got shut off and your entire database was stored on the ephemeral drive... of course if you do that on ANY instance, you are taking a HUGE (and very stupid) risk.

Some companies are saving tons of money with Spot. Here's a writeup on [Vimeo](#) saving 50%, and one on [Pinterest](#) saving 60%+ (\$54/hr => \$20/hr).

Why don't more companies use Spot for their instances? Many of the companies buying EC2 instance hours aren't very price sensitive and are very very risk-adverse, especially when it comes to outages and to operational events that sap engineering effort. They don't want to deal with the hassle to save a few bucks, especially if AWS fees aren't a significant cost-center versus personnel. And for 24/7 instances, they already pay 1/2 price via "reserved instances", so the savings aren't as dramatic as they seem versus full-priced "on-demand" instances. Spot isn't fully relevant to large customers. You can be nearly certain that when a customer gets to be the size of a Netflix, they 1) need to coordinate with Amazon on capacity planning because you can't just spin up 1/2 a datacenter on a whim, and 2) getting significant volume discounts that bring their usage costs down into the Spot price range anyways. Plus, the first tier of cost cutting is to reclaim hardware that isn't really needed; at my last company, one guy found a bug where as we cycled through boxes we would "forget" about some of them and shutting that down saved \$100+k / month (yikes). Once companies burn through that fat, they start looking at Spot.

There's a second, less discussed reason Spot doesn't get used... *It's a different API.* Think about how this interacts with "organizational inertia" Working at a company that continuously spends \$XX / hr on EC2 (and coming from a company that spent \$XXXX / hr), engineers start instances with the tools they are given. Our Chef deployment doesn't know how to talk to spot. Rightscale (prev place) defaulted to launching on-demand instances. With some quantity of work, I could probably figure out how to make a spot instance, but why bother if my priority is to get role XYZ up and running by tomorrow? I'm not about to engineer a spot-based solution just for my one role and then evangelize why that was a good idea; it's gotta be an org-wide decision. If you read the Pinterest case-study I linked above, you'll notice they talk about migrating their whole deployment over from \$54/hr to \$20/hr on spot. Reading between the lines, they didn't choose to launch Spot instances 1-by-1; one day, they woke up and made a company-wide decision to "solve the spot problem" and 'migrate' their deployment tools to using Spot by default (probably with support for a flag that keeps their DB instances off Spot). I can't imagine how much money Amazon has made by making Spot a different API instead of being a flag on the normal EC2 API; Hint: it's boatloads .. as in, you could buy a boat and then fill it with cash until it sinks.

So if you are willing to tolerate slightly higher risk and / or you are somewhat price-sensitive ... then, yes, **you absolutely can save a crapton of money by running your service under Spot 24/7.**

Just make sure you are double-prepared to unexpectedly lose your instance (ie, take backups) something you ALREADY need to be prepared for with an "on-demand" instance that doesn't have 100.0% uptime either.

Think of it this way:

Instead of getting something 99.9% reliable, you are getting something 99.5% reliable and paying half-price

A2: So long as your bid price is above the spot instance market price, you can continue to run whatever spot instances you want, and only pay the market price.

However, when the market price goes above your bid price, you lose your instances. Without any warning. They just terminate. While the spot price rarely spikes, and when it does it tends to come back down again quickly, for many applications the possibility of losing all your instances without warming is unacceptable. You can insulate yourself against that possibility by bidding higher, but then you risk having to pay that much.

TL;DR: If your application is tolerant to sudden termination, then spot instances are great. But there is a risk involved in using them.

A3: Spot on, if your bid price always remains above the spot price.

I couldn't find any other explicit mention of when they will terminate your instance.

I would have assumed it would be when they would require that capacity for customers willing to pay full charges for the instance, but then again, the spot price could technically go above the on-demand price.

289. <https://stackoverflow.com/questions/5237943/creating-a-json-store-for-iphone/5249674#5249674>

T: Creating a JSON Store For iPhone

Q: We have loads of apps where we fetch data from remote web services as JSON and then use a parser to translate that into a Core-Data model.

For one of our apps, I'm thinking we should do something different.

This app has **read-only data**, which is **volatile** and therefore **not cached locally for very long**. The JSON is **deeply hierarchical** with **tons of nested "objects"**. Documents usually contain no more than 20 top level items, but could be up to 100K.

I don't think I want to create a Core Data model with 100's of entities, and then use a mapper to import the JSON into it. It's seems like such a song and dance. I think I just want to persist the JSON somewhere easy, and have the ability to query it. MongoDB would be fine, if it ran on iPhone.

Is there a JSON document store on the iPhone that supports querying?

Or, can I use some JSON parser to convert the data to some kind of persistent NSDictionary and query that using predicates?

Or perhaps use SQLite as a BLOB store with manually created indexes on the JSON structures?

Or, should I stop whining, and use Core Data? :)

A: When deciding what persistence to use, it's important to remember that Core Data is first and foremost an object graph management system. Its true function is to create the runtime model layer of Model-View-Controller design patterned apps. Persistence is actually a secondary and even optional function of Core Data.

The major modeling/persistence concerns are the size of the data and the complexity of the data. So, the relative strengths and weaknesses of each type of persistence would break down like this:

To which we could add a third lessor dimension, volatility i.e. how often the data changes

(1) If the size, complexity and volatility of the data are low, then using a collection e.g. NSArray, NSDictionary, NSSet of a serialized custom object would be the best option. Collections must be read entirely into memory so that limits their effective persistence size. They have no complexity management and all changes require rewriting the entire persistence file.

(2) If the size is very large but the complexity is low then SQL or other database API can give superior performance. E.g. an old fashion library index card system. Each card is identical, the cards have no relationships between themselves and the cards have no behaviors. SQL or other procedural DBs are very good at processing large amounts of low complexity information. If the data is simple, then SQL can handle even highly volatile data efficiently. If the UI is equally simple, then there is little overhead in integrating the UI into the object oriented design of an iOS/MacOS app.

(3) As the data grows more complex Core Data quickly becomes superior. The "managed" part of "managed objects" manages complexity in relationships and behaviors. With collections or SQL, you have manually manage complexity and can find yourself quickly swamped. In fact, I have seen people trying manage complex data with SQL who end up writing their own miniature Core Data stack. Needless to say, when you combine complexity with volatility Core Data is even better because it handles the side effects of insertions and deletion automatically.

(Complexity of the interface is also a concern. SQL can handle a large, static singular table but when you add in hierarchies of tables in which can change on the fly, SQL becomes a nightmare. Core Data, NSFetchedResultsController and UITableViewDelegate make it trivial.)

(4) With high complexity and high size, Core Data is clearly the superior choice. Core Data is highly optimized so that increase in graph size don't bog things down as much as they do with SQL. You also get highly intelligent caching.

Also, don't confuse, "I understand SQL thoroughly but not Core Data," with "Core Data has a high overhead." It really doesn't. Even when Core Data isn't the cheapest way to get data in and out of persistence, its integration with the rest of the API usually produces superior results when you factor in speed of development and reliability.

In this particular case, I can't tell from the description whether you are in case (2) or case (4). It depends on the internal complexity of the data AND the complexity of the UI. You say:

290. <https://stackoverflow.com/questions/13708707/a-lightweight-php-frameworks-that-provides-http-router-and-access-control>

T: A lightweight PHP frameworks that provides HTTP router and access control

Q: As you know some well-known PHP frameworks have provide front-controller pattern and access control mechanism. Also there are some micro framework that provide front-controller pattern.

I have surveyed some such frameworks and yet could not make a decision, My concerns is:

- Stability
- Stability
- Stability
- Performance
- Security

I do not expect any thing more form my core framework, I will use pure PHP or I may use specific module from various frameworks.

Currently I have experience in ZF 1.x, ZF 2.x, Phalcon frameworks. And I also read Lithium docs, but I found no one suitable for my project.

Also as per [this](#), [this](#), [this](#) and [this](#) pages ZF, Symfony, CakePHP, FuelPHP are not efficient frameworks (fat frameworks).

A1: In my opinion (because that's all that any answer could be here) the best, lightest weight framework is [Kohana](#). It is very minimal and can integrate with whatever third party libraries you use (including ZF).

A2: I always recommend [the Yii framework](#). It has great performance -
<http://www.yiiframework.com/performance/>

291. <https://stackoverflow.com/questions/8833232/performace-of-php-page-after-url-rewriting/8833266#8833266>

T: Performance of PHP page after URL Rewriting

Q: I have written a rewrite rule for my page

```
http://localhost/project/new.php?action=login like  
RewriteRule ^([a-z]+)/([a-z]+) $1.php?action=$2
```

Now my file is can be accessed at <http://localhost/project/new/login> which is the exactly the same thing i wanted, but the problem is that the page is loading too slowly despite of the fact that i am running the application on local server. As soon as i remove the .htaccess file it loads quickly...

A: If you dont modify the PHP page, than is not the performance of the PHP page that you should worry, but the performance of the server or of the rewrite rule. The main "classical" way to do this is called **front controller** where you create a redirect rule to a unique point of entry from where you distribute the calls accordingly using a Router class in PHP. this is more maintainable and extendable.

[The front controller pattern](#) by Martin Fowler, a design pattern in more programming languages, PHP is quite new at this. [Zend Framework](#) is implementing it as well.

292. <https://stackoverflow.com/questions/11964578/repository-iqueryable-query-object/11980291#11980291>

T: Repository / IQueryable / Query Object

Q: I am building a repository and I've seen in many places 2 reasons not to expose IQueryable outside the repository.

- 1) The first is because different LINQ providers could behave differently, and this difference should be contained within the repository.
- 2) The second is to prevent service level developers from modifying the database query such that it accidentally causes performance issues.

I guess issue 2 can only be prevented by keeping all query logic within the repository and not allowing any form of external query building? But that does seem a bit impractical to me.

Issue 1 would seem to be resolved by using the Data Object Pattern.

e.g. public IEnumerable<T> FindBy(Query query)

My question is, why would I not just pass a lambda expression in, as that is provider independent, would appear to provide me with the same functionality as a query object, and the same level of separation?

e.g. public IEnumerable<T> FindBy(Expression<Func<T,bool>> predicate)

Is there any reason not to do this? Does it break some rules? Best-practises? that I should know about?

A: Your approach is, without a doubt, adding significant unnecessary complexity.

All of the code from the other question at [Generic List of OrderBy Lambda](#) fails to do anything other than mask an existing effective API with an unnecessary and unfamiliar abstraction.

Regarding your two concerns,

1. LINQ providers do behave differently but as long as the predicates that you are passing can be processed by the LINQ provider, this is irrelevant. Otherwise, you will still encounter the same issue, because you are passing in an Expression, which gets passed to the IQueryable eventually anyway. If the IQueryProvider implementation can't handle your predicate, then it can't handle your predicate. (You can always call a `ToList()` if you need to evaluate prior to further filtering that cannot be translated).
2. Modifying a query can cause performance issues, but it is more likely to expose much needed functionality. Furthermore, the performance issues incurred by a sub-optimal LINQ query are likely to be significantly less detrimental than the performance issues incurred by pulling a lot more records than you need in order to avoid exposing an IQueryable or by systematically filtering any data access logic through bloated levels

of abstractions that don't actually do anything (the first threat is more significant). In general, this won't be an issue because most leading LINQ providers will optimize your query logic in the translation process. If you want to hide your query logic from the front end, then don't try making a generic repository. Encapsulate the queries with actual business specific methods. Now, I may be mistaken, but I am assuming your use of the repository pattern is inspired by Domain Driven Design. If this is the case, then the reason for using a repository is to allow you to create a persistence-ignorant domain with a primary focus on the domain model. However, using this kind of a generic repository doesn't do much more than change your semantics from Create Read Update Delete to Find Add Remove Save. There isn't any real business knowledge embedded there.

Consider the meaningfulness (and usability) of an

293. <https://stackoverflow.com/questions/3177733/how-to-avoid-java-code-in-jsp-files/3180202#3180202>

T: How to avoid Java code in JSP files?

Q: I'm new to Java EE and I know that something like the following three lines

```
<%= x+1 %>
<%= request.getParameter("name") %>
<%! counter++; %>
```

is an old school way of coding and in JSP version 2 there exists a method to avoid Java code in JSP files. Can someone please tell me the alternative JSP 2 lines, and what this technique is called?

A: The use of *scriptlets* (those `<% %>` things) in [JSP](#) is indeed highly discouraged since the birth of *taglibs* (like [JSTL](#)) and [EL \(Expression Language\)](#), those `${}` things) over a decade ago.

The major disadvantages of *scriptlets* are:

1. **Reusability:** you can't reuse scriptlets.
2. **Replaceability:** you can't make scriptlets abstract.
3. **OO-ability:** you can't make use of inheritance/composition.
4. **Debuggability:** if scriptlet throws an exception halfway, all you get is a blank page.
5. **Testability:** scriptlets are not unit-testable.
6. **Maintainability:** per saldo more time is needed to maintain mingled/cluttered/duplicated code logic.

A2: In the MVC Architectural pattern, JSPs represent the View layer. Embedding java code in JSPs is considered a bad practice. You can use [JSTL](#), [freeMarker](#), [velocity](#) with JSP as "template engine". The data provider to those tags **depends on frameworks** that you are dealing with. Struts 2 and webwork as an implementation for MVC Pattern uses [OGNL](#) "very interesting technique to expose Beans Properties to JSP".

A3: Experience has shown that JSP's have some shortcomings, one of them being hard to avoid mixing markup with actual code.

If you can, then consider using a specialized technology for what you need to do. In Java EE 6 there is JSF 2.0, which provides a lot of nice features including gluing Java beans together with JSF pages through the `#{{bean.method(argument)}}` approach.

A4: Wicket is also an alternative which completely separates java from html, so a designer and programmer can work together and on different sets of code with little understanding of each other.

Look at Wicket.

A5: You raised a good question and although you got good answers, I would suggest that you get rid of JSP. It is outdated technology which eventually will die. Use a modern approach, like template engines. You will have very clear separation of business and presentation layers, and certainly no Java code in templates, so you can generate templates directly from web presentation editing software, in most cases leveraging WYSIWYG.

And certainly stay away of filters and pre and post processing, otherwise you may deal with support/debugging difficulties since you always do not know where the variable gets the value.

A6: If somebody is really against programming in more languages than one, I suggest GWT, theoretically you can avoid all the JS and HTML elements, because Google Toolkit transforms all the client and shared code to JS, you won't have problem with them, so you have a webservice without coding in any other languages. Even you can use some default CSS from somewhere as it is given by extensions (smartGWT or Vaadin). You don't need to learn dozens of annotations.

Of course if you want, you can hack yourself into the depths of the code and inject JS and enrich your HTML page, but really you can avoid it if you want, and the result will be good as it was written in any other frameworks. I say worths a try, and the basic GWT is well-documented.

And of course many fellow programmers hereby described or recommended several other solutions. GWT is for people who really don't want to deal with the web part or to minimalize it.

294. <https://stackoverflow.com/questions/22068911/how-and-why-index-php-is-executing-on-every-request-in-zf2/22069080#22069080>

T: how and why index.php is executing on every request in ZF2?

Q: In Zend framework 2 (Or generally any framework), when we requesting some url with **module_name/action_name**

i.e. /album/list

how and why index.php is executing on every request?

A: What is a Front-Controller?

It's the single entry point of your application. The front controller (index.php) takes the request data and passes it to the appropriate services simply spoken.

Why should a Front-Controller be used?

In a web application you basically don't want to add overhead to every of your scripts. Instead you have one centralized point that delegates tasks.

For example a complex web application has a routing layer normally, a database layer, maybe caching, sessions and input handling are important.

When you had to provide these components in every standalone script (login.php, user.php, contact.php), you had to make all of the services available first. If you then needed to swap components it would be a pain to edit all of your files to apply your changes.

Example Workflow

That's where a front controller comes in handy. It takes the request and says: "*Hey! I want to bootstrap my application. So load my bootstrapping class and pass in the necessary data of the request*".

The bootstrapping class says: "*Mayday. I received orders from the front-controller. Need some routing here*". Then my routing service provider is loaded.

"*Oh and please give me a bit of sessions*". Now I want my session service to be made available. And once all the background work is done, the front controller or one of its delegated services can load the resource you actually requested.

Wrapping it up

In a middle- or large scale application you will not get around using a front controller. If you need to tie together a tiny application which doesn't depend on many service layers you can just drop the front-controller.

Otherwise you should absolutely use one. Once your application grows it automatically becomes harder to maintain. You will need a central point where your request is delegated to the services that are appropriate for handling that certain task.

295. <https://stackoverflow.com/questions/194584/how-do-you-write-good-php-code-without-the-use-of-a-framework/194595#194595>

T: How do you write good PHP code without the use of a framework?

Q: Other than standard OO concepts, what are some other strategies that allow for producing good, clean PHP code when a framework is not being used?

A: Remember: MVC, OOP and tiers are design concepts, not language constructs, nor file-structuring.

For me, this means that when not using a framework, and when there's not different teams for programming and designing; there's no value in using *another* template system on top of PHP (which is a template language). Also, separating code from layout doesn't necessarily mean doing it on different files.

This is how i used to do for one-off, seldom expanded, PHP web apps:

1. write a 'general utilities' file, there i put some formatting/sanitising functions, as well as a few DB access functions:
 1. getquery(): given a SQL, returns a result object
 - getrecord(): given a SQL, returns a record object (and closes the query)
 - getdatum(): given a SQL, returns a single field (and closes the query)
 - put all configurations (DB access, some URL prefixes, etc) on a 'config.php' file
 - write a model layer, either one file, or one for each object you store on DB. There, will be all the SQL constants, present a higher-level API, based on your conceptual objects, not on DB records.

that's your 'framework', then you write the 'presentation' layer:

4. one PHP file for each page, starts with some *simple* code to fetch the objects needed, followed by HTML with interspersed PHP code, just to 'fill in the holes'. with very few exceptions, the most complex code there should be for loops. I make a rule to use only one-liners, the ?>should be in the same line as the opening <?php
 - each data-entry form should point to a small PHP without any HTML, that simply gets the POST data, enters into the DB, and forwards to the calling page.

and that's it. If working alone, it has all the separation of intents you need, without drowning in a lot of files for a single user action. Each page as seen by the user is managed by a single PHP file.

It's even easy to maintain, after a few months without looking at the code, since it's easy to test the app, taking note of the filenames in the URL field of the browser. This guides you directly to the relevant code.

(nowadays, of course, i'm using Django for almost everything...)

A2: I'd say pretty much the same as for any other language:

- Don't optimise prematurely
- Keep methods small
- Practise DRY
- Practise data-driven programming
- Use sensible shortcuts (e.g. ternary operator)
- Format your code well so that it can be understood by others

- Don't use OO blindly
- Always check return codes for errors
- Enable the highest warning level and ensure your code doesn't produce any warnings
- Be *very* careful when it comes to typing issues (this goes for all weakly-typed languages). The '===' operator is your friend.

A3: Really this question is quite language agnostic, as it applies to most languages where you choose to "roll your own". Two suggestions I would make would be :

Firstly, just because you aren't using a framework doesn't mean you can't adopt the patterns for segregating code. The MVC pattern is the minimum you should consider when arranging your source code - it makes for a much cleaner and easier to maintain collection of source code, even if the application doesn't entirely follow the routing processes associated with frameworks, having code that "does" things separated out from that which "represents" things is very beneficial.

Secondly, just because you've chosen not to use a full framework, doesn't mean you need to reinvent the wheel. Utilise pre-packaged libraries sensibly in order to solve a specific problem. Two good examples would be a logging framework (log4php) and a front-end rendering/template solution (Smarty).

A4: If you really do follow OO concepts, like separation of concerns, your code will be pretty good, but here are a few suggestions:

- Framework or not, use MVC.
- I can't stress enough how important it is to never mix your logic with your HTML. In an HTML file, PHP should be used only as a template language and nothing more.
- Use a DBAL.
- Separate your design from your content. A common method for doing this is using CSS heavily and having header and footer files containing the bulk of site layout.
- Have a single file for option constants, like DB credentials, FTP credentials, etc.

296. <https://stackoverflow.com/questions/27816397/whats-a-good-mechanism-to-move-from-global-state-to-patterns-like-dependency-in>

T: What's a good mechanism to move from global state to patterns like dependency injection?

Q: I'm in the process of reworking and refactoring a huge codebase which was written with neither testability nor maintainability in mind. There is a lot of global/static state going on. A function needs a database connection, so it just conjures one up using a global static method: \$conn = DatabaseManager::getConnection(\$connName); Or it wants to load a file, so it does it using \$fileContents = file_get_contents(\$hardCodedFilename); Much of this code does not have proper tests and has only ever been tested directly in production. So the first thing I am intending on doing is write unit tests, to ensure the functionality is correct after refactoring. Now sadly code like the examples above is barely unit testable, because none of the external dependencies (database connections, file handles, ...) can be properly mocked.

A: I think You've made first good step. Last year I was on DutchPHP and there was a lecture about refactoring, lecturer described 3 major steps of extracting responsibility from god class:

1. Extract code to private method (it should be simple copy paste since \$this is the same)
2. Extract code to separate class and pull dependency
3. Push dependency

I think you are somewhere between 1st and 2nd step. You have a backdoor for unit tests. Next thing according to above algorithm is to create some static factory (lecturer named it ApplicationFactory) which will be used instead of creation of instance in TimeUser. ApplicationFactory is some kind of ServiceLocator pattern. This way you will inverse dependency (according to SOLID principle). If you are happy with that you should remove passing Time instance into constructor and use ServiceLocator only (without backdoor for unit tests, You should stub service locator) If you are not, then You have to find all places where TimeUser is being instantiated and inject Time implemenation:

```
new TimeUser(ApplicationFactory::getTime());
```

After some time yours ApplicationFactory will become very big. Then You have to made a decision:

1. Split it into smaller factories
2. Use some dependency injection container (Symfony DI, AurynDI or something like that)

Currently my team is doing something similar. We are extracting responsibilities to seperate classes and inject them. We have an ApplicationFactory but we use it as service locator at as hight level as possible so classes bellow gets all dependencies injected and don't know anything about ApplicationFactory. Our application factory is big and now we are preparing to replace it with SymfonyDI.

297. <https://stackoverflow.com/questions/789536/is-it-possible-to-use-a-web-framework-but-not-be-dependant-on-that-framework>

T: Is it possible to use a web framework but not be dependant on that framework?

Q: I am investigating the use of web frameworks with my Java web-app. My basic requirements are pretty much easy maintainability, testability and no repetition.

I have explored writing my own MVC-type app using some sort of front controller pattern and JSP's for the views. The benefit of this is that I have complete control of all aspects of my web-app and if I design it properly it should not be hard to move it over to a more tested framework in the future if I so choose. However, the con is that I have to reinvent the wheel so to speak.

I hear good things about the currently available web frameworks. Some technologies that I have been looking at are Spring, Wicket, Struts, Guice, Hibernate and Tapestry.

I am a bit wary of Tapestry and Wicket. I dont know TOO much about them but they seem to deviate from the servlet->model jsp->view formula. I am not sure if I am comfortable with that. Although, I hear that Wicket is actually the best fit with Guice and is extremely testable.

Spring seems like it could be a nice fit, but I am very wary of frameworks which attempt to do everything. I would love to use spring-MVC, but can I swap in other components? Can I for example use Guice as my DI engine while using Spring-MVC as my framework?

I have briefly looked at Struts but it seems overly complex for my needs and again seems to be a complete package.

I've never used Hibernate, but it seems to be the standard for ORM and if it's anything like ActiveRecord (which I have only been exposed to a little bit) I am sure it fits my needs.

I also have never really used Guice but people really seem to like it, and I am a fan of DI in general even though I am not sure how it is used in an actual application.

Basically, I am only really confident with writing Servlets / JSP's. I am not opposed to learning alternate technologies but I am looking for advice as to which ones would REALLY benefit me.

If I can make an MVC app using Servlets and JSP's is it worth it to incorporate Spring? Or should I just use Servlets / JSP's and incorporate a DI engine like Guice?

I am pretty sure I would like to use Hibernate for ORM, but I hear it can be pretty complex. All I am really looking for is a way to map my POJO's to a database, so if there is something better/easier to use I am willing to look it up.

I am feeling lost and am looking for a bit of direction from people knowledgeable in the area, any opinions on any of these issues would be hugely appreciated. Thanks!

A: "Spring seems like it could be a nice fit, but I am very wary of frameworks which attempt to do everything. I would love to use spring-MVC, but can I swap in other components? Can I for example use Guice as my DI engine while using Spring-MVC as my framework?"

Agreed Spring provides a lot of stuff, but it's totally modular. You can use DI with or without AOP and so forth. And yes you can use Spring MVC and Guice for DI together.

"I have briefly looked at Struts but it seems overly complex for my needs and again seems to be a complete package."

I have used Struts for quite some time now, but even when I started using it, I found it easy as a breeze. The controller might seem overwhelming at first, but you will have real fun when you get the hang of it. The best way would be taking a look at some real world examples using Struts.

"I've never used Hibernate, but it seems to be the standard for ORM and if it's anything like ActiveRecord (which I have only been exposed to a little bit) I am sure it fits my needs."

Oh then if you found Struts to tough, Hibernate is huge. It requires a big learning curve. It pays at the end, but if you know ActiveRecord, I will suggest you to stick to it before you get a good amount of knowledge of Hibernate.

"I am pretty sure I would like to use Hibernate for ORM, but I hear it can be pretty complex."

IMHO, very true...at least for beginners. (Anyone suggesting a change here?)

"If I can make an MVC app using Servlets and JSP's is it worth it to incorporate Spring?"

You mean without Struts or any other framework? How?

Seems like you are trying to take on too much too fast. Try considering one thing at a time. DI itself is a tricky thing to implement in real world. Oh yes conceptually it's great, but what I mean is you need to first get a hang of things one by one.

A2: Very simply, if you are comfortable with JSPs and Servlets, then if you want to save some of the drudgery of web programming, I would look at Stripes or Struts 2.

I am very familiar with Stripes, and only am aware that Struts 2 is similar, so I will focus this entry on Stripes.

As an aside, Struts 1 is worthless. It offers no value (frankly).

Stripes has several features, but I will focus on only a few.

The primary value of Stripes, and if this were its only feature it would still be very valuable, is its binding framework.

Binding is the process of converting the requests string values in to the actions values. Stripes does this amazingly well. Specifically, Stripes binding does very well on nested and indexed parameters, as well as type conversions. You can easily have a form field named "currentDate" and then have a "Date currentDate" in your Action, and Stripes will "do the right thing".

If you have a form field named "mainMap['bob'].listOfThings[3].customer.birthDate", Stripes will make the map, create the list, create the customer, convert the string to a date, populate the birthDate, put the customer in the 3 slot of the list, and put that list in the 'bob' spot of the map. (I do stuff like this all the time.)

The binding of requests to Action variables is just wonderful.

On top of that you get, if you use their form tags, you get nice behaviors when, for example, they put "Fred" in your date field. You easily get the form back, with Fred in the field, and a nice error message.

Finally, I really like their Resolutions as a result from their Actions. For example, a ForwardResolution to forward to a page, RedirectResolution to redirect to a page, StreamingResolution if you want to pump data down the socket, etc. It's a very elegant feature.

Stripes has all sorts of power and does all sorts of things, but those 3 pieces are what make it best for me, and what I use 99% of the time.

Simply, it really stays out of the way and readily handles the "plumbing" without completely obscuring the HTTP request nature of the system.

For someone who is content with JSP/Servlets, Stripes I think is an excellent step up as it adds good, solid value with very little cost (it's simple to set up) and without having to toss out everything you already know, since it works just great with JSPs and JSTL. Learn the simple mechanism it uses to map Actions to URLs, and how simple it is to map requests to your actions, and you'll be flying in no time.

Works great with Ajax and the like as well.

A3: The question illustrates some confusion. I think the definitive answer is "no, it is not possible to use a web framework but not be dependent on it".

But your instinct is good. You want to maximize the general benefit a framework provides by helping to properly layer and modularize your code and minimize its invasiveness.

With that said, I think Spring is the winner on both counts.

If you follow the Spring idiom, the structure of your code will be better by the use of interfaces, layering, and aspects. Some of the attention they pay to design is bound to rub off on you. That's as helpful as the good plumbing code they provide.

Your code base does not have to be 100% Spring. I've seen Spring used in enhancements to legacy Java apps that weren't rewritten from front to back.

Struts tends to not be a good choice because it is JUST a web framework. It encourages you to put all your processing in Action subclasses, never to come out. Spring injects the idea of a service interface that decouples the web tier from the back end. It's easier to swap out web tiers and expose the service as SOAP, RMI, EJB, or remote HTTP call.

Hibernate is far more complex than Struts. If you choose Spring, use persistence interfaces and start with Spring JDBC. When you're ready for Hibernate, you can always write a new implementation and simply inject it into the place where your JDBC version used to be.

298. <https://stackoverflow.com/questions/20314098/spring-mvc-without-servlets/20314490#20314490>

T: Spring MVC Without Servlets

Q: I'm new to Spring MVC (previously used Rails and ASP.NET MVC). I noticed that I still have to use servlets. From what I can see, Spring requires you to work with servlets--you can't swap it for a different view engine (like Apache Velocity).

Is it possible to use Spring MVC with a different view engine? There doesn't seem to be any material about this that I can find.

A: There's some confusion.

1. You can't have Spring MVC without servlets, simply because Spring MVC is built on top of the Servlet technology. (But that is not a problem, because you **can** have other view technologies.)
2. You are confusing view technologies with servlets.
 - There are several possible view technologies.
 - If something, servlets are controllers, not views (actually, Spring MVC follows a [Model 2 MVC](#), so servlets are not controllers in the same sense as used in the standard MVC pattern).

The Spring Framework has a chapter dedicated to view technologies: <http://docs.spring.io/spring/docs/3.2.x/spring-framework-reference/html/view.html>

There you can find **info and how to configure** several views technologies, such as:

- [JSP & JSTL](#)
- [Tiles](#)
- [Velocity & FreeMarker](#)
- XSLT, Document views (PDF/Excel), JasperReports and others.

But don't be limited to that guide. There are other view technologies not listed there (as the view mechanism is very flexible and extensible). A very good example of one that is not listed there is [Thymeleaf](#).

299. <https://stackoverflow.com/questions/482804/what-are-the-known-gotchas-with-regards-to-the-chain-of-responsibility-pattern/482894#482894>

T: What are the known “gotchas” with regards to the Chain of Responsibility pattern?

Q: I have been finding myself using the [Chain of Responsibility](#) pattern often (3 times is often for me) in my current project and I'm wondering if I have become a little over-enthusiastic about the solution. Specifically, I have been using the Apache Commons [chain project](#). So, far I have been quite impressed by how it has simplified a number of complex interchangeable pieces of app logic into a more cohesive and organized whole. However, a few of the newer people on the project seem to have difficulty "getting it." What are your experiences with it? What problems have you encountered in its implementation?

So far, the only problem I have noticed that it is when you are trying to deal with objects that need to be closed. Having those objects stored in your Context class makes for a pain when you have completed the execution of your chain. I was able to work around this using Filters instead of Commands, but it seems a little unintuitive because your close statements are often very far away from where the object was instantiated.

Anyways, I would love to hear the thoughts from some developers who have more experience than I with this pattern.

A1: I'm tempted to say it works well for an *unspecific* problem (eg framework mode), but works less well for a lot of *specific* problem. Frameworks are written for other people to use, and you want to give the client total freedom of implementation. Once you know exactly what you are going to do to solve the problem, I think other solutions are better.

The danger of the chain of responsibility pattern is much the same as those for the blackboard pattern; it's really easy to end up creating a lot of abstractions that mostly have don't provide value in delivering your end goal. The command objects and processing objects really just form the logic of your application, and you are hiding it behind a processing chain instead of putting it right up front where your most important code is. It is much easier to understand and maintain this if you just program a method (or several methods) that represents the full processing chain without the abstractions of the processing chain. The processing chain can really hide the business logic of your application really well, and I think you prioritize the technical artifact over the business code.

So basically you replace what *could* have been very straight-forward application code that *reads* very easily with much more abstract processing chains. You are doing meta-programming. Personally I never do any meta-programming any more, so I'd tend to agree with those colleagues that dislike it ;)

A2: I think it is fair to say that in general it is worth using a given design pattern if it gives you more benefits than costs. Every pattern introduces extra level of indirection in the code, so it is more difficult to follow, especially for junior members of the team. Having said that I think that the *Chain of Responsibility* pattern is definitely useful if you don't know upfront what are the classes going to be that are going to do the processing (so being in the chain), or you reuse these classes in different contexts, create different chains in different scenarios, etc.

In general I think it is pretty bad to over-engineer your solutions (because as you said new people struggle with understanding it), but there are some cases where the design patterns are very useful.

300. <https://stackoverflow.com/questions/308539/when-to-use-domain-driven-development-and-database-driven-development/308647#308647>

T: When to use domain driven development and database driven development?

Q: Can anybody have good answer when should be database driven development be used and when should domain driven development be used. These both development approach have their importance in their respected areas. But I am not so clear which approach is appropriate in what type of situation. Any recommendation?

A: First for some background, Martin Fowler actually described three different "patterns" in his book Patterns of Enterprise Architecture. Transaction Script, Active Record and Domain Model. DDD uses the domain model pattern for the overall architecture and describes a lot of practices and patterns to implement and design this model.

Transaction script is an architecture where you don't have any layering. The same piece of code reads/writes the database, processes the data and handles the user interface.

Active Record is one step up from that. You split off your UI, your business logic and data layer still live together in active record objects that are modeled after the database.

A domain model decouples the business logic that lives in your model from your data-layer. The model knows nothing about the database.

And now we come to the interesting part:

The cost of this added separation is of course extra work. The benefits are better maintainability and flexibility. Transaction script is good when you have few or no business rules, you just want to do data-entry and have no verification steps or all the verification is implemented in the database.

Active record adds some flexibility to that. Because you decouple your UI you can for example reuse the layer beneath it between applications, you can easily add some business rules and verification logic to the business objects. But because these are still tightly coupled to the database changes in the datamodel can be very expensive.

You use a domain model when you want to decouple your business logic from the database. This enables you to handle changing requirements easier. Domain Driven Design is a method to optimally use this added flexibility to implement complex solutions without being tied to a database implementation.

Lots of tooling makes data-driven solutions easier. In the microsoft space it is very easy to visually design websites where all the code lives right behind the web-page. This is a typical transaction script solution and this is great to easily create simple applications. Ruby on rails has tools that make working with active record objects easier. This might be a reason to go data-driven when you need to develop simpler solutions. For applications where behaviour is more important than data and it's hard to define all the behaviour up front DDD is the way to go.

A2: Think of it this way.

The problem domain exists forever. Your class definitions will reflect the eternal features of the domain.

The relational database is today's preferred persistence mechanism. At some point, we'll move past this to something "newer", "better", "different". The database design is merely one implementation; it reflects a solution architecture more than the problem domain.

Consequently, it's domain first. Classes reflect the problem domain and the universal truths. Relational database and ORM come second and third. Finally, fill in other stuff around the model.

A3: I've asked a similar question: [Where do I start designing when using O/R mapping? Objects or database tables?](#)

From the answers I got I would say: Unless you have concrete reason to use database driven development, use domain driven development.

A4: As a side-note to mendelt's post, I feel there is a fourth pattern: one that is layered, separates business logic from persistence and storage, yet uses no "entities", or "business objects". A half way point, if you will, between Transaction/Action script and DDD.

In a good deal of the systems I've worked on, the persistence layer (repositories) used SqlClient directly and returned datasets to a calling service. The services performed decisions and compiled views which were sent to the user, through the controller. You might consider the service layer a business model, and you'd be right, but it wasn't a "domain" model in the DDD sense. Still, ALL business logic occurred in that one layer, period. Each layer had its job. The views displayed data, the controllers determined views, the persistence layer handled storage, and the services worked in-between controllers and persistence.

The point is this: DDD is an approach to defining a business through UI, tests, and code. It is not about entities, value objects and aggregates. Those things are just by-products of the OOP purists approach to DDD.

Just more thoughts for your consideration.

A4: For complex business models, I prefer a mix of ActiveRecord and DDD. The domain objects know how to save themselves and data actions are done against a repository (nHibernate can act as a generic repository, if you look at a repository as something that exposes data to the model as a collection). The business logic resides in the domain entities, and even some encapsulation of value types can be accomplished, although only when there is a business need. Some implementations of DDD favor removing all public setters and only modifying entities through methods. I'm not a fan of that implementation unless there is a very good business need.

It seems to me that this implementation gives you the ease of use of ActiveRecord and the business logic encapsulation of DDD.

A5: Domain Driven Development is surely the way to go. It makes more sense and adds flexibility.

301. <https://stackoverflow.com/questions/24778876/could-i-save-postgres-transaction-and-continue-work-with-db-within-it-later/24779574#24779574>

T: Could I save Postgres transaction and continue work with db within it later

Q: I know about prepared transaction in Postgres, but seems you can just commit or rollback it later. You cannot even view the transaction's db state before you've committed it. Is any way to save transaction for later use?

What I want to achieve actually is a preview (and correcting) of some changes in db (changes are imports from csv file, so user need to see preview before applying it). I want to make changes, add some changes later, see full state of db and apply it (certainly, commit transaction)

A: I cannot find a very good reference in docs, but I have a very strong feeling that the answer is: **No, you cannot do that.**

It would mean that when you "save" the transaction, the database would basically have to maintain all of its locks in place for an indefinite amount of time. Even if it was possible, it would mean horrible failure modes and trouble on all fronts.

For the pattern that you are describing, I would use two separate transactions. Import to a staging table and show that to user (or import to the main table but mark rows as "unapproved"). If user approves, in another transaction move or update these rows.

You can always end up in a situation where user can simply leave or crash without clicking "OK" or "Cancel". If what you're describing was possible, you would end up with a hung transaction holding all these resources. In my proposed solution you end up with wasteful rows in "staging" table that you may still show to user later or remove.

You may want to read up on persistence saga. This is actually a very simple example of a well known and researched problem.

To make the long story short, this pattern breaks down a long-running process like yours into smaller operations that are applied and persisted in some way in separate transactions. If any of them happens to fail (or does not occur as expected), you have compensating actions that usually undo what the steps executed so far have done (e.g. by throwing away stale/irrelevant data).

Here's a decent introduction:

- <http://kellabyte.com/2012/05/30/clarifying-the-saga-pattern/>
- <http://vasters.com/clemensv/2012/09/01/Sagas.aspx>

This concept was formally introduced in the 80s, but is well alive and relevant today.

302. <https://stackoverflow.com/questions/4706448/java-desktop-application-to-client-server-web/4706602#4706602>

T: Java desktop application to Client/Server (Web)

Q: We have a desktop java application (image-processing) that is working great, now we have to add a client/server architecture using Java EE plateform.

We must use also MVC, and interacting with many other libraries like JDOM, JMatlink(MATLAB), and calling some exe files.

Based on your experience what is the best choice to do that (framworks, ...)

A1: Correct, you must use an MVC framework to design a flexible and reusable web application on the Java EE platform.

I suggest the following design:

1. Use JSF (Java Server Faces) to design the front end. As you are migrating your desktop application then it will better suit you becuase it's Component and Event driven framework.
2. Middlware: EJB 3(or EJB3.1) This will provide best available flexibility, performance and security to call your Business components directly from JSF Beans or any other remote application.

Over here you can use various design pattern to encapsulate Library and database access i.e. DAO (Data Access Object).

Use DTO (Data Transfer Objects) to transfer your request/response.

Hope it will give base to start your research.

A2: If you can abstract the layers that talk to the backends such that your frontend (Swing?) doesn't need to know where those service are located, you are half-way there.

The key should be a good module concept. Frameworks like the NetBeans platform help you with that, and they can easily integrate non-visual modules that handle the backend code.

I'm not sure what you mean with "*We must use also MVC*"

MVC is a design pattern not a library or framework.

But if you use something like the NetBeans platform, you'll be applying that pattern anyway, because it forces you to think in modules. Each module will have a defined responsibility and during startup it registers itself with the application.

Take an application that allows you to manage people (e.g. for a human resource department). One module is responsible for displaying a form where the user can look at a single employee. That module in turn looks for a provider that can load or list all employees. How that provider gets the data is invisible to the front end. It could use a flat file, a relational database or a call to a remote EJB server (this is where you could plug your JavaEE stuff in)

The application could even download the modules from the server if correctly configured.

The key is to make the modules independent from each other. This is true for any large scale application regardless of the technology used (web application, a server side daemon or a desktop application)

303. <https://stackoverflow.com/questions/2019042/seam-application-architecture/2044717#2044717>

T: Seam application Architecture

Q: I need to implement quite big system in Seam. I'm considering the way of designing the architecture. If it's good to use page controllers or application controllers or front controller or every each of them. If it's helpful to use backend bean or maybe there's no need to do that. If you have any suggestion or link to helpful article I will appreciate it.

A: Daniel,

It is good practice to use a front controller, most people aren't aware of that design pattern.

It is a really good design pattern to use because it ensures you are accessing the application through a single entry point. You can monitor everything that comes and goes easily with less configuration. You reduce the amount of possible code duplication because there is a single entry point. In addition to having less code to maintain, the code should be easier to follow since there is only one way in. You can then easily follow the execution flow of the application.

Unfortunately for Seam, there isn't really a front controller pattern. I haven't spent as much time as I would like to develop my own, but security and auditability are my number one focus.

As far as page / application controllers go, in Seam, you have more contexts or scopes available. Event, Page, Conversation, Session, Application, to name most of them.

If you're developing a controller or in Seam, a page action, most of the time, it will be event based. That is the shortest lived scope. If you have page flows, you would then use conversational-scoped components.

Take a look at the examples in the source code. You can do a lot with very little code, it is amazing, but at the same time, there is a lot going on that may take a while to pick up on.

The n-tier design that most places follow doesn't necessarily apply here. For most of my pages, I define a query that I'll use in XML (entity query), then I'll inject it into my page action and call it there. So instead of having a controller, service, dao, and entity classes, you end up with simply a page action, the queries, and entity classes. You can cut out the service and dao layers in most cases.

Your whole definition of a service might change too. For me, a service is a service provider such as notification, security (auditing), exception handling, etc. all of these services run in the background and are not tied to a particular http request.

A2: If you need to learn a lot about Seam for a project, I recommend you get the [Seam In Action](#) book, which is the best on the subject.

To answer your question, personally I prefer to use the pull-MVC style in Seam, where you refer to data in your view templates that Seam takes care of initialising, as needed, using @Factorymethods. However, there is more than one way to do it in Seam, so it is worth reading about the alternatives first, hence the book recommendation. Alternatively, build a few Seam applications first to throw away before you try to build one 'right' :)

304. <https://stackoverflow.com/questions/18739425/how-to-refactor-large-if-else-block-in-javax-servlet-front-controller>

T: How to refactor large if else block in java servlet front controller

Q: I am currently using a front controller pattern for my servlet and utilize a large if-else if structure in the doGet() and doPost() methods; however, my application is starting to add more and more functionality and as result the if-else blocks are getting out of control. I was wondering what are some popular strategies for handling this type of situation (while maintaining a front controller).

All I could think to do was maybe use a hashtable that maps paths (from the request url) to helper methods that determines the appropriate JSP (and sets attributes).

I liked the look of the Spring framework; however, I am currently not able to port to a framework, how does something like Spring avoid the problem I am facing?

A: Independently of the framework or technology, I've faced several times your case and what I always do is to use a command pattern:

https://en.wikipedia.org/wiki/Command_pattern

and in the command handler I use a Factory pattern that instantiates the appropriate class to handle the request with the information of the command object.

With this architecture you are veery flexible and it is quite easy to implement :)

305. <https://stackoverflow.com/questions/4757418/pattern-one-activity-multiple-views-advantages-and-disadvantages>

T: Pattern “One activity, multiple views”: Advantages and disadvantages

Q: This pattern is similar to the pattern *Main Servlet* (the Front Controller) that is used for developing web applications.

The main idea of this pattern: we have one Activity that manages multiple views and this activity is responsible for representing current content. Not all views need functional of activity (e.g. life-cycle methods) so the main question is: **if I can go without activity why do I have to use it?**

I have found the following disadvantages of using this pattern:

1. Official source doesn't recommend to [Overload a Single Activity Screen](#) but they don't explain why.
2. We cannot use TabActivity, ListActivity, MapActivity. But there are some tricks to go without them.
3. If different screens have different menu it's a problem to make that without activities.
4. It is necessary to keep history by ourselves. But it's not so difficult to develop.

I have found the following advantages of using this pattern:

1. It's faster to change the content of current activity than to start another activity
2. We are free to manage history as we want
3. If we have only one activity-context it's simpler to find and solve problems with memory leaks

What do you think about this pattern ? Could you provide any other advantages/disadvantages ?

A: We cannot use TabActivity, ListActivity, MapActivity. But there are some tricks to go without them.

You have to use MapActivity if you want to use MapView. You have to use PreferenceActivity if you want to use preference XML.

It is necessary to keep history by ourselves. But it's not so difficult to develop.

The difficulty in managing your own history will depend greatly on what the history needs to be. Implementing history for a simple wizard will be fairly easy. However, that is a particularly simple scenario. There is a fair amount of history management code in Android that you would have to rewrite for arbitrary other cases.

You also forgot:

#5. You will be prone to leak memory, because you will forget to clean up stuff, and Android will not clean up stuff (since it assumes that you will be using many small activities, the way they recommend).

#6. Your state management for configuration changes (rotation, dock, SIM change, locale change, multiple displays, font scale) will be more complicated because now you also have to figure out what extra stuff (e.g., history) need to be part of the state, and you have deal with all of them at once rather than activity-at-a-time.

#7. Having multiple entry points for your application becomes more challenging (e.g., multiple icons in launcher, app widget linking to some activity other than the main one, responding to etc.).

It's faster to change the content of current activity than to start another activity

For most modern Android devices, the speed difference will not be significant to most users, IMHO.

If we have only one activity-context it's simpler to find and solve problems with memory leaks

Except that you still have more than "one activity-context". Remember: your activity, large or small, is still destroyed and recreated on configuration changes.

What do you think about this pattern ?

Coase's "[nature of the firm](#)" theory says that businesses expand until the transaction costs for doing things internally become higher than the transaction costs for having other firms do the same things.

Murphy's "nature of the activity" theory says that the activity expands until the transaction costs of doing things internally become higher than the transaction costs for having other activities do the same things. Android developers will tend towards a "user transaction" model for activities -- things that are tightly coupled (e.g., steps in a wizard) will tend to be handled in single activity, and things that have little relationship (e.g., browse vs. search vs. settings vs. help vs. about) will tend to be handled in distinct activities.

306.<https://stackoverflow.com/questions/45412924/umbrella-project-with-multiple-apps-containing-front-end-logic>

T: Umbrella project with multiple apps containing front end logic.

Q: I have 2 applications which have shared functionality/routes. For example, in both applications there is a diary, goal tracking, sleep tracking, etc which work in the same way. There are also routes specific to each app. In AppA, a user can track their mood, and in AppB a user can view notes from their doctor.

Is there a way to have an umbrella project which contains in /apps the generic app, AppA, and AppB? Each app will have its own router/controllers/templates etc. AppA and AppB will each require the GenericApp as a dependency. So far I have only seen umbrella projects with one app that contains the front end logic (web), with the other apps being libraries that are included in. How can this work with routing across multiple apps? Is there another approach I can take for this?

I have found [this question & answer](#) in my search, however it is not exactly what I am looking for. It seems to follow the pattern of one front end app including in other libraries.

307.<https://stackoverflow.com/questions/24965332/javascript-module-pattern-works-on-javascript-but-not-in-my-server-browser>

T: javascript module pattern works on jsbin but not in my server/browser

Q: I am a backend developer, I write javascript only when needed and in not the best ways. But I wanted to redeem myself and start writing organized and following best practices as much as I could.

So I started a module pattern to encapsulate some functions and bind UI events from my markup, because this was pretty much trial and error, I used jsbin following the suggestion of a friend who is a front end developer.

The thing is, that my concept works on jsbin, but then I moved that to my js file in the server and there it seems I lose scope of the jQuery objects that I cache inside my module pattern.

<http://jsbin.com/ciwomeye/7/edit>

The functionality is pretty basic I populate the options of two select elements (this works) then I bind the on change events for those selects, and when triggered I should call some functions that eventually should do an ajax request to my backend and obtain data.

Can you guys please advise me on the code, and tell me what I am doing wrong please?

A: There's not much to go on here, but I'm fairly certain that your issue is that your script tag is in `<head>`, and it's running before your content is loaded. If this is the case, it will be trying to access elements in the DOM that don't yet exist (e.g. when this line runs, `$hostSelect1: $('#host-select-1')` the select element with id `host-select-1` won't exist yet, but jQuery will look for it anyway and fail silently).

You can move your script to the bottom of the page, right before `</body>`, in which case you can be certain that all of your content will be loaded when your script runs. This method also has some other performance benefits. Or else you can wrap your call to `DbDiff.init()` in `$(document).ready`, like this `$(document).ready(function() {DbDiff.init()});`, which will have largely the same effect (except that settings has already been evaluated... you would need to do a little restructuring in order to make sure `$('#host-select-1')`, etc. are evaluated and assigned to `$hostSelect1` only after your DOM content has loaded).

308. <https://stackoverflow.com/questions/26880752/what-are-the-key-elements-of-a-service-oriented-architecture-and-how-do-they-make-an-soa-effective>

T: What are the key elements of a Service Oriented Architecture and how do they make an SOA effective?

Q: Service-oriented architecture (SOA) is a software architecture design pattern based on distinct pieces of software providing application functionality as services to other applications. Key elements of a Service Oriented Architecture are, application fronted, service, service repository and service bus.

Uses open standards to integrate software assets as services, Standardizes interactions of services, Services become building blocks that form business flows, Services can be reused by other applications, thus increased Reusability, Legacy leverage, Agility, Loose coupling and Interoperation.

309. <https://stackoverflow.com/questions/1379915/why-is-fxpro-used-for-pos-systems>

T: Why is FoxPro used for POS systems?

Q: I'm looking at upgrading a POS (Point Of Sale) project which is currently built in FoxPro to .net. The planned architecture is quite complex and there is plenty of rationale behind the new technologies chosen. Some of the requirements include the ability to have both desktop and web front end (where web front end has limited functionality), syncing data with an external website and the ability for multiple clients to run off of 1 server. My current model of choice is an MVP pattern with Sql Server (probably Express) as the DB, and a WCF service layer between the presentation and services in order to allow for remote UIs.

My concern is that during my research I have noticed that there seems to be a common theme amongst touch screen POS systems to build them in FoxPro.

Apologies for the slightly subjective question however I am keen to find out if there is any particular reason for this? Does FoxPro have any particular out of the box functionality that lends itself to this type of system? I have not used FoxPro and so before finalising my choice of technologies for this project would like to make sure I am not missing a trick by ruling it out completely.

A: Licencing - SQLserver didn't run well on client OSes and was expensive.

Foxpro was cheap and easy.

If all you are doing is retrieving price values from one table and updating sales in another, then SQL is rather overkill.

A2: Many POS systems have a standalone capability so that the store can continue to trade even if the connection to the in-store server(s) is down.

Typically this means a local database for price lookup etc, and local storage of transaction data until the server connection comes back up again.

The hardware and licensing costs need to be as low as possible.

Hence FoxPro was a good choice a few years ago, but a properly architected .NET application would be an excellent choice today.

A3: FoxPro had a few advantages at that time. I can remember that for many many years all the new concurrent DBs laked at least in on place, so we choose FoxPro over and over again for now POS solutions:

- it was fully integrated database - so an out-of-the box solution
- it was really cheap compared to the alternatives (as other users have pointed out too)
- it ran on cheap hardware - for moderate sizes (like most customers required).
- it had a simple to learn and intuitive integrated environment, so no extra tools were required.
- it was very very easy to create very nice reports at that time (managers liked it allot, and since they made the decisions mostly... :)).
- FoxPro was a learning course in almost all IT schools, so it was very cheap and easy to find FoxPro specialists. Especially in eastern European countries, their number is still huge (many POS software was outsourced there).

There are still an incredible huge number of FoxPro legacy applications (especially in small and medium companies), so this is not just a POS issue.

310. <https://stackoverflow.com/questions/2580956/creating-a-web-application-that-can-be-extended-by-plugins-modules>

T: Creating a web application that can be extended by plugins/modules

Q: I'm currently involved with developing a C# CMS-like web application which will be used to standardise our development of websites. From the outset, the idea has been to keep the core as simple as possible to avoid the complexity and menu/option overload that blights many CMS systems. This simple core is now complete and working very well.

We envisaged that the system would be able to accept plugins or modules which would extend the core functionality to suit a given projects needs. These would also be re-usable across projects. For example, a basic catalogue and shopping basket might be needed. All the code for such extensions should be in seperate assemblies. They should be able to provide their own admin interfaces and front-end code from this library. The system should search for available plugins and give the admin user the option to enable/disable the feature. (This is all very much like WordPress plugins)

It is crucial that we attack this problem in the correct way, so I'm trying to perform as much due dilligence as possible before jumping in.

I am aware of the Plugin Pattern (<http://msdn.microsoft.com/en-us/library/ms972962.aspx>) and have read some articles on it's use. It seems reasonable but I'm not convinced it's necessarily the correct/best technique for this situation. It seems more suited to processing applications (image/audio manipulation, maths etc). Are there any other options for achieving this kind of UI extensibility functionality? Or is the plugin pattern the way to go?

I'd also be interested if anybody has links to articles that explain using the plugin pattern for this purpose?

A: The managed extensibility framework (MEF) provides a way that is focused specifically towards building composeable and extensible applications. It's on codeplex for .net 3.5 and will be bundled with .net 4 when it's released here in a couple of weeks. It'll help provide the plumbing that you'll need for what you're trying to do.

311. <https://stackoverflow.com/questions/32415529/mvc-vs-web-api-for-multi-page-app-is-the-future-web-api>

T: MVC vs Web API for Multi Page App. Is The Future Web API?

Q: I'm starting a new project in super early story phase and I'm a little unsure of what design pattern to use. The app is a reporting app that will allow users to design reports and download them. The app will basically be a wizard style multi page data selector. I'd like to offer the functionality to build these reports from a desktop app too.

Considering the advances in Web API over the past few years, would it be crazy to not use it over MVC?

I've been out of the development game for a bit and it seems that Web API and an angular or other js front-end is the route of choice for new application developers looking to focus on server side business logic along with as many consuming front-ends as possible. There's very little data persistence in this app apart from settings etc.

So am I right to go the web API route? Would this be a good example of when NOT to use MVC? Or is there a middle ground that uses both that's universally understood as being a smart design choice?

A: This is a difficult question to answer because it raises more questions.

In short, the answer is: It depends.

As you're well aware, MVC is a **Pattern** that is used to separate application's concerns. **Design Patterns** on the other hand, are solutions to software design problems.

Microsoft's branding of asp.net MVC was initially introduced to offer an *alternative* to webforms. Both of these patterns (webforms and MVC) are viable solution for when you want to create a website or web application. It all comes down to what needs to be done and how efficient your team is in either one of them.

Microsoft asp.net Web API is a framework for building web APIs on top of the .NET framework. Back in the days, we would create Web Services using .asmx files. Then, they introduced WCF and now, we have Web API. Web Services and WCF still exist today and are valid choices but...the newer stuff does overcome some of the limitations found in the earlier stuff. There are Pros and Cons in using anyone of them. You need to pinpoint what does one offer over the other and if it fits your need.

The app is a reporting app that will allow users to design reports and download them. The app will basically be a wizard style multi page data selector. I'd like to offer the functionality to build these reports from a desktop app too.

What's not clear is when you say the ability to **design reports**. Do you mean that your users will get to choose where and how they want things to look and feel on the report? For example, user1 wants its logo at the top right while user2 wants it at the bottom left etc...How much will your users be able to "**design**" their reports? Then you mention something about a wizard. Are the steps in your wizard there to help the user **design** his report or are the steps there to **act as parameters** to your report?

You then mention that you'd like to offer this wizard-like functionality from within a Desktop application as well...my first instinct would be to host your web application somewhere and from within your Desktop application, have a browser control that points to the URL of your wizard-like web application. Considering the advances in Web API over the past few years, would it be crazy to not use it over MVC? Well...they serve different purpose.

In the past years, you **typically** created a website using webforms and/or asp.net MVC in order to design web pages/VIEWS which were then sent to the user's browser.

Web APIs are **typically** used for creating APIs that does not return Views or Web Pages but instead, returns data. Notice how I use **typically**...that's because the **trend** for the past 2-3 years now has been to create Web APIs and use a client side framework such as Angular to invoke that Web API and render **Views**. With this approach, you pretty much bypass the need of using asp.net MVC and/or webforms.

Keep in mind that although I say **trend**, I do not mean this will die in the next few months or years. There is value in creating these types of application which is beyond the scope of this post. But remember that client side framework requires people knowing them...so you'll need to take that into consideration if you choose to go down that route.

By the way, Microsoft did introduce yet another alternative to asp.net MVC called SPA (Single Page Application) which allows you to build web application using the above mentioned approach. With all that, I'm not even sure if I did end up answering your question :-)

I guess I'd still need more clarification on the exact task at hand.

A2: Well, both the MVC and Web API approach allow separation of your model and logic from presentation, which fits your requirement to have the wizard working via a desktop app as well as web. For me it comes down to your requirement for development time vs. application performance.

Using MVC will be quicker however you'll incur a server round trip unless you use some kind of proprietary controls in your view that are AJAX based. With Web API only, you're going to need to do a lot of manual JSON manipulation and be reliant more on your front-end MVVM (a client-side representation of the MVC pattern), which is *always* more time consuming.

Using Web API definitely keeps you more loosely coupled, has the potential for overall highest performance, and if you have a need to publish your API out to the public, you've got that in place. It will come at development time cost though.

So, if you just want to get something up and running quickly, use MVC is my advice. Need a very loosely coupled, optimally performant solution? Go the Web API route. Microsoft are now almost merging Web API and MVC anyway so Web API is essentially the controller of an MVC pattern.

Also I should add in relation to Vlince's answer that a single page web application is simply an application that makes use of multiple DOM elements at the client-side that are shown or hidden according to the input. Kendo UI is a framework particularly suited to that approach, however it can be done with nothing more than pure JavaScript, and isn't a Microsoft specific technology.

A3: PHP provides autoload functionality with [SPL](#) and [spl_autoload](#) (and related functions). You can register a custom autoloader for your library code.

For the shared functionality handled by your application, have you considered the [Front Controller design pattern](#)?

312. <https://stackoverflow.com/questions/191934/does-anyone-have-database-programming-language-framework-suggestions-for-a-gui>

T: Does anyone have database, programming language/framework suggestions for a GUI point of sale system?

Q: Our company has a point of sale system with many extras, such as ordering and receiving functionality, sales and order history etc. Our main issue is that the system was not designed properly from the ground up, so it takes too long to make fixes and handle requests from our customers. Also, the current technology we are using (Progress database, Progress 4GL for the language) incurs quite a bit of licensing expenses on our customers due to multi-user license fees for database connections etc.

After a lot of discussion it is looking like we will probably start over from scratch (while maintaining the current product at least for the time being). We are looking for a couple of things:

1. Create the system with a nice GUI front end (it is currently CHUI and the application was not built in a way that allows us to redesign the front end... no layering or separation of business logic and gui...shudder).
2. Create the system with the ability to modularize different functionality so the product doesn't have to include all features. This would keep the cost down for our current customers that want basic functionality and a lower price tag. The bells and whistles would be available for those that want them.
3. Use proper design patterns to make the product easy to add or change any part at any time (i.e. change the database or change the front end without needing to rewrite the application or most of it). This is a problem today because the Progress 4GL code is directly compiled against the database. Small changes in the database requires lots of code recompiling.

Our new system will be Linux based, with a possibility of a client application providing functionality from one or more windows boxes.

So what I'm looking for is any suggestions on which database and/or framework or programming language(s) someone might recommend for this sort of product. Anyone that has experience in this field might be able to point us in the right direction or even have some ideas of what to avoid. We have considered .NET and SQL Express (we don't need an enterprise level DB), but that would limit us to windows (as far as I know anyway). I have heard of Mono for writing .NET code in a Linux environment, but I don't know much about it yet. We've also considered a Java and MySQL based implementation.

To summarize we are looking to do the following:

1. Keep licensing costs down on the technology we will use to develop the product (Oracle, yikes! MySQL, nice.)
2. Deliver a solution that is easily maintainable and supportable.
3. A solution that has a component capable of running on "old" hardware through a CHUI front end. (some of our customers have 40+ terminals which would be a ton of cash in order to convert over to a PC).

Suggestions would be appreciated.

Thanks

[UPDATE] I should note that we are currently performing a total cost analysis. This question is intended to give us a couple of "educated" options to look into to include in or analysis. Anyone who could share experiences/suggestions about client/server setups would be appreciated (not just those who have experience with point of sale systems... that would just be a bonus).

[UPDATE]

For anyone who is interested, we ended up going with Microsoft Dynamics NAV, LS Retail (a plugin for the point of sale and various other things) and then did some (and are currently working on) customization work on top of that. This setup gave us the added benefit of having a fully integrated g/l system, which our current system lacked.

A: I suggest you first research your constraints a bit more - you made a passing reference to a client using a particular type of terminal - this may limit your options, unless the client agrees to upgrade.

You need to do a lot more legwork on this. It's great to get opinions from web forums, but we can't possibly know your environment as well as you do.

My broad strokes advice would be to aim for technology that is widely used. This way, expertise on the platform is cheaper than "niche" technologies, and it will be easier to get help if you hit a brick wall. Of course, following this advice may not be possible if you have non-negotiable technology already in place at customers.

My second suggestion would be to complete a full project plan, with detailed specs and proper cost estimates, before going with the "rewrite from scratch" option. Right now, you're saying that it would be cheaper to rewrite the system than maintain it, and you don't really know how much it would cost to re-write.

A2: Java for language (or Scala if you want to be "bleeding edge", depending on how you plan to support it and what your developers are like it might be better, but also worse)

H2 for database

Swing for GUI

Reason: Free, portable and pretty standard.

Update: Missed the part where the system should be a client-server setup. My assumption was that the database and client should run on the same machine.

A3: I suggest you use browser for the UI.

Organize your application as a web application.

There are tons of options for the back-end. You can use Java + MySQL. Java backend will save you from windows/linux debate as it will run on both platforms. You won't have any licensing cost for both Java and MySQL. (Edit: Definitely there are a lot of other languages that have run-times for both linux & windows including PHP, Ruby, Python etc)

If you go this route, you may also want to consider Google Web Toolkit (GWT) for creating the browser based front-end in a modular fashion.

One word of caution though. Browsers can be pesky when it comes to memory management. In our experience, this was the most significant challenge in doing browser based POS You may want to checkout Adobe Flex that runs in browser but might be more civil in its memory management.

A4: Golden Code Development (see www.goldencode.com) has a technology that does automated conversion of Progress 4GL (the schema and code... the entire application) to a Java application with a relational database backend (e.g. PostgreSQL). They currently support a very complete CHUI environment and they do refactor the code. For example, the conversion separates the UI, the data model and the business logic into separate Java classes. The entire result is a drop-in replacement that is compatible with the original (users don't need retraining, processes don't need to be modified, the data is migrated too). This is possible because they provide an application server and a set of runtime classes that provide that compatibility. The result of the automated conversion is not something that needs further editing before you can compile and run it. True terminal support is included so hardware terminals still work (it requires a small JNI library to access NCURSES from Java). All the rest of the code in the runtime is pure Java. No Progress Software Corp technology is used in the resulting system and it runs on Linux.

At least one converted system is already in production, running a 24 by 7 mission critical environment. It is a converted ERP system that their mid-sized pilot customer uses to run their entire business.

313.<https://stackoverflow.com/questions/25229217/types-of-three-tiers-web-programming-webforms-or-mvc/25230058#25230058>

T: Types of three-tiers Web Programming (Webforms or MVC)

Q: Are there different types of web programming layer?

The relationships between the layers can be different ? Different than in the image above

(Presentation Layer - Business Logic Layer - Data access Layer)

If there are, please explain them Or even introduce some resources. (Advantages and Disadvantages)

A: Probably the most important one that you (and most everyone else) should know about is Onion Architecture..

http://media.ch9.ms/ch9/7a85/504ec747-81f3-49c1-bce3-2af5cb497a85/aspConfMvcSolutionBestPractices_Custom.jpg

The image is from a presentation on Channel9 about building an ASP.NET MVC 4 app with this architecture. Really worth watching, but be warned, it may forever change how you think about building applications (:-))

<http://channel9.msdn.com/Events/aspConf/aspConf/ASP-NET-MVC-Solution-Best-Practices>

In essence, you stop thinking about the database as being the "bottom layer". In fact, you think of it as a "top layer" alongside the user interface, or put another way, it's a port to the world outside your application. Your domain entities are at the bottom, but they have no reliance on or awareness of anything that uses them. You then define interfaces -- again with no reliance on or awareness of particular data access technologies -- that describe whatever storage and retrieval operations you need. (Try to avoid simply defining the five CRUD operations.... and even more importantly, avoid using a [generic repository pattern](#) ... long-term maintainability often becomes an issue here)

The UI layer and business logic will never have direct access to the database-specific implementation of your repository interfaces. You write your application code against interfaces only.

314.<https://stackoverflow.com/questions/27251713/wpf-architecture-with-business-layer-and-dal/27252423#27252423>

T: WPF Architecture with Business Layer and DAL

Q: I'm starting a new application in WPF and I want it to have a good architecture so that it can be maintainable. I'm using Entity Framework and what I planned so far is.

- View Layer: One project (startup) with the startup view, and main menus. Different projects for each type of view, for example, if I have views related with Books then I'd have a project named BooksView with all the views.
- Business Layer: One project for each type of Business Class, for example BusinessBooks. Each one would have a Repository with the specific operations and any helpers to do calculations if needed.
- Data Access Layer: It contains a folder named Entity Framework with the DBContext and with the T4 generated classes and with a class named ContextCreator which has the following code:

Is this approach any good?

A: Though I am quite not sure of your application scale but it seems good to me that you have started on a right path for separation of concerns.

But you may need to rethink if creating separate project for each category of views does not introduce unnecessary complexity.

Again I am not sure if you are new to WPF, but for the View layer for better maintainability, loose coupling and hence testability etc., [MVVM](#) is the best chosen pattern to organize things in place. For getting MVVM in place you may handcode everything from scratch or there are nice frameworks available like:

[MVVM Lite](#)

[Assisticant](#)

Also if you are planning towards a relatively big(layman term!!)/enterprise class application and since you are looking for highly maintainable, flexible application you may consider using [PRISM framework from Microsoft](#). [Prism Guidance and downloadable PDFs etc.](#)

Once you finalized on the View part, the you need to focus on Validations for your app and whether you would be implementing validations in the ViewModel or in your domain objects. Assisticant framework has some good domain-centric validation mechanism built into it.

For the Data access layer, since you chose to go with EF, from my understanding so far, the [Unit-Of-Work with Repository pattern](#) would greatly help you to gain extensibility, testability etc. features.

If you are planning high on unit testability and loose coupling of your application, you need to consider Inversion of Control and Dependency Injection perhaps with a suitable framework.

[Here](#) you can check a WPF application framework to understand on how to organize different areas of a WPF application in a layered approach.

<https://stackoverflow.com/questions/11481149/difference-in-dal-with-repository-pattern-and-dal-without-repository-pattern/11481172#11481172>

T: Difference in DAL with repository pattern and DAL without repository pattern?

Q: Some time back I started using EF as a DAL and from tutorials and videos come to know about repository pattern and Unit of work patterns.

About repository I learned it is an abstraction over DAL and it separate business logic from data access code. Also that it avoid reputation of data access code and help in unit testing.

I understand repository pattern is a particular way of making DAL. But what it brings ? I am not getting. My confusion is just making a DAL (a separate class library/ project) it will also give these benefits (separate data access logic from business logic, save data access code reputation, help in unit testing etc).

Probably I am still missing benefits of repository patren. Please guide me on this.

A: Data Access Layer is supposed to deal with data sources like databases, but to achieve some higher level goals as described by [MSDN](#) you need repository pattern.

As per [MSDN](#)

- You want to maximize the amount of code that can be tested with automation and to isolate the data layer to support unit testing.
- You access the data source from many locations and want to apply centrally managed, consistent access rules and logic.
- You want to implement and centralize a caching strategy for the data source. You want to improve the code's maintainability and readability by separating business logic from data or service access logic.
- You want to use business entities that are strongly typed so that you can identify problems at compile time instead of at run time.
- You want to associate a behavior with the related data. For example, you want to calculate fields or enforce complex relationships or business rules between the data elements within an entity.
- You want to apply a domain model to simplify complex business logic.

315. <https://stackoverflow.com/questions/5209939/which-pattern-most-closely-matches-scenario-detailed-and-is-it-good-practice/5323537#5323537>

T: Which pattern most closely matches scenario detailed and is it good practice?

Q: I have seen a particular pattern a few times over the last few years. Please let me describe it.

In the UI, each new record (e.g., new customers details) is stored on the form without saving to database. This clearly has been done so not clutter the database or cause unnecessary database hits.

While in the UI state, these objects are identified using a Guid. When these are saved to the database, their associated Guids are not stored. Instead, they are assigned a database Int as their primary key.

The form can cope with a mixture of retrieved items from the database (using Int) as well as those that have not yet been committed (using Guid).

When inspecting the form (using Firebug) to see which key was used, we found a two part delimited combined key had been used. The first part is a guid (an empty guid if drawn from the database) and the second part is the integer (zero is stored if it is not drawn from the database). As one part of the combined key will always uniquely identify a record, it works rather well.

Is this Good practice or not? Can anyone tell me the pattern name or suggest one if it is not already named?

A: There are a couple patterns at play here.

Identity Field Pattern

Defined in P of EAA as "Saves a database ID field in an object to maintain identity between an in-memory object and a database row." This part is obvious.

Transaction Script and Metadata Mapping

In general, the ASP.NET DataBound controls use something like a Transaction Script pattern in conjunction with a Metadata Mapping pattern. Fowler defines Metadata Mapping as "holding details of object-relational mapping in metadata". If you have ever written a data source control, the Metadata Mapping aspect of this pattern seems obvious.

The Transaction Script pattern "organizes business logic by procedures where each procedure handles a single request from the presentation." In order to encapsulate the logic of maintaining both presentation state and data-state it is necessary for the intermediary object to indicate:

If a database record exists

How to identify the backend data record, to populate the UI control

How to identify the data and the UI control if there is no current data record, so that presentation data can be updated from the backend datastore.

The presence of the new client data entry Guid and the data-record integer Id provide adequate information to determine all of this with only a single call to the database. This could be accomplished by just using integers (and perhaps giving a unique negative integer for each unpersisted UI data item), but it is probably more explicit to have two separate fields.

Good or Bad Practice?

It depends. ASP.NET is a pretty successful software project, and this pattern seems to work consistently. However, this type of ASP.NET web control has a very specific scope of application - to encapsulate interaction between a UI and a database about data objects with simple mappings. The concerns do seem a little blurred, but for many applicable scenarios this will still be acceptable. The pattern is valid wherever a Row Data Gateway would be acceptable. If there is more than one database row affected by a web control, then this approach will not be functional. In these more complex cases, either an Active Record implementation or the combination of a Domain Model and a Repository implementation would be better suited.

Whether a pattern is good or bad practice really depends on the scenario in which it is being applied. It seems like people tend to advocate more complex design structures, because they can be applied to more scenarios without failing. However, in a very simple application where the mappings between data records and the UI are direct, this pattern is very useful because it creates the intended result while minimizing the amount of performance and development overhead.

316. <https://stackoverflow.com/questions/2765583/reusable-architectural-code-management>

T: Reusable architectural code management

Q: Our code is in Java and Javascript (AJAX libraries). We have wrappers/reusable code around the existing libraries to perform mundane tasks like, db connections, session management, logging, hibernate settings, base structure, some reusable multitenancy code etc.. From the javascript end, we have page initializers, UI layout components, custom js objects, and some of our own logic.

We have multiple projects where this code can be reused, but at the same time, this code is evolving along with the application. So if we find a common way to do it, we can move it to the framework code and let other projects also benefit out of it. If/when we find a bug in the base code, we can fix it in one place and commit and all the other projects will pick up the change (rather than everyone making the changes locally).

If it's just java files, we can keep it as a separate project, and include it as a dependent module in eclipse/maven and have it included as a jar, as and when needed. This part is easy to handle, but now we also have reusable javascript in the code, which cannot exactly be jar(ed). We want some suggestions on how the code should be laid out, so we can reuse it via maven (deployment time) and via eclipse (development time), without going thru too many hoops.

Before writing this, I did come across some articles on stackoverflow, which do talk about reusable code and methodologies which are great, but not exactly how to manage them using svn, maven, eclipse etc..

Linking them, for reference.

- [Architecture of some reusable code](#)
- [How do you make code reusable?](#) -> This is a great article from a theory stand point, but no tips on management.
- [How do I index and make available reusable code?](#)

In some of our old projects, we maintained ant files, which would copy files from base locations to the final war, so everything is available. But over the period of time as the project grew, even for a simple check, we had to rebuild the whole war and deploy to test on the developers machine. Which took away 5 minutes every time.

So the question is, are there any repository patterns, eclipse project layout ideas, packaging styles, which can help us resolve this issue ?

A: I would suggest using a Component oriented java web framework for such tasks. Wicket immediately comes to mind. (But JSF, Tapestry etc will work equally well)

In wicket, everything is a component and components can be packaged with behaviors (which may include javascript, css etc)

So you'd have a commons - project where you maintain reuseable java and javascript code.

The benefits are obvious, it's pretty much exactly what you have been asking for. The drawbacks, on the other hand are mainly that javascript and css content is inside your jars and will be served by the app server rather than a static web server or CDN.

317. <https://stackoverflow.com/questions/29357680/how-much-responsibility-should-the-model-have-in-mvc/29358866#29358866>

T: How much responsibility should the Model have in MVC?

Q: First off, I apologize if this question has already been asked and answered somewhere else? I've read many questions and answers on here regarding MVC, but not quite like this (yet).

My question is, how much should the Model in MVC, know? In almost every tutorial or MVC sample I've came across, the Page's Title and Description are set in a ViewBag, and then the layout reads from it, and sets it on the page.

To me, that seems a bit, not right. I would think that the a Model for that Controller and View, should have a Title property. To do this, I would have a BasePageModel with the Title, Description, and a Meta Collection. The controller would set each one, and then the _layout would have a @model BasePageModel and then set them on the page.

Is this "wrong" to do it this way (even though it does work), since the Model now kind of knows about the View/layout? Or is this more of a ViewModel than a Model?

A: You're right that it belongs in a ViewModel. I think the slightly confusing part about your example is that you need to distinguish between the *blog* title and the *page* title.
You would typically have a generic ViewModelBase for all your pages that have title and description properties, which would be populated manually when you materialize the ViewModel. In the case of the Blog post you would populate The ViewModel from the BlogPost data model.

"MVC" as a design pattern doesn't account for proper layering of concerns. In it's purest form you either get logic in the controller or the model which is messy and sometimes hard to test.

Every dev shop has a slightly different way structure their projects for easy maintainability, everyone's got an opinion (there's not right answer except whatever's easiest to maintain) But as an example, our apps layers are typically structured as

- Data Model (EF, only visible to queries, ideologically the "repository")
- Queries (context specific Model materialization - don't "include" what you don't need)
- Services (Collect data from external sources and aggregate)
- ViewModels (Only pass data that's required in the necessary format. if it looks simple, use automapper)

318. <https://stackoverflow.com/questions/15350012/best-c-sharp-architecture-pattern-for-communicating-between-separate-plugins-o/15350520#15350520>

T: Best c# architecture / pattern for communicating between separate plugins of application

Q: I am currently involved in designing a system from the ground up, and we have come across an architectural design scenario that I'm not sure of the best way to solve - but I'm sure other people have solved and there's probably even a pattern for it.

The story so far:

We have a multi-tenant website in which we are implementing various features as Plugins, our clients will choose which plugins they wish to use in their application. And each plugin could have a variety of "widgets" that a user can add to a page. (eg. similar idea to how Android apps often come with widgets that you can add to the main screens).

A plugin can depend upon other plugins to be enabled (eg an eCommerce Plugin would need Payments Plugin). Also plugins can use other plugins to enhance their functionality (eg Blogs plugin has the option of using the Comments plugin, could also use Comments with eCommerce Products).

As much as possible, we want each plugin to be self contained, with a very skinny public interface. We believe this separation of concerns will give us the best long term flexibility and maintainability of the overall system.

The problem:

When we started to layout all the plugins we currently know about (let alone future requirements), and their dependencies and possible relationships with other plugins - it started to have a very strong resemblance to a spider web of madness. And we also started to see some Circular References happening.

eg Navigation Plugin needs to know about what Pages are on the site. But you can also add a Navigation widget to a Page.

The partial/potential solution:

We were thinking that each plugin should be completely separate from other plugins, but would get info from and communicate with other plugins via Messages. These messages can be broken down into 2 basic types

- request for info from another plugin (Request / Response Messages)
- event notifications (Event Messages)

Both of these message types will be very simple DTO type classes - they shouldn't contain any business logic - just the info required for some other service to process the request, and provide a response.

I have mocked up a very simplified version of a couple of plugins and what we see the solution to their interactions to other plugins would be: <http://screencast.com/t/Mdb9wUmMF>

In this diagram, the Navigation, Page, Search and Other plugins wouldn't know anything about each other. But they would know about the Messages that are available, and the ProcessMessages interface.

eg Request / Response Messages

The Navigation and Other Plugins would know that if it sends a GetPagesRequest to ProcessMessages, it will get back a PagesResponse with all the info they need. (The Nav/Other plugins would need a response to the GetPagesRequest immediately.)

The Navigation and Other Plugins wouldn't know anything about the Page plugin.

Request / Response Message Requirements

A plugin that raises a Request Message would always (usually?) expect a Response message immediately.

Only 1 service would know how to process a Request Message, and provide the Response Message that would get passed back to the calling Plugin.

eg Event Messages

When a user updates the url of a page in the Page Plugin, the plugin would send a PageUrlUpdated message to ProcessMessages. The Navigation and Other plugin would then consume the PageUrlUpdated message and do whatever it needs to.

Event Message Requirements

A plugin that raises an Event would *never* expect a response. 0-Many plugins might consume a given message. (Tech Note: for Event messages we are going to send them to MassTransit and RabbitMQ - then have 1-n consumers for each message)

The questions

1. From a few sketches we've made, the above idea seems to work, and has a lot less inter-dependencies between different elements of the system. But I don't know the name of the design pattern or architectural structure - or if I'm on complete the wrong track. I was hoping that someone could point me to the proper solution - some good documentation and examples would be excellent. (Trying to avoid re-inventing the wheel - and an existing pattern is likely to be more robust and successful)
2. For the Request Messages, we were envisioning some kind of StructureMap-ish mapping from the Request Message to the concrete plugin / service that would process the message. Again - I'm sure that this has been solved before and there's a pattern for it, or we're completely on the wrong track and there's a better solution.

Any help and ideas are greatly appreciated Saan

PS - I would also have an IWidget in a common project with some basic properties - so the Pages Plugin could just request all classes that implement IWidget to add to a page

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closed as not a real question by [jgauffin](#), [Forty-Two](#), [slfan](#), [Björn Kaiser](#), [santosh singh](#) Mar 12 '13 at 19:45
It's difficult to tell what is being asked here. This question is ambiguous, vague, incomplete, overly broad, or rhetorical and cannot be reasonably answered in its current form. For help clarifying this question so that it can be reopened, [visit the help center](#). If this question can be reworded to fit the rules in the [help center](#), please [edit the question](#).

3 Sounds like MEF is a good place to start - look at [msdn.microsoft.com](#)
[EtherDragon](#) Mar 11 '13 at 23:17

Managed Extensibility Framework is robust enough to handle this architecture strategy. MEF also provides property and constructor injection so you can plug one plugin into another. – [IAbstract](#) Mar 11 '13 at 23:21

Divide and conquer. Ask smaller more well defined questions about specific parts of your architecture. For example, how do the different classes consume information from each other or how can a plugin interact with another without tight coupling between the plugins. – [jgauffin](#) Mar 12 '13 at 11:27

For anyone else looking at this question. I eventually found out that the Mediator pattern. – [Saan Feb 12 '14 at 0:32](#)

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1 Answer

Your question is subject to a lot of different approaches; but I might suggest Service Oriented Architecture. Mostly because it can bend to a business in a very quick and agile manner. This architecture provides many bonuses:

- Lightweight
- Agile
- Code Re-usability

However it does come with an array of hurdles that may need to overcome such as:

- Interoperability
- Security
- Performance
- Persistence

So implementing some of these resolutions may alleviate such an issue. However, that will require some knowledge of the matter on your part. As this Architecture is agile, but everything is exposed to a degree. Additionally what about multiple instances being instantiated?

Those are all potential items you'll have to identify.

What I would personally do, is find the true core of the business- Not the project; but the business. Then determine what approach would best accomplish that task. That will be a model that will last as the business core is at its heart.

Some things I'd highly recommend on this matter are:

- [Patterns Of Enterprise Application Architecture](#).
- [Implementing Domain Driven Design](#).
- [Domain-Driven Design: Tackling Complexity In The Heart Of Software](#).
- [Service Design Patterns: Fundamental Design Solutions](#).

There are a lot of other viable books, but those were some I found very helpful. As they culminate a vast array of design discussions that involve:

- Lazy Loading
- Unit Of Work
- Repository
- Dependency Injection
- Model Extensibility Framework
- and more...

This will fill in several gaps; but I can't emphasize enough. *No technology is better than one another, they all have pros and cons. But the technology that captures your business goals the best is the ideal choice.* And I understand your need for a response to help you, but remember:

[Ask not the Elves for counsel, as they both say yes and no.](#)

Simply because we don't know your project or your business, those goals are going to heavily impact your decision. Those are things that only you will know. As I stated things we don't know that you'll want to account for:

- Company Objectives
- Maintainability
- Companies Growth Projections
- Possible Shifts in the Company paradigm.

There are more, but you'll have to account for some of those variables for the applications rate of decay to stay stagnant for awhile. So the life of the application will endure for quite awhile.

Hopefully that helps, but that is my two cents.

319. <https://stackoverflow.com/questions/30252729/what-are-the-advantages-to-passing-a-global-db-connection-into-each-function-of/30261636#30261636>

T: What are the advantages to passing a global DB connection into each function of a model?

Q: I am working with an older code base that passed a db connection into most functions in each class of the models. The db connection is created as a global and passed everywhere in the application:

```
$user = new User();
$user->loadById($db, $userId);
```

What advantages do we get by doing this vs a single connection the entire model inherits similar to the way most frameworks currently work?

Any insight would be very helpful.

Full Disclosure: I asked this question this way because this is how we do it at work. I don't like that we pass around the DB connection. I am trying to find a proponent of this method to see if my mind can be changed. That is why I tried to sway the discussion to the PRO side of this conversation without being blocked as a bad question. And it worked. I didn't get banned, but the great StackOverflow community didn't let me down. It appears I'm not out in left field with how I think about this issue.

A: The main advantage is: *it's easier*. As in, it's the simplest thing to do, because as a result, **you have no application architecture**. You're grasping at things from everywhere and anywhere because you have no idea how to get them otherwise, and this makes for very poor maintainability. Guess what happens 5 years down the line with this sort of codebase? Massive legacy technical debt, and it's very likely your developers aren't using Object Oriented Programming - more likely shoving procedural code in classes.

I'm not going to bother explaining about global state, because there's already a [fantastic answer](#) that already exists on programmers. A small excerpt:

Very briefly, it makes program state unpredictable.

To elaborate, imagine you have a couple of objects that both use the same global variable. Assuming you're not using a source of randomness anywhere within either module, then the output of a particular method can be predicted (and therefore tested) if the state of the system is known before you execute the method.

However, if a method in one of the objects triggers a side effect which changes the value of the shared global state, then you no longer know what the starting state is when you execute a method in the other object. You can now no longer predict what output you'll get when you execute the method, and therefore you can't test it. You'll find some developers do this purely out of laziness or a lack of knowledge / understanding of the basic concepts of [SOLID](#). If you access global state (like the database), then the beautiful, isolated class you are currently writing that theoretically can be handed off to any other developer, and also tested in its own right, is now *coupled* to this object somewhere off in the clouds.

As well as the above, you're making a liar of your object API. Each object should, via its constructor / method signatures, specify *exactly* the required external objects with which it requires to function. This allows:

- Your object to have a *definitive* API for its usage

- Future developers can see exactly what is required for this object to function from the constructor / method signatures
- Everything passed in via [Dependency Injection](#) (the posh word for passing in parameters, basically), can be 'mocked out' for testability
- Developers don't need to read through your code to find out what other objects are required, because of point 2
- You aren't accessing something that can be changed by something else, somewhere else, and make debugging a nightmare

Your code should not be brittle. You should be completely confident in making changes somewhere in a massive codebase, without worrying about breaking something somewhere else. Your unit tests will cover this. I highly recommend reading [The Clean Coder](#) as it elaborates on some of these concepts.

AlmaDO has a picture of a good image about [Singletons](#), which are basically objects that return a *single instance* of an object, like a database or logger. So if you request a new database from it, you either get a new one or just get back the one that already exists. In the traditional request / response / dead context, *this is completely unnecessary*. If you're having a *very* long-running process, maybe this might be necessary, especially in other languages, but as a general rule of thumb in PHP; unless you're running a PHP web socket server or similar, DI is a much better way to go for maintainability.

This is *exactly* the same as calling `StaticObject::Database`, again - something that can be accessed from anywhere.

[This](#) is a really good post on Singletons in PHP, and how they're not at all needed - that post also has a lot of useful links in it further down.

Basically - don't be lazy and grasp SOLID. There's a reason it exists, and it's certainly not just for PHP, either. The main reason people do it is because they don't know better and it's easier, and easier isn't always the best way.

320. <https://stackoverflow.com/questions/24851276/mvc-search-functionality-using-repository-pattern>

T: MVC Search functionality using repository pattern

Q: I'm trying to build a simple Search functionality into an application using repository pattern, domain models, and a service layer.

I've searched around and haven't found anything that fits the repository pattern. I've had a quick read on the Specification method, but that doesn't look like it will fit what I require. Please read on.

A typical search would involve: Find a student that goes to college xyz, and studies subject abc, and speaks english, and... So, I'm hitting each table essentially.

I have the following layers:

Service layer

`AppStudentService`, `AppCollegeService`, ...

Business Logic Layer (BLL) which contains the following domain models:

`Student`, `College`, `Subject`, `Language`, `SearchService` ...

Data Access Layer (DAL) which contains the following repositories:

`StudentRepository`, `CollegeRepository`, `SubjectRepository`, `LanguageRepository`

To attack this problem, I built an `AppSearchService` in the Service layer. This instantiates the `SearchService` in the BLL, and all required repositories in the DAL.

In the BLL I built a `SearchService` which contains the search logic and calls a `SubSearch()` method on each of the repositories to fetch data for its area, e.g. `StudentRepository.SubSearch` returns student(s) details. The business logic will tie up all the sub-search results together for the final search results to be returned.

I decided to break the search into a number of small queries, i.e. `SubSearch` methods, rather than a massive search query which would contain many joins. Using Entity Framework.

Question 1.

Each repository has its standard methods, e.g. Add, Save, Remove, FindAll, FindBy, and a SubSearch method. Is adding my custom (non-repo) method a good idea here, or does it contaminate the repository design?

Question 2.

Would it be better put all the SubSearch methods and search logic together into a new Search class (and method) in the DAL? This way all the logic is together and doesn't require instantiating all the BLL objects and Repo objects, i.e. better performance.

Question 3.

Is what I've done a good approach for the repository pattern? If not can someone point me in the right direction, thanks.

A: You would be better off create a SearchRepository, that is used to search across your data layer. This will be the most efficient, because joining the results of multiple repositories together is going to be ugly, and inefficient at best. A nightmare to maintain at worst.

You don't want to perform multiple queries for a search if you don't have to. You should perform the query as a single unit. This is most efficient.

321. <https://stackoverflow.com/questions/13738605/repository-pattern-where-to-place-functionality-that-touches-multiple-entities>

T: Repository pattern: Where to place functionality that touches multiple entities?

Q: I'm using the Repository pattern, and have been for a long time, but there's one thing I've never really found a good solution for. Often I need to access data that relates to multiple entities, and I can't find what feels like a good solution for where to place that functionality. A few cases:

Assuming that in the system there are Users which have Tasks:

- I need to retrieve a list of the most recent task for each user as a pairing of User to Task, say as a Dictionary<int, int> GetUsersRecentTask()
- I need to generate a report of all Users and their Tasks for that month.
- I need to generate statistics on all the objects in the system.

Now normally I would just put it in say the Users repository, but *it just doesn't feel right*.

I've also tried placing it in a higher level service, but *it just doesn't feel right to put data access there*. So where would I best place it

A: Don't consider the Repository pattern a dogma. It's just a concept. So, the UsersRepository has GetUsersRecentTask while you have different repositories such as: ReportsRepository with GetUsersReport (which includes tasks) and StatisticsRepository with Get[Object]Stats .

While the Repository Pattern originally deals only with business objects, it's still a good pattern if you need 'lesser' objects such as View Models or report data which are just data structures (no behavior). So it makes sense to ask the ReportsRepository for a certain report.

The only thing you have to be aware is that some repositories deal with business objects while others deal with DTOs .

322. <https://stackoverflow.com/questions/33811387/is-it-a-good-idea-to-have-a-business-service-depend-upon-interfaces-to-other-bus>

T: Is it a good idea to have a business service depend upon interfaces to other business services?

Q: I am utilizing the unit of work pattern, the repository pattern, that are used in a Business Logic Layer that are typically called Services. Is it a good idea to have a business service depend upon interfaces to other business services within this type of architecture to reuse functionality?

A: Yes, unless your business services are absolutely trivial, they will almost always have to be decomposed into finer grained bits of logic. This logic is often extracted into a "domain" layer, separate from the service layer.

323. <https://stackoverflow.com/questions/22933497/writing-unit-tests-when-the-repository-holds-your-most-important-code>

T: Writing unit tests when the repository holds your most important code

Q: I have an EAV system that stores entities in a SQL database, fetches them out and stores them in the cache. The application is written using the repository pattern because at some point in the future we will probably switch to using a NOSQL database for serving some or all of the data. I use Ninject to fetch the correct repository at runtime.

A large part of the system's functionality is around storing, retrieving and querying data in an efficient and timely manner. There is not a huge amount of functionality that doesn't fall into the realm of data access or user interface.

I've read up on unit testing - I understand the theory but haven't put it into practice yet for a few reasons:

- An entity consists of fieldsets, fields, values, each of which has many properties. Creating any large number of these in code in order to test would require a lot of effort.
- Some of the most crucial parts of my code are in the repositories. For instance all of the data access goes through a single highly optimised method that fetches entities from the database or cache.
- Using a test database feels like I'm breaking one of the key tenets of unit testing - no external dependencies. In addition to this the way the repositories are built feels like it's tied into how the data is stored in SQL. Entities go in one table, fields in another, values in another etc. So I have a repository for each. It is my understanding though that in a document store database that the Entity, its field and values would all exist as a single object, removing the need for multiple repositories. I've considered making my data access more granular in order to move sections of code outside of the repository, but this would compound the problem by forcing me to write the repository interfaces in a way that is designed for retrieving data from SQL.

Question: Based on the above, should I accept that I cannot write unit tests for large parts of my code and just test the things I can?

A: No, you shouldn't accept that. In fact, this is never the case - with enough effort, you can unit test pretty much anything.

Your problem boils down to this: your code relies upon a database, but you cannot use it, because it is an external dependency. You can address this problem by using *mock objects* - special objects constructed inside your unit test code that present themselves as implementations of database interfaces, and feed your program the data that is required to complete a particular unit test. When your program sends requests to these objects, your unit test code can verify that the requests are correct. When your program expects a particular response, your unit tests give it the response as required by your unit test scenario.

Mocking may be non-trivial, especially in situations when requests and responses are complex. Several libraries exist to help you out with this in .NET, making the task of coding your mock objects almost independent of the structure of the real object. However, the real complexity is often in the behavior of the system that you are mocking - in your case, that's the database. The effort of coding up this complexity is entirely on you, and it does consume a very considerable portion of your coding time.

324. <https://stackoverflow.com/questions/26880752/what-are-the-key-elements-of-a-service-oriented-architecture-and-how-do-they-mak>

T: What are the key elements of a Service Oriented Architecture and how do they make an SOA effective?

Q: Service-oriented architecture (SOA) is a software architecture design pattern based on distinct pieces of software providing application functionality as services to other applications. Key elements of a Service Oriented Architecture are, application fronted, service, service repository and service bus.

Uses open standards to integrate software assets as services, Standardizes interactions of services, Services become building blocks that form business flows, Services can be reused by other applications, thus increased Reusability, Legacy leverage, Agility, Loose coupling and Interoperation.

325.<https://stackoverflow.com/questions/10496193/in-asp-net-mvc-repository-pattern-does-every-class-needs-to-have-an-interface/10496266#10496266>

T: In ASP.NET MVC repository pattern, does every class needs to have an interface?

Q: I'm kind of confusing what should be a repository and what should have an interface. Yes I know those are all for the comfort of unit tests.

Can somebody give me a hint?

A: Repository pattern helps you to make your application more manageable and scalable. It provides you facility to plug or unplug certain functionality with bare minimum changes and as well effecting application compatibility.

Generally when it comes to MVC Repository is used for Data Layer.

It is not necessary to implement it but will be good if you do it and specific answer to your question it depends how you implement it as such one to one mapping of interface and class is not needed.

You can go through following link for more details

[MVC repository pattern design decision](#)

326.<https://stackoverflow.com/questions/26746711/simplemembership-websecurity-getconfirmationtoken-problems>

T: SimpleMembership - WebSecurity GetConfirmationToken Problems

Q: I'm building an application which is close to completion, I'm adding in the final layers of security and functionality for emailing new user's a confirmation token when they register. Getting the initial registration confirmation token was easy enough. The token is passed to the view and an email is sent out. However, there are two scenarios where I need to resend that token, these being:

- When the user is redirected to a view called 'Registration Step Two'.
- When a user tries logging in before they have confirmed their account.

The first scenario has a button on the page which could easily have the token embedded, making this a simple task. However, the login page will not have this functionality, the server will only know the user's email address. Keeping to the DRY principle I am merging this into one method, however whilst I can get the email address the user registered with I can't find an appropriate `WebSecurity` or `Membership` call which gets the confirmation token.

I've tried requesting this from the membership table using the below Expression, however an exception is thrown stating the `LastPasswordFailureDate` is null (which is to be expected), so this wasn't possible.

I've looked at blogs similar to Kevin Junghans (below), however `WebSecurity.GetConfirmationToken` doesn't seem to be supported anymore as I cannot locate it anywhere.

[Retrieving Confirmation Token](#)

I've even seen the next link, which points at a question on StackOverflow and to be honest I don't want to be implementing it in this manner as I've spent a vast amount of time incorporating an EntityFramework repository pattern to do all this for me.

[Resend Confirmation Email with WebSecurity](#)

I'm wondering if anyone has any recommendations on getting the confirmation token without writing the SQL within the application itself.

A: Whilst thinking on it a little more this morning, I finally realised why the `LastPasswordFailureDate` was returning the mentioned Exception. Essentially I believe I am an idiot and have forgotten to add a nullable reference to the `DateTime` fields within my Model. I can't test this for fix for several hours, but will update this answer/question in either event.

327.<https://stackoverflow.com/questions/15830917/migrating-from-asp-mvc-application-to-node-js-application-with-a-focus-on-design>

T: Migrating from asp.mvc application to node.js application with a focus on design

Q: I am currently looking into alternative platforms to migrate an existing application onto, it started out as a prototype using asp.mvc but the majority of code is javascript with a simple asp mvc web service so as we are looking at taking it forward it seems sensible that we just scrap the current microsoft stack and just go for nodejs giving us more freedom of where and how we host our application, also we can reuse some of the models and code in both the web service and front end, although this would probably end up being a small amount.

This will probably be quite a large question encompassing many parts but I will put it out there anyway as I am sure this could be helpful to lots of other people looking at how they can move from something like .net/java to node.js. As most of these statically typed languages have lots of patterns and practices used, such as Inversion of Control, Unit of Work, Aspect Oriented Programming etc it seems a bit strange moving towards another platform which doesn't seem to require as much structure in this area... So I have some concerns about migrating from my super structured and tested world to this new seemingly unstructured and dynamic world.

So here are the main things I would do in MVC and would want to do in node.js currently but am not quite sure the best way to achieve the same level of separation or functionality.

A:

I recently recently switched from ASP MVC to Node.js and highly recommend switching.

I can't give you all the information you're looking for, but I highly recommend Sequelize as an ORM and mocha (with expect.js and sinon) for your tests. Sequelize is adding transaction support in the next version, 1.7.0. I don't like QueryChainer since each of its elements are executed separately.

I got frustrated with Jasmine as a test framework, which is missing an `AfterAll` method for shutting down the Express server after acceptance tests. Mocha is developed by the author of Express.

If you want to have an Express server load in plugins, you could use a singleton pattern like this: <https://github.com/JeyDotC/articles/blob/master/EXPRESS%20WITH%20SEQUELIZE.md>
You will probably will also really like <https://github.com/visionmedia/express-resource> which provides a RESTful interface for accessing your models. For validation, I think you'll be happy with <https://github.com/ctavan/express-validator>

Why would you need to test Node modules without using Node? It's considered standard to call a test script with a Makefile, and you can add a pre-commit hook to git to run the tests before making a commit.

328.<https://stackoverflow.com/questions/340183/plug-in-architecture-for-asp-net-mvc/677682#677682>

T: Plug-in architecture for ASP.NET MVC

Q: I've been spending some time looking at Phil Haack's article on [Grouping Controllers](#) very interesting stuff. At the moment I'm trying to figure out if it would be possible to use the same ideas to create a plug-in/modular architecture for a project I'm working on.

So my question is: Is it possible to have the Areas in Phil's article split across multiple projects?

I can see that the name spaces will work themselves out, but I'm concerned about the views ending up in the right place. Is it something that can be sorted out with build rules?

Assuming that the above is possible with multiple projects in a single solution, does anyone have any ideas about the best way to make it possible with a separate solution and coding to a predefined set of interfaces? Moving from an Area to a plug-in.

I have some experiences with plug-in architecture but not masses so any guidance in this area would be useful.

A: I did a proof of concept a few weeks ago where I put a complete stack of components: a model class, a controller class and their associated views into a DLL, added/tweaked [one of the examples](#) of the VirtualPathProvider classes that retrieve the views so they'd address those in the DLL appropriately. In the end, I just dropped the DLL into an appropriately configured MVC app and it worked just like if it had been part of the MVC app from the start. I pushed it a bit further and it worked with 5 of these little mini-MVC plugins just fine. Obviously, you have to watch your references and config dependencies when shuffling it all around, but it did work.

The exercise was aimed at plugin functionality for an MVC-based platform I'm building for a client. There are a core set of controllers and views that are augmented by more optional ones in each instance of the site. We're going to be making those optional bits into these modular DLL plugins. So far so good.

I wrote up an overview of my prototype and a [sample solution for ASP.NET MVC plugins](#) on my site. EDIT: 4 years on, I've been doing quite a few ASP.NET MVC apps with plugins and no longer use the method I describe above. At this point, I run all of my plugins through MEF and don't put controllers into plugins at all. Rather, I make generic controllers that use the routing information to select MEF plugins and hand the work off to the plugin, etc. Just thought I'd add since this answer gets hit a fair bit.

329. <https://stackoverflow.com/questions/6162329/implement-a-fake-nhibernate-repository/6163796#6163796>

T: Implement a fake NHibernate repository

Q: I am using StoryQ to perform some basic integration testing and we are using NHibernate as our ORM. When I started, I didn't know that NHibernate implemented the Repository pattern and so I created my own IRepository in order to run my integration tests.

However, considering that NHibernate already implements the Repository pattern, I assume that it is doing so against some kind of interface. So, I would like to work against NHibernate's interface for the Repository if my assumptions are correct.

I have tried to search for it but I come across information that to do that I need to work against the ISession interface. As I do not really know NHibernate that well, can someone explain why I would need to implement my fake repository against the ISession interface? What is the IRepository equivalent in NHibernate? Is there some tutorial which goes into greater depth into the matter?

A: NHibernate doesn't implement the Repository pattern. It replaces it.

SQLite in-memory databases are nice if you've got a simple database implementation, but I've found that things can become cumbersome quickly, almost to a point where it becomes as painful, if not more, to use SQLite as it is to stub/mock ISession/ICriteria/etc.

One perfect example of this: In one of my recent projects, in which I was using PostgreSQL as my production database and SQLite as my test database, I had a need to extend NHibernate to add support for an aggregate function that was recently added to PostgreSQL. Figuring out how to add this was a story in itself, but I worked it out. I then had to find a functional equivalent in SQLite. I needed an aggregate function that worked in the same exact way as its Postgres counterpart. There was none. I asked around and was told that there were ways to extend NHibernate to "fake" this function in SQLite. I also had the option of extending SQLite to add this functionality.

All I wanted to do was write two, maybe three, tests around the scenario that I was trying to implement. I ended up spending way too much time trying to ensure functional equivalency between the two systems. It wasn't worth all this effort for one function. And what would happen if down the road, I needed to add another function?

I think SQLite is useful. It's a great lightweight database system and I love that you can conveniently use it as a in-memory database for simple scenarios. However, I'm not sure it's worth using beyond that. I think from now on, I'll be using the same database across all environments, even if it means having slower integration tests for all data persistence logic.

A2: I'm not sure where in core NHibernate there is an IRepository interface (AFAIK there's none) so you might be referring some other NHibernate side projects.

It is not the best approach to go about mocking ISession either. The best thing in my opinion, is to use a real in-memory database that is fully supported by NHibernate. You may need to check how to configure NHibernate to run on sqlite in-memory database, which basically is just configuring NHibernate in your tests.

The good thing about this approach, is that tests run with a very good speed, as if there's no database involved, and you don't need to abstract away all your ORM functionality (and loose features too) just to run / drive your tests

330. <https://stackoverflow.com/questions/11388994/how-to-design-application-architecture-in-asp-.net/11389886#11389886>

T: how to design application architecture in ASP.NET

Q: I am going to convert Visual C# application into ASP.NET. For this task, I want to create architecture first and then want to develop programme. So, how can I break-down my logic into libraries? I know, its very basic question, but very much worried about it as I am working alone and I need assistance..

A1: I used this [Building Layered Web Applications with Microsoft ASP.NET](#) as a model when i started building web applications using ASP.Net

A2: With any luck your existing application has been written using SOLID OO principles. In this case you can separate your business logic from your UI. If this is not the case then I would start by making a clean set of interfaces to your business logic and make some unit tests around them. The next thing is MVC is optimized for disconnect situations such as web applications. Depending on what infrastructure you have create either an MVC3 or and MVC4 application using Razor and test projects. As you build out your project try to make unit tests as you go. This will improve the reliability of your code, also switch on the FxCop static code analysis. The next thing you will need to think about is how interactive you want your web UI to be. If your users are intranet users perhaps you could get away with using the scaffolding features with the data annotations in the model. If your application is to impress external customers then you need a richer user experience. In which case look into making an MVVM pattern on your client browser using knockout. Here is a link <http://www.codeproject.com/Articles/305308/MVC-Techniques-with-JQuery-JSON-Knockout-and-Csharp> As you build the controllers there is a tendency for them to become fat (it's a consequence of SRP) Think about using techniques such as aspect orientated programming with compiler attributes and filters to keep the code dry and clean.

A lot of what you need to do will depend on your organization. For example if you are working in an organization with SOA policies then you will need to discuss with your architects how you want to use WebAPI vs WCF. Another aspect to think about is how will Microsoft support client side scripting in the future. At a guess I am hoping that they will make tooling to simplify the javascripting side. For the time being I am learning HTML5 with javascript libraries like Jquery,Jquery-Ui, Ajax in order to make a richer user experience

331. <https://stackoverflow.com/questions/969964/when-to-use-soa-service-oriented-architecture/4085124#4085124>

T: When to use SOA (Service Oriented Architecture)

Q: I had a conversation with one of our architects recently and he summarized his use of SOA as "The only time we'll use services is when we need async actions otherwise we'll use go direct to the data store"

I thought about this statement and it seems fairly logical as services work well in a publish subscribe model, but I was wondering in what other scenarios you should be looking to use SOA?

A1: We expose services to our customers because they shouldn't be able to connect to the datasource directly.

We expose services to ourselves because it's easier to spread them over different technologies using WCF.

We expose services because we have different user interfaces for the same datasource. And when we use services we save a third of the work.

It is never only because of the async actions.

A2: Another case to use services is when you want to integrate a heterogeneous technology stack.

In other words, if your DB is postgres, but you have code in Java, Perl, Python, and C++, you can write stored procedures and have each programming language call those. If you are working with a DB that doesn't have stored procs, or you want to have the capability of switch those out - or you just want to run over port 80, you could wrap the SQL calls in a service-oriented layer (think websphere) that can now be called by anyone - plus you can put the authentication and authorization logic (connect to LDAP, whatever) in the SOA layer.

You can also use that SOA layer to, say build up a logical routine to do "stuff" with that old COBOL box in the corner that manages invoices or creates statements for customers.

So if you've got a number of legacy systems you want to interconnect - say the sales system to the warehousing system to the order predicting systems - SOA might be one way to achieve that goal. (You can also use a "service bus" to create an event driven system as a better way of orchestrating change.)

A3: There are many scenarios in which you'd benefit from using services. Some of these scenarios have been codified by industry gurus (such as Thomas Erl of SOA fame).

SOA Patterns

I'd say you want to look for:

- Legacy application reuse
- Business process reuse (multiple use cases for same process)
- Implementation abstraction (platform, language, persistence abstraction)

Your colleague is right to be cautious. There are a lot of deployment and support variables introduced with adoption of web services.

A4: Another scenario might be an integration scenario, where you'd like many separate components, or systems, to communicate with each other.

A5: SOA can be used as a way to hide the implementation details of your subsystems. If your customers need product information, for instance, it's probably a good idea to wrap your product database or inventory subsystem into a generic service and expose only the subset of functionality and data your customers need. Then, if you ever need to replace or upgrade that subsystem, you'll be able to make those changes transparent to your users and your customer facing software interface.

A6: There is another school of related thought termed SOAD (Service Orientated Application Design) exists where every component of the system is a service. This is to leverage the benefits offered by the environment that they are built with (EJB, WCF) i.e. you get lots of free plumbing.

Some more resources on this at

Building a SOA

[SOA Design Pattern](#)

[Achieving integrity in a SOA](#)

[Achieving Flexibility/Maintainability in a SOA](#)

A6: I would use SOA in a system that will be extended in the time inside the organization and probably to others organizations.

For products that could change is nice too, you can replace little parts of it.

At the end you will have lots of lego bricks that you will join together.

332.<https://stackoverflow.com/questions/4137605/a-good-way-to-send-the-results-from-a-mysql-query-over-a-web-service/4137739#4137739>

T: A good way to send the results from a MySQL query over a Web Service?

Q: I've been trying to figure out a good and easy way to send the results of a MySQL Query over my Web Service.

There is a lot of good methods that I've looked into, like Data Transfer Object, but I would like to keep it as simple as possible. At this point simply getting this to work has a higher priority. :)

Any help or documentation is welcome, even on more difficult topics, but as mentioned above the simpler the better at this point.

A: when you say expose your results, do you also mean dynamic querying? such as [Wcf Data Services](#)
However be careful on what and how you expose information. It is a pain to go back and fix it.

for SOA or a 3 physical Tier I would consider using

- Service Layer
- Data transfer objects, they are great, exposing data directly can cause issues with maintainability/Changeability

to help with DTO's look at AutoMapper, it was designed for it.

if I have missed a point, add a comment

ps here is a great list of helpful patterns [PoEAA Catalogue](#)

333.<https://stackoverflow.com/questions/7155737/how-to-implement-mvc-across-the-lan/7157147#7157147>

T: How to implement MVC across the LAN?

Q: I don't want to reinvent the wheel, so ask how others do this ...

I have 2 upcoming projects, one in Delphi and one in PHP (plus maybe one in Java), so info specific to those would be welcome, but a generic answer is also acceptable.

So, I have a bunch of PCs and a database server (ODBC) and want to develop an MVC app.

I guess that the Model is on the d/b server and that the view is on each individual PC. Where is the controller?
One on the d/b server, or one copy on each PC?

When writing data I imagine it is enough to lock the relevant d/b table(?). But how to update all of those views and tell them that there is new data or that the data which they are working on has been modified or deleted by another user?

Any code is welcome as are URLs or book recommendations ... thanks

A: As far as I understood MVC, there is no rule about the location of the controller itself.

Please take in consideration that MVC is an [architectural pattern](#), not an hardware nor even logical design. If, like in any n-Tier architecture, it could make sense to have the DB in a dedicated computer (for performance and maintainability/backup reasons), controllers and views can be... everywhere...

MVC is a *pattern*, that is, more a way of modeling/interfacing objects and classes than a way of distributing your application into modules. In fact, you can (and IMHO should) share MVC code among client and servers, whereas the objects are still implementing Model/View/Controllers in a separated way.

A "classic" MVC implementation (e.g. used by RoR or by [DoR](#) or [Relax](#) in the Delphi world - both in draft status) uses directories or files to split views and controllers. But this is just one implementation design of this pattern.

You can have a [pure object](#) MVC orientation, as we implemented for instance in [our ORM framework](#). You can in fact have objects everywhere, to handle your model, to access the DB, to handle your business services.

In our *mORMot Open Source framework*, for Delphi 6-XE, you can follow this development pattern:

- **Data Tier** is either *SQLite3* and/or an internal very fast in-memory database, and/or [any other external database](#) (via OleDB or OCI), most SQL queries are created on the fly by the ORM kernel;
- **Logic Tier** is performed by pure ORM aspect: you write Delphi classes which are mapped by the Data Tier into the database, and you can write your business logic in both Client or Server side, just by adding some events or methods to the classes; a [Service-Oriented-Architecture](#) (DataSnap-like) is also available, and can be used without any object;
- **Presentation Tier** is either a Delphi Client, either an AJAX application, or any other back-end able to communicate using RESTful JSON over HTTP/1.1 - in this case, PHP or JAVA clients are perfect candidates.

I suggest you take the time to download and take a look [at the mORMot documentation](#). It's far from perfect, but it tries to be complete. In the SAD document, you'll find some pages about the architecture we implemented, in particular MVC, n-Tier, SOA and ORM. Don't be afraid of the 1000 pages of PDF - you don't have to read it all: I just added some general diagrams which may help you modeling your solution.

In all cases, taking a breath before implementing a solution for your project is a very good decision. The time you'll spend now by looking at existing architectures will certainly save you pain in the future. Good start!

334. <https://stackoverflow.com/questions/4660156/is-it-ok-to-call-a-service-from-another-service-in-an-soa-architecture/4679843#4679843>

T: Is it OK to Call a Service from Another Service in an SOA Architecture?

Q: I think I know the answer to this one, but I have just spotted someone doing exactly the opposite - who is a very skilled developer, were they just having a bad day?

Q: Is it OK to call a service from within a service in an SOA architected system?

I suspect not, but i'll ask anyway...

A: Definitely yes. This SOA pattern is commonly called choreography where one web service processes and then passes the message to another down a processing pipeline. Google it and you will find some good references.

Another case may be more technical reason like routing, where you have frontend webservices that routes your messaged to different backend services based on security policy, content, bridge different technology or transport protocol etc.

A2: I can't think of any reason why not. I can think of multiple reasons why a service could call another service. I've architected and implemented multiple services that do this. I'm also aware of other architectures that set up this sort of system.

A3: think about the architectural goal of "separation of concerns". instead of each service knowing how to do everything, it can rely on other specialized services for shared pieces of functionality

A4: I have some different scenario. What if you want to implement service level clustering in your SOA? For example, say persistence service is resides on one machine and is responsible for handling all persistence tasks in the cluster. So, on other machine which needs persistence functionality, need to connect to the that machine only(ignore fail over factor).

Now while login, if User service has instance of Persistence service directly, then you will not be able to implement service level clustering.

We have our SOA middleware and I called service from each other directly. But when we implemented service level clustering using JMS/ActiveMQ, we faced the problem for those interconnected services.

335. <https://stackoverflow.com/questions/31612896/what-happens-if-my-node-js-server-crashes-while-waiting-for-web-services-callbac/31629251#31629251>

T: What happens if my Node.js server crashes while waiting for web services callback?

Q: Im just starting to look into Node.js to create a web application that asynchrounously calls multiple web services to complete a single client request. I think in SOA speak this is known as a composite service / transaction.

My Node.js application will be responsible for completing any compensating actions should any web service calls fail within the composite service. For example, if service A and B return 'success', but service C returns 'fail', Node.js may need to apply a compensating action (undo effectively) on service A and B.

My question is, what if my Node.js server crashes? I could be in the middle of a composite transaction. Multiple calls to web services have been made, and I am waiting for the callbacks. If my node server crashes, responses meant for the callbacks will go unheard. It could then be possible that one of the web services was not successful, and that some compensating actions on other services would be needed.

Im not sure how I would be able to address this once my node server is back online. This could potentially put the system in an inconsistent state if service A and B succeeded, but C didn't.

A1: Distributed transactions [are bad for SOA](#) - they introduce dependency,rigidity , security and performance problems. You can implement a [Saga](#) instead which means that each of your services will need to be aware of the on-going operation and take compensating actions if they find out there was a problem. You'd want to save state for each of the services so that they'd know on recovery to get to a consistent internal state.

If you find you must have distributed transactions than you should probably rethink the boundaries between your services.

(updates from the comments) Even if you use a Saga, you may find that you want some coordinator to control the compensation - but if your services are autonomous they won't need that central coordinator -they'd perform the compensating action themselves - for example if they use the reservation pattern infoq.com/news/2009/09/reservations . They can perform compensation on expiration of the reservation. Otherwise, you can persist the state somewhere (redis/db/zookeeper etc.) and then check that on recovery of the coordinator

336. <https://stackoverflow.com/questions/34167965/mvc-with-service-architecture/34168330#34168330>

T: MVC with Service architecture

Q: I'm creating a MVC project where in one of its View, there will be search part and the listing part. At the same time I have an idea of using a service layer (Web API or WCF).

I would like to ask which one is correct way or setup for building this search and listing page ?

The way I'm doing it at the moment is using partial view for listing part that will get updated every time searching occurs and position the service layer behind the controller (service layer in the middle of controller and business layer).

337. <https://stackoverflow.com/questions/8399375/soa-update-request-granularity-and-nulls>

T: SOA update request granularity and nulls

Q: We are striving towards an SOA enterprise...

Given three options for say updating member details how do we design the contract?

The business process is quite simple. The customer calls (or logs in themselves), and updates their personal details so that we have the latest details available. The customers employer can also supply members details (this will be in bulk - potentially 10s of 1000s at a time). This is so we can communicate with them correctly in the future. We have multiple back end systems.

The details are:

- Phone numbers,
- Addresses,
- Email,
- Name or company name,
- Contact person,
- Tax File Number,
- Marital Status
- Smoker status

As it stands now the business rules are: If a valid tax file number has already been supplied, you cannot supply it again. (can be overridden) If valid address details are present, the employer cannot update them, only supply them the first time.

Option 1: One operation, Member.UpdateDetails

- Only one service to create and manage.
- If business rules grow, this service could become less cohesive.
- Has the problem of having to differentiate between specifying that something should be removed versus leaving it as is.
- Single unit of work, single transaction.

Option 2: Break down into four operations: Member.UpdateContactDetails; Member.ProvideTaxFileName; Member.UpdateName; Member.UpdateDemographics

- Potentially simplifies the single operation - spreads the complexity over the four operations.
- Still has the problem of having to differentiate between specifying that something should be removed versus leaving it as is. For example what if I only wanted to specify smoker status without marital status.
- Requires some deep analysis to figure out how to group these correctly - The cohesiveness depends on the business process.
- More services to write and maintain.
- Transactions become a concern - multiple transactions handled by the caller?

Option 3: Break down into smaller still: Member.UpdateAddress; Member.UpdateBusinessDetails; Member.UpdateContactNumbers; Member.UpdateContactPerson; Member.UpdateEmailAddress; Member.UpdateMailingAddress; Member.UpdatePhysicalAddress; etc.

- Removes the issue of having to differentiate between specifying that something should be removed versus leaving it as is.
- Business rules can evolve easily in whatever operation.
- Loads of services to write and maintain.
- Transactions become a concern - many transactions handled by the caller?
- Start to look like property setters / CRUD - apparently a no go.

In option one or two, say the caller only wants to update the home email address - I cannot expect that the client complete the entire message - *does the client leave all of the other tags out? What is the accepted, obvious, intuitive pattern to dealing with this problem?*

If this IS indeed the pattern, *then how does the client clear the field, or set it to null?* In .NET, in the server code I cannot see an obvious way to distinguish between not supplied and null. Since it is not obvious, I expect that this is not an accepted pattern.

A: I would strongly suggest the second option, because it preserves the intention of the user making the change all the way through to the code that acts on it.

The first advantage is that it absolves you from answering the question of "how do I represent deletion in a DTO" - because now you would capture that fact as a DeleteContactNumber message, explicitly.

The second advantage is that you are absolved answering the question of "how do I add multiple addresses at once" - because you don't have to infer that someone added an address from the mutated DTO, you get an AddContactAddress message.

The third advantage is that you can do more interesting business analysis at the end of the day - because you know what the events that happen are, without having to do analysis of the DTO and infer that.

Finally, it becomes easy to add more information to the specific events: do you want to know *why* people are deleting their contact address?

Using a model of "fetch the data, mutate the data, save the data" is less lines of code, but it ultimately makes it harder to understand why things are done in your system - and that will eventually cost you.

A2: Personally, I don't see too much wrong with having both the UpdateMember capability AND the simpler capabilities of UpdateAddress etc. Some may argue, but I think this will be perfectly acceptable.

'Intuitive' may be the better word to follow here - what feels right to you?

To me, UpdateMember would seem a definite candidate to include. If this service is being consumed by a UI, all the fields would likely already be populated by a GetMember call, so all the fields would be populated anyway with their original values. You could possibly use something similar even if it is not a UI. Then you can have UpdateAddress, Update PersonalDetails as well, for simpler, specialized circumstances.

What I don't like however is this idea of only having the UpdateMember capability and then leaving fields you don't want to change blank. I don't think many people use this pattern and I certainly wouldn't. As you say, how do you then set a field to null.

338. <https://stackoverflow.com/questions/66040/application-level-replication-technologies>

T: Application Level Replication Technologies

Q: I am building out a solution that will be deployed in multiple data centers in multiple regions around the world, with each data center having a replicated copy of data actively updated in each region. I will have a combination of multiple databases and file systems in each data center, the state of which must be kept consistent (within a data center). These multiple repositories will be fronted by a SOA service tier.

I can tolerate some latency in the replication, and need to allow for regions to be off-line, and then catch up later.

Given the multiple back end repositories of data, I can't easily rely on independent replication solutions for each one to maintain a consistent state. I am thus lead to implementing replication at the application layer -- by replicating the SOA requests in some manner. I'll need to make sure that replication loops don't occur, and that last writer conditions are sorted out correctly.

In your experience, what is the best pattern for solving this problem, and are there good products (free or otherwise) that should be investigated?

A1: You should definitely consider IBM Lotus Domino. A Lotus Notes database can replicate between sites on a predefined schedule. The replicate in Notes/Domino is definitely a very powerful feature and enables for full

replication of data between sites. Even if a server is unavailable the next time it connects it will simply replicate and get back in sync.

As far as SOA Service tier you could then use Domino Designer to write a webservice. Since Notes/Domino 7.5.x (I believe) Domino has been able to provision and consume webservices.

A2: You dont give enough specifics to be certain of your needs but I think you should check out SQL Server Merge replication. It allows for asynchronous replication of multiple databases with full conflict resolution. You will need to designate a Global master and all the other databases will replicate to that one, but all the database instances are fully functional (read/write) and so you can schedule replication at whatever intervals suit you. If any region goes offline they can catch up later with no issues - if the master goes offline everyone will work independantly until replication can resume.

I would be interested to know of other solutions this flexible (apart from Lotus Notes/Domino of course which is not very trendy these days).

A3: I think that your answer is going to have to be based on a pub/sub architecture. I am assuming that you have reliable messaging between your data centers so that you can rely on published updates being received eventually. If all of your access to the data repositories is via service you can add an event notification to the orchestration of each of your update services that notifies all interested data centers of the event. Ideally the master database is the only one that sends out these updates. If the master database is the only one sending the updates you can exclude routing the notifications to the node that generated them in the first place thus avoiding update loops.

339. <https://stackoverflow.com/questions/969964/when-to-use-soa-service-oriented-architecture/4085124#4085124>

T: When to use SOA (Service Oriented Architecture) [closed]

Q: I had a conversation with one of our architects recently and he summarized his use of SOA as "The only time we'll use services is when we need async actions otherwise we'll use go direct to the data store"

I thought about this statement and it seems fairly logical as services work well in a publish subscribe model, but I was wondering in what other scenarios you should be looking to use SOA?

A1: We expose services to our customers because they shouldn't be able to connect to the datasource directly.

We expose services to ourselves because it's easier to spread them over different technologies using WCF.

We expose services because we have different user interfaces for the same datasource. And when we use services we save a third of the work.

It is never only because of the async actions.

340. <https://stackoverflow.com/questions/4137605/a-good-way-to-send-the-results-from-a-mysql-query-over-a-web-service/4137739#4137739>

T: A good way to send the results from a MySQL query over a Web Service?

Q: I've been trying to figure out a good and easy way to send the results of a MySQL Query over my Web Service.

There is a lot of good methods that I've looked into, like Data Transfer Object, but I would like to keep it as simple as possible. At this point simply getting this to work has a higher priority. :)

Any help or documentation is welcome, even on more difficult topics, but as mentioned above the simpler the better at this point.

A: when you say expose your results, do you also mean dynamic querying? such as [Wcf Data Services](#)

However be careful on what and how you expose information. It is a pain to go back and fix it.

for SOA or a 3 physical Tier I would consider using

- Service Layer
- Data transfer objects, they are great, exposing data directly can cause issues with maintainability/Changeability

to help with DTO's look at AutoMapper, it was designed for it.

if I have missed a point, add a comment

ps here is a great list of helpful patterns [PoEAA Catalogue](#)

341.<https://stackoverflow.com/questions/18067656/ecommerce-frontend-split-databases/18068091#18068091>

T: Ecommerce frontend split databases

Q: Until now I've worked on a web app for keeping record of different products from different warehouses in regards to inventories and transactions etc.

I was asked to do an ecommerce front end for selling products from these warehouses and I would like to know how should I approach this problem?

The warehouses web app has a lot of logic and a lot of products and details and I don't know whether to use the same database(s) for the second app by mingling the data in regards to user mgmt, sales orders and etc.

I've tried doing my homework but for the love of internet I don't even know how to search, if I'm placed on the right track I shall retreat to my cave and study.

I'm not very experienced in this matter and I would like to receive some aid in deciding how to approach the problem, go for a unified database or separated one-way linked databases and how hard would it be to maintain the second approach if so?

A: Speaking of warehouses, I believe that is what you should do with your data, e.g. roll each and every disparate data source into a common set of classes/objects that your eCommerce store consumes and deals with.

To that end, here are some rough pointers:

1. Abstract logic currently within your inventory app into a middle tier WCF Service that both your inventory app and eCommerce app can consume it. You don't want your inventory app to be the bottleneck here.
2. Warehouse your data, e.g. consolidate all of these different data sources into your own classes/data structures that you control. You will need to do this to create an effective MVC pattern that is maintainable and sustainable. You don't want those disparate domain model inventories to control your view model design.
3. You also don't want to execute all of that disparate logic every time you want a product to show to the end user, so cache the data in a well indexed, suitable table as described above for high availability that you can get to using Entity Framework or similar. Agree with the business on an acceptable delay and kick off your import/update processes on a schedule.
4. Use Net.Tcp bindings on your services to move your data around internally. It's quick, it's efficient and there is very little overhead compared to SOAP when dealing in larger data movements.
5. Depending on scale required, you may also want to consider implementing a WCF Service purely for the back-end of your ecommerce store, that deals only in customer interactions with the underlying warehoused data sources, this could then warrant its own server eventually if the store becomes popular. Also, you could figure in messaging eventually between your SOA components, later down the line.
6. Profit. No, seriously!

I hope this helps. Good luck!

342. <https://stackoverflow.com/questions/2553616/wcf-rest-services-for-use-with-the-repository-pattern/2554236#2554236>

T: WCF Rest services for use with the repository pattern?

Q: I am considering moving my Service Layer and my data layer (repository pattern) to a WCF Rest service.

So basically i would have my software installed locally (WPF client) which would call the Service Layer that exists via a Rest Service... The service layer would then call my data layer using a WCF Rest Service also OR maybe just call it via the DLL assembly

I was hoping to understand what the performance would be like. Currently I have my datalayer and servicelayer installed locally via DLL Assemblies locally on the pc.

Also i presume the WCF REST services won't support method overloading hance the same name but with a different signature??

I would really appreciate any feedback anyone can give.

A: If all you want is a thin CRUD layer exposed as a web service (to provide database access without a VPN, etc.), then you can do the same thing using [WCF Data Services](#) without all the effort, and have something that's a great deal more flexible (you can write Linq against the proxies, for example).

What you're calling the *service layer* ought to expose *domain objects*, so assuming you have a domain model and want to expose this using a WCF Web Service (REST or otherwise), the answers to your questions are:

- WCF is very fast. It's obviously not *transparent*, but from experience, if you're connecting to the services over a network connection then any "slowness" you experience will be due to latency/bandwidth limitations of the network itself. The only exception is the setup time of the WCF client (i.e. the channel) - which is why you generally want to keep them alive as long as possible, they are not throwaway objects like a `DataContext`.
- Method overloading is not supported over the wire. You can overload methods within the service assembly and differentiate them via the `OperationContract` attribute (and specifically the `Name` property, but to an outside client, they will appear to be different web methods with different names).
- **However**, if you're designing web services, even REST services, the very first thing you need to do is change your perspective from an RPC-based ("function") mindset to a document-based ("message") one. In other words, instead of having 4 methods that take different combinations of 4 possible arguments, you should define a "request" class that exposes all 4 of those parameters as properties. This is often considered *bad* design for "local" code, but it is *good* design for web services.
- In the same vein, using a web service to expose a "repository" is typically considered an anti-pattern (with the exception of WCF Data Services which serves a very different purpose). The reason is that a web service is supposed to provide *business logic* (which I assume is what your service layer does). It should provide very coarse-grained operations, atomic transactions where the client supplies *all* of the information required to perform a single complete transaction at the same time, instead of invoking several methods in succession.

In other words, if you find, when trying to translate your services into web services, that it's necessary to invoke several operations on several different services in order to perform a single "unit of work", then you should think about redesigning the services to provide better abstractions over the work. The overall design should minimize "chatter" between client and service.

So to summarize, it probably makes very little sense for you to have a "service layer" that lives on the client which talks to a "data layer" that's exposed as a web service, *unless* you need to solve the very *specific* problem of providing CRUD operations over a WAN. From an architectural perspective, what makes a lot *more* sense is to expose the actual *services* through WCF, and move toward more thin-client applications.

Keep in mind, however, that going down the "SOA" path, while it may have many long-term benefits, is likely to cause some short-term pain. You basically have another library to maintain, another library to test, another point of failure, another thing you need to document. If you don't have a large, distributed architecture, or plan to in the near future, then it may be too early to start integrating WCF services beyond the WCF Data Services framework mentioned at the top.

Also, you don't specify the domain or the kind of application you're developing, but REST as a specific service model imposes a number of trade-offs with respect to security, distributed transactions, etc. If these services are intended for internal or B2B consumption - i.e. if they are "enterprise" services - you really should consider

SOAP instead, which gives you access to WS-Security, Active Directory integration and all that good stuff. REST is *great* for public apps and mashups but isn't appropriate for *every* scenario.

343. <https://stackoverflow.com/questions/26880752/what-are-the-key-elements-of-a-service-oriented-architecture-and-how-do-they-make>

T: What are the key elements of a Service Oriented Architecture and how do they make an SOA effective?

Q: Service-oriented architecture (SOA) is a software architecture design pattern based on distinct pieces of software providing application functionality as services to other applications. Key elements of a Service Oriented Architecture are, application fronted, service, service repository and service bus.

Uses open standards to integrate software assets as services, Standardizes interactions of services, Services become building blocks that form business flows, Services can be reused by other applications, thus increased Reusability, Legacy leverage, Agility, Loose coupling and Interoperation.

344. <https://stackoverflow.com/questions/41339432/why-are-web-services-a-preferred-standard-to-achieve-soa/41398183#41398183>

T: Why are Web Services a preferred standard to achieve SOA?

Q: I'm learning about web services and I read it is the standard way to archive a Service Oriented Architecture. Why are Web Services used so much to implement SOA?

A: A service is a self contained unit of functionality. You access that functionality over a well defined interface that the service exposes to the outside world.

SOA is (obviously) about service-orientation. It is an architectural pattern relying on loosely connected services that interact and collaborate to provide larger functionality than the individual services. Web services are just one way to implement SOA. You can just as well use message oriented middleware to obtain the same, or even have the services as processes on one machine.

Why web services are popular as a SOA implementation is because of history. Before SOA had a name, people were doing a similar thing using RPC. However RPC only works in a homogenous technology stack so soon after that XML-RPC appeared, then after that SOAP, and all sorts of specifications and programming standards to support different types of software talking to each other across the network. So, many companies have turned to web services to interconnect different, heterogeneous, legacy systems, with newly created solutions, or even software systems of their business partners.

Being the right thing at the right time (with accompanying standards to interconnect heterogeneous systems) made web services the first tool being picked up by companies while trying to make the move to a SOA architecture. But you can have SOA implementations without necessarily resorting to using web services.

345. <https://stackoverflow.com/questions/59537/service-oriented-architecture-how-would-you-define-it/30051421#30051421>

T: Service Oriented Architecture: How would you define it

Q: Service Oriented Architecture seems to be more and more of a hot topic these days, but after asking around the office I have found that I seem to get many different definitions for it. How would you guys define SOA? What would you consider the official definition?

A: Wikipedia: "A SOA is a software architecture that uses loosely coupled software services to support the requirements of business processes and software users. Resources on a network in an SOA environment are made available as independent services that can be accessed without knowledge of their underlying platform implementation."

SOA is not that new, but it has potential to achieve some amazing things. But the organization has to be ready for it: the business has to think in processes and that's the big problem

A2: An SOA design includes components (i.e., *services*) that can be used by code regardless of implementation (i.e., any OS or language). A single instance of a service may also be used by multiple applications, whereas, e.g., a DLL would have to be duplicated for each app and require the same implementation technology as the linking application.

Services in an SOA design are usually implemented as interoperable web services.

A3: A clarification here - "Service Oriented Architecture is a **systems integration** and code reuse approach where applications are dependent on **connecting to services provided by other running applications across the network.**"

I have a scenario where two j2ee applications have been integrated using event driven messaging. Here the above phrases of **systems integration** and **connecting to services provided by other running applications across the network** hold good. Can i call this SOA ?

The following principles would hold good here 1) statelessness 2) message oriented - loosely coupled infact decoupled 3) extensible.

However, the following do not apply 1) platform independence - neither of the applications being integrated has been designed to work in a different platform. 2) The applications are plain j2ee applications which have not been designed with all soa concepts.

A4: I agree with all of the people that point you to Fowler on this. Basically it runs like this: service oriented architecture got a reputation as being good, so anything that people want to be associated with good they call SOA. In reality it has a lot of downsides and can create a Service Oriented Gridlock or Dependency Oriented Architecture.

Here's my go at a definition: Service Oriented Architecture is a systems integration and code reuse approach where applications are dependent on connecting to services provided by other running applications across the network. This is distinct from component architectures, where software components are shared statically between applications in the form of libraries or SDKs, for example.

346.<https://stackoverflow.com/questions/6232926/what-is-a-good-open-source-package-for-building-flexible-spam-detection-on-a-lar>

T: What is a good open source package for building flexible spam detection on a large Rails site?

Q: My site is getting larger and it's starting to attract a lot of spam through various channels. The site has a lot of different types of UGC (profiles, forums, blog comments, status updates, private messages, etc, etc). I have various mitigation efforts underway, which I hope to deploy in a blitzkrieg fashion to convince the spammers that we're not a worthwhile target. I have high confidence in what I'm doing functionality wise, but one missing piece is killing all the old spam all at once.

Here's what I have:

- **Large good/bad corpora** (5-figure bad, 6 or 7-figure good). A lot of the spam has very reliable fingerprints, and the fact that I've sort of been ignoring it for 6 months helps :)
- **Large, modular Rails site deployed to AWS.** It's not a huge traffic site, but we're running 8 instances with the beginnings of a SOA.
- **Ruby, Redis, Resque, MySQL, Varnish, Nginx, Unicorn, Chef, all on Gentoo**

My requirements:

1. I want it to perform reasonably well given the volume of data (therefore I'm wary of a pure ruby solution).
2. I should be able to train multiple classifications to different types of content (419-scam vs botnet link spam)
3. I would like to be able to add manual factors based on our own detective work (pattern matching, IP reuse, etc)
4. Ultimately I want to construct a nice interface to be used with Ruby. If this requires getting my hands dirty in C or whatever, I can handle it, but I'll avoid it if I can.

I realize this is a long and vague question, but what I'm looking for primarily is just a list of good packages, and secondarily any random thoughts from someone who has built a similar system about ways to approach it.

A: We looked for an acceptable open source solution and didn't find one.

If you come to the same conclusion and decide to consider proprietary anti-spam, check out the paid [Akismet](#) collaborative spam filtering service. We've had decent performance from it across a dozen medium sized sites. It integrates with rails through rack and [rackakismet](#).

347.<https://stackoverflow.com/questions/18611447/node-web-app-with-java-api/18612494#18612494>

T: Node Web App with Java API

Q: Here is the story;

We recently started a project with 1 FE guy experienced in Node environment and 2 BE guy working with Java.

We built the BE of it, the API side on Tomcat + Java and the actual web app part running on node.js/express.js. So, the www (web app) part of it runs on express.js and makes ajax calls to the Tomcat Server to return json results.

As we had full time jobs and limited time to sit down and talk about things, this seemed to be a fast way to get the project up and running.

The thing is that, you have two separate projects, to git pushes and two instances running on amazon.

Right now, we are stuck in a discussion where this architecture makes sense or not. So we need an expert to put an end to this argument.

A: It reads as though you're recreating a [Service Oriented Architecture](#)

Service-oriented architecture (SOA) is a software design and software architecture design pattern based on discrete pieces of software that provide application functionality as services, known as Service-orientation. It's hard to give a informed answer in your instance without more information on the context. But there are dozens of posts on SO and elsewhere which can guide your discussion on when it is the right approach.

Try [What are the advantages and disadvantages of using Services over Components](#) and [When to use SOA Service Oriented Architecture](#)

348.<https://stackoverflow.com/questions/2665024/how-is-an-soa-architecture-really-supposed-to-be-implemented/2665155#2665155>

T: How is an SOA architecture really supposed to be implemented?

Q: My project is converting a legacy fat-client desktop application into the web. The database is not changing as a result. Consequently, we are being forced to call external web services to access data in our own database. Couple this with the fact that some parts of our application are allowed to access the database directly through DAOs (a practice that is much faster and easier). The functionality we're supposed to call web services for are what has been deemed necessary for downstream, dependent systems.

Is this really how SOA is supposed to work? Admittedly, this is my first foray into the SOA world, but I have to think this is the complete wrong way to go about this.

A: I've seen people try to jam SOA at too low a level and this may be such a case. I would certainly not equate DAO and SOA at the same level.

I agree with @ewernli

[What is SOA "in plain english"?](#)

IMHO, SOA makes sense only at the enterprise-level, and means nothing for a single application.

If I'm reading into your question correctly, your web services are for C/R/U/D data into the database. If so, providing C/R/U/D services directly to the database and its tables are likely too low level to be SOA services.

I'd look for services at a higher level and try to determine whether they are interesting at to the enterprise. If so, those are your services. I'd also ask myself whether my former desktop app is providing services (i.e. should you be looking to make your new app an SOA service itself rather than trying to force an SOA architecture into the desktop app at a low level).

A2: SOA... SOA... is the bane of my existence, for just this reason. What, or what not, constitutes SOA? I support SOA products in my day job, and some people get it, some don't. SOA.. SOA is about wrapping discrete business services in XML. ZIP+4 validation services. Payment gateways. B2B messaging.

SOA *CAN* be used to decouple desktop apps from backend databases. Sometimes it doesn't make sense, sometimes it does. What almost *NEVER* makes sense is low-latency high-query-count logic. If you ever have to use an application in France directly connected to a database in California, you'll get what I mean. SOA pretty much forces you to then smartly about how you model and return your data (look into **SDO - Service Data Objects**). The devil's in the details though. Marshalling data to/from XML can be costly.

349. <https://stackoverflow.com/questions/13862333/understanding-soa-architecture/13863580#13863580>

T: Understanding SOA architecture

Q: I'm working on a SOA project based on SOAP. Well, i read many tutorials on Internet, but i still have the same problem, which is all articles & blogs, even the official documentation of eclipse told you how to use the IDE assistant or such APIs & frameworks (e.g : JAX-WS, CXF) to create a web service and gives you as bonus some definitions of SOAP, WSDL & UDDI, but none of them explained how an SOA works, the process of publishing & deploying a WS is done & how the C/S req/resp process of invoking a distant web service is done using all these entities SOAP, WSDL & UDDI and the other files which exist in a SOA project (XML files & java files). I have read many e-books but still don't understand how SOA works. pliiiz i need your help guys, i'm really disturbed & confused. Many thanks in advance.

A: Don't get too hung up on that term Service Oriented Architecture ([SOA](#)) as its really more of a marketing term that describes a well-known and practiced software development methodology of making programs into specialized components that can be reused across a broad range of applications. It can also describe applying this software development methodology to business process modeling where business units and workflows are modularized and looked at as individual services rather than monolithic processes that exist in a bubble, and some call this different but related application of the concept [Service Oriented Modeling](#). While SOA shares a lot in common with modularization, it also adds the requirement that your separate code modules not only inter-operate and integrate (i.e. work well together with) each other, but potentially with everyone else's code in the world, and also that they are available over some well-defined mechanism.

An SOA "purist" might tell you that for your software to be "SOA-compliant" (note: that's not a real thing as there's no single set of rules or governing body on services) that you need to write it as a [SOAP](#) Web Service, publish and maintain a WSDL which can act as a contract between you and any implementing parties, and follow the relevant [WS-* specs](#). However, in reality [REST](#) and other lightweight modularization/integration/reusability approaches are just as much in line with the concept of SOA. If you did want to become an "expert" in SOA then read through every word of the following specs:

DISCOVERY

- [UDDI](#)
- [RDDL](#)
- [XRI](#)
 - [XRDS](#)

MESSAGING

- [SOAP 1.1](#)
- [SOAP 1.2](#)
 - [SOAP over JMS](#)
 - [MTOM](#) (Msg Trans Optimization Mechanism)
- [WS-Addressing](#)

META-DATA

- [WSBPEL](#)
- [WSDL 1.1](#)
- [WSDL 2.0](#)
- [WADL](#)
- [WSFL](#)
- [WS-Policy](#)
- [WS-PolicyAssertions](#)
- [WS-PolicyAttachment](#)
- [WS-MetadataExchange](#) (WS-MEX)

SECURITY

- [WS-SecurityPolicy](#)
 - [WS-Security](#)
- [WS-Trust](#)
 - [WS-SecureConversation](#)

QUALITY OF SERVICE

- [WS-ReliableMessaging](#) (WS-RM)
 - [WS-Coordination](#)
 - [WS-AtomicTransactions](#)
 - [WS-TX](#)

(those are just some of the most important WS-* specs, [see full list here](#))

Then read every page of the following essential SOA books:

- [Service-Oriented Architecture - Concepts, Technology and Design](#)
- [Enterprise Integration Patterns](#)
- [RESTful Web Services](#)

However, I don't actually advise that as there's way too much reading material. What I would suggest though, is that you use them as a reference as you code your own programs following an SOA methodology and notice that in a specific area, a reference manual on what to do next would come in handy. Practice makes perfect and you'll really learn a lot more from working with real-world examples than from reading books and learning everything about the standards and theory. As you mentioned, start with the overly-simplistic JAX-WS and JAX-RS Web Service examples that come out-of-the-box with IDEs like NetBeans or Eclipse, then try some examples that come with popular SOA frameworks like [CXF](#), [Axis2](#) or [RESTlet](#).

In general, as you are writing code constantly ask yourself if your code is:

1. Reusable in other applications or domains
2. Makes its core functionality extensible internally and accessible externally (especially over a network connection, i.e. [HTTP](#))
3. Provides output data or metadata in an easy to parse/process (and thus integrate) format like [XML](#), [JSON](#) or one of the many related data languages and sub-languages
4. Able to provide metadata on demand to describe its inner workings, making it possible to automate its integration
5. As specialized and modularized as possible; and at the same time, if there are other similar specialized [APIs](#) or Web Services that already exist out there, would it be better to use them instead of reinventing the wheel

There are lots of other questions and criteria that people may use, but IMHO these are the most important.

350. <https://stackoverflow.com/questions/589488/mvp-mvc-vs-traditional-n-tier-approach-for-winform-apps>

T: **MVP/MVC vs traditional n-tier approach for winform apps**

Q: We have a large suite of apps, most are C# 1.1, but at least 10 major ones are in VB6. We are undertaking a project to bring up the VB6 apps to .NET 3.5.

All the c# 1.1 apps are written using a traditional n-Tier approach. There isn't really any architecture/separation to the UI layer. Most of the code just responds to events and goes from there. I would say that from the point of maintainability, it's been pretty good and it's easy to follow code and come up to speed on new apps.

As we are porting VB6 apps, the initial thinking was that we should stick to the existing pattern (e.g. n-Tier).

I am wondering, whether it's worth it breaking the pattern and doing VB6 apps using teh MVP/MVC pattern? Are MVC/MVP winform apps really easier to maintain? I worked on a MVC-based project and did not feel that it was easier to maintain at all, but that's just one project.

What are some of the experiences and advice out there?

A1: Dude, if something works for you, you guys are comfortable with it, and your team is up to specs with it. Why do you need to change?

MVC/MVP sounds good... Then why am I still working on n-Tier myself?

I think before you commit resources to actual development on this new way of programming... You should consider if it works for YOUR team.

A2: If you are porting the VB6 apps vs. a full rewrite, I'd suggest to focus on your Pri 1 goal - to get asap to the .Net world. Just doing this would have quite a lot of benefits for your org.

Once you are there, you can evaluate whether it's beneficial to you to invest into rearchitecting these apps.

If you are doing full rewrite, I'd say take the plunge and go for MVP/MVVM patterned WPF apps. WPF will give you nicer visuals. The MVP/MVVM pattern will give you unit testability for all layers, including the visual. I also assume that these apps are related, so chances are you might be able to actually reuse your models and views. (though, I might be wrong here)

A3: It moves a thin layer of code you still probably have on the UI. I say thin, because from your description you probably have plenty of code elsewhere. What this gives you is the ability to unit test that thin layer of code.

Update 1: I don't recommend to re architect while doing the upgrade, the extra effort is best expend on getting automated tests (unit/integration/system) - since you will have to be testing the upgrade works anyway. Once you have the tests in place, you can make gradual changes to the application with the comfort of having tests to back the changes.

A4: "Change - that activity we engage in to give the allusion of progress." - Dilbert

Seriously though, just getting your development environment and deployment platforms up to .NET 3.51 is a big step in and of itself. I would recommend that things like security reviews and code walkthroughs should probably come before re-archecting the application.

MVC and MVVM are excellent paradigms, particularly in terms of testability. Don't forget about them, but perhaps you should consider a pilot project before full scale adoption?

A5: MVC in particular does not exclude n-Tier architecture.

We also have ASP.NET 1.1 business application, and I find it a real nightmare to maintain. When event handlers do whatever they like, maybe tweak other controls, maybe call something in business logic, maybe talk directly to the database, it is only by chance that software works at all.

With MVC if used correctly you can see the way the data flows from the database to your UI and backwards. It makes it easier to track the errors if you got the unexpected behaviour.

At least, it is so with my own little project.

I'll make the point once again: whatever pattern you use, stick to the clear n-Tier architecture. 2-Tier or 3-Tier, just don't mess everything into a big interconnected ball.

351. <https://stackoverflow.com/questions/30726714/what-is-the-value-of-multiple-hybris-extensions>

T: What is the value of multiple Hybris extensions?

Q: This is a question about web based software architecture. I am a Hybris newbie, but as I understand it, you can create a full Spring MVC app in one Hybris extension. What is the value of breaking out components of that app into multiple Hybris extensions? Are there web app features or architectural value (e.g. maintainability, extensibility, performance, etc...) that you can only realize by using multiple extensions?

A1:

So Hybris is based on the concept of being flexible and modular, allowing new functionality to be plugged in where needed via extensions. An extension is an encapsulated piece of the Hybris Suite that can contain whatever you need it to contain, I.E. storefront, hMC, backoffice, etc. By default extensions are completely independent, however you can create dependencies between extensions no problem.

Say you're building an application that you want to have a section in the hMC, a frontend and some functionality in the backoffice too. In general you would have 4 extensions here:

a core extension for the model, services, interceptors, etc

hMC extension

frontend extension, pluggable frontend

backoffice extension

The real value of extensions is they allow hybris to be flexible and modular allowing for easy migration from one version of hybris to another.

<https://stackoverflow.com/questions/13044937/best-way-to-organize-architect-a-web-site>

T: Best way to organize/architect a web site

Q: I have to take a key decision about our web site organization/architecture.

Here is my context. Our main web site will be available in different countries. Even if the Business is nearly the same, there are some region-specific features. Of course it concerns translations, but also master/layouts and business process. These differences are because of different legislations. At the beginning we will have 4 or 5 derivations, but the target could be 20.

A simple comparison could be Stackoverflow and the Stack Exchange Network. Main features are quite the same between websites, but there are site-specific business rules.

To my mind, there are basically two possible approaches :

Having a single web site that manages region/country-specific features. This will keep core features on the same site, but will involve coupling between all regions. There is also a risk of "IF" in the code. Devs & Maintainability is optimal (unique fix for all) but risky (could break others). A way to do this is a combination of portable areas and a custom view engine (generic view template in parent folder and derivation in a sub folder)

Having one web site per region/country. There will be a common web site that will be implemented. There will be some common components but each web site will have its own lifecycle; Devs & Maintainability is easier but costly (if there are many derivations)

Please Note, another impact of this organization is deployment and availability.

What is the best way to organize this ?

Edit : We already have some experiences in MVC and as a general guideline, we are aware of MVC Best Practices : thin controllers, DI, ViewModels, Action Filters, ...

353. <https://stackoverflow.com/questions/1863220/how-is-mvc-more-convenient/1863311#1863311>

T: How is MVC more convenient?

Q: I have a large website that I have time to convert to a nice custom-framework that I can build to my needs. I want to build my own, and not use something like Smarty because I'd like to...

know how all the guts of it work

cut any and all bloat

learn it, just for kicks

But, after building it in different ways, several times...I keep feeling that for the amount of "convenience" it offers, the code becomes increasingly unflexible, attempting to keep track of files becomes triple as hard (especially if you are the lone developer on the project), and there isn't even any real awesome documentation out there.

At this point, I really need convincing...how is this going to change my life, again?

A1: This has been answered already, but to put a finer point on it, I think the single attribute that encompasses when to/not MVC is scalability:

MVC allows clear separation of duties (ie, front-end vs. database coders).

MVC is a pattern that enforces uniform coding habits.

Maintainability is increased as it's easier for a new project member (who understands MVC) to grok the codebase.

If you are the sole owner of the code and don't foresee other people joining anytime soon, then you should not need it.

A2: It can be difficult (sometimes impossible) To convert an existing project to some new pattern/framework. It also depends on how you are implementing an MVC framework.

You say that keeping track of files is hard. While you may end up with more files, they shouldn't be hard to keep track of if you have a good organization and naming system, i.e. keeping models, views, and controllers in 3 separate folders, or have some kind of naming convention that tells you what is what

I also don't understand why you see the code as more 'unflexible'. Having code properly separated into Models, Views, and Controllers is that it is more modular, and it can prevent code duplication.

The most important thing about having this separation of concerns is Maintenance. One of the biggest benefits of an MVC framework is that it is easier to pick out what code is misbehaving and fix it. The separation of concerns = a separation of problems & bugs.

A3: The greatest thing about MVC is that it's really just a concept. How you implement it is up to you as long as you follow the standard of separating duties.

I've written a few different MVC code bases based on what needs to happen in the project. One code base has a service layer to further separate "business logic" from the controller and views. Another one separated CLI controllers from web controllers.

This is just how I look at and use MVC. I suggest finding some credible documents or blog posts online about MVC.

A4: It is probably most convenient in the sense that it is an accepted pattern, and other people drifting in and out of your project will understand it. The big thing about Design Patterns, the book, was not that the patterns were new, but that they all suddenly had accepted names.

If you are and will be the sole updater, it may be no big deal.

354.<https://stackoverflow.com/questions/1654762/what-is-an-mvc-framework-and-why-is-it-necessary-useful/1655485#1655485>

T: What is an MVC framework and why is it necessary/useful?

Q: I know that an MVC framework allows you to separate business logic, data base access and presentation, but why do we need a framework to do this.

Can't we just keep our classes separated, perhaps using different packages/folders for the model, view and controller classes?

A1: An MVC framework is a framework written to split up the business logic, database access and presentation.

This is very useful in most web applications, and now lately into software/desktop applications.

This is due to the fact that following the MVC model, your code will be much clearer, cleaner and you keep your application DRY (Do not Repeat Yourself).

You can write your own classes and separate them into Model, View and Control. But again, you will need a framework to help you in accomplishing certain tasks. Like a List control in ASP.NET, or PHP framework being able to help you translate text between languages and so on. (Oh why reinvent the wheel?!)

A2: It's not, but sometimes it's a necessary evil.

Take your case for an example, although code behind seems to have a better separation of concern, but the problem with it is that it may not separate out the concerns as clearly as you wish. Usually when we do the code behind stuff we are not building the apps in MVC framework. The code behind code is also not easy to maintain and test anyway, at least when compare to MVC.

If you are building ASP.NET MVC apps then I think you are surely stuck with inline code. But building in MVC pattern is the best way to go about in terms of maintainability and testability.

To sum: inline code is not a good practice, but it's a necessary evil.

355.<https://stackoverflow.com/questions/25477321/how-about-an-mvc-style-structure-in-an-classic-asp-app/25478506#25478506>

T: How About an MVC Style Structure in an Classic ASP App?

Q: I have a classic ASP app that is just starting to undergo transformation into MVC. As that might take a while, I am thinking of applying some MVC-style logic to key parts of the existing code to make day to day maintenance easier.

Firstly I plan to create a 'view' - an include file that is iterated through with every record of a GetRows().

Secondly I plan to create a 'model' - a simple property driven class to display the item. For example a BusinessProfile class might have properties such as BusinessName, Address, PhoneNumber, and YearsInBusiness.

Finally I plan to create a 'controller' class that will grab the data (using the GetRows() method), perform any calculations required and populate the 'model'.

Is such a task worth doing?

Might such an approach would cause a big performance hit in a classic asp app? Right now most of the html is being written directly to the response stream and I understand that this is an efficient way of working in ASP.

I did find an article here which indicates the approach I'm taking, but I won't be going that far in mimicking MVC (no url changes or route data to consider).

A1: Of course there will be a difference in performance in Classic ASP using an MVC structure. It's simply just more work for it to do. However, the trade-off is maintainability, depending on how big the application is, and you have to think it's worth it. I would think it is since Classic ASP is 'spaghetti code'.

To be honest, I would learn C# Asp.Net MVC5 instead. Great tutorials online to learn to do this type of stuff pretty quickly--Developing in general is quicker in C#/Net than in classic ASP when considering all the built in functionality offered, which helps make up for most of the time taken to learn .net. It's also worth using the effort to learn .net MVC rather than rebuilding or building a new Classic ASP application, because if you knew ASP.Net MVC, you surely wouldn't be going this route. (I am a Classic ASP Developer)

356.<https://stackoverflow.com/questions/2267041/what-are-the-performance-implications-of-using-design-patterns-in-php/2267053#2267053>

T: **What are the performance implications of using design patterns in PHP?**

Q: I know that design-patterns are very useful in creating of big projects. Does anyone have experience in both creating project with normal (OO, procedural) and using design patterns in respect to performance(speed of execution)? I want to create some big project and I am afraid that using design patterns my scripts would run slower. So What is pefrmance of code with desing paterns compare to normal OO programming?

A1: Personally,

I'd program it, and then figure out if there are speed problems/bottlenecks.

Only worry about performance when it becomes a problem.

A2: The objective of design patterns is to solve common problems. These problems may include maintainability (which is what it sounds like you're mostly interested in), as well as performance. Personally, I would favour applying architectural patterns first to make the operations of your application easy to understand. It should then

be easier to refactor the existing code to introduce some performance-related patterns, should the performance of your code warrant it.

A3: An old adage about database design can be applied here: "Design for normalization first, denormalize for performance later". In this case, design it right the first time, if you find performance bottlenecks, optimize and break elements of your design on a one off basis then. Another issue, get someone using your application before you start optimizing, otherwise, who really cares?

A4: Some of the reasons design patterns are used is to eliminate code duplication and placing the code in the right spot. Both of these factors adds up to a fast application. Individual techniques such as caching and loading-code-only-when-needed could be easier/faster to apply with design patterns.

That said, maintainability will be much more prominent with some kind of thinking behind the coding applied, which will let you as a programmer focus on the real performance issues.

A5: Rarely code complexity is a factor in total execution speed of a PHP application, usually database interaction and network transfer times are much better candidates for slowness. In any case, develop first and optimize later. You might found out that that kind of optimization is not even necessary.

A6: This depends entirely on what your application is doing and on the details of how you implement the patterns. Design patterns themselves are not really related to performance, but are intended to help you structure your system to aid maintainability.

Besides, performance should not be a concern at this stage; focus on getting the design pinned down first, and if it turns out to be running too slowly, only then should you worry about optimization.

A7: Well I don't have experience with programming using design patterns (only MVC). It is useful for maintainability, but amount of classes/code is greater compare to OO programming. (that is conclusion from my research ,but not from experience). By desing patterns I mean Factory,Decorator, Singleton etc.

357. <https://stackoverflow.com/questions/1866821/is-mvc-a-design-pattern-or-architectural-pattern/9571399#9571399>

T: Is MVC a Design Pattern or Architectural pattern

Q: According to Sun and Msdn it is a design pattern.

According to Wikipedia it is an architectural pattern

In comparison to design patterns, architectural patterns are larger in scale. (Wikipedia - Architectural pattern)
Or it is an architectural pattern that also has a design pattern ?

Which one is true ?

A1: MVC is more of an architectural pattern, but not for complete application. MVC mostly relates to the UI / interaction layer of an application. You're still going to need business logic layer, maybe some service layer and data access layer. That is, if you're into n-tier approach.

A2: Why does one of them have to be true?

Both can be true, depending on point of view.

MVC can be an archiectual pattern, if it forms the basis of the application architecture.

It can also be seen as simply a design pattern, an abstract notion that is applicable to any application.

A3: Design patterns say how to write code effectively (considering Code Metrics).

A few benefits:

358. <https://stackoverflow.com/questions/22913092/which-approach-for-maintaining-reusable-net-components>

T: Which approach for maintaining reusable .net components?

Q: My team develops .net components which are used by other development teams within the company.

More often than not, these teams need an urgent enhancement and they want it now. To preserve my team's sanity, I would like to make planning more predictable and propose releases with a frequency no less than a month. I am curious about how others solve this kind of issues.

To take a concrete example, let's say we are developing our own Grid class. When one of the teams needs sorting but our next release is in 3 weeks. Would it be a good strategy to let them wrap our Grid in their own code and provide the required functionality themselves?

If not, what would be a good strategy to allow our users to enhance the components themselves? Could you please recommend some literature that explains the different strategies for maintaining an internal framework?

A1: First, you cannot say to the other teams "Hey, hold on for 3 weeks". Think about their own pressure to finish things in time, they have lives and deadlines too.

You can offer two solutions: a) "Ok, We can do it but due to internal agenda we cannot get it done before 3 weeks" b) "You can wrap it yourself and do all the hard work if you cannot afford to wait 3 weeks"

And maybe a third solution:

c) "If you can spare a developer we can guide him to implement it, of course he'll need some time to get in the code and start doing something real but we both will gain at the end"

That was not an answer for your question but made a suggestion for the scenario you painted.

Now the answer:

Can you really predict other teams' demands? If you say yes stop hardworking now and go to Vegas, you can make lots of money by using super powers.

Think other teams as clients. You mostly cannot predict demands (to new features) unless they are too obvious; it's an error to ship without it in the first place.

You can try to make some brain storm with the other teams' architects before even starting to waste time in any fancy component nobody will use or care about.

From this you will start to get a more concrete idea about what you need to build. Now you already got some "clients". Stop doing other components (they will just create more "new features" pressure anyway) and focus on delivering something you will do the work, all the work it's supposed to do at least.

By just creating components without some agreement with your "clients" you risk to waste time creating things (even pretty good ones) no one needs and forcing your "clients" to seek the same nice other (free?) component they found searching on Google.

In the pure technical question, maintainability of components is not very different from any other app. Just let it be loose coupled (dependency injection can be a good idea) and you will be fine.

A2: seems like you need branching (and merging)...here is a good starting point:<http://msdn.microsoft.com/en-us/library/gg475908%28v=vs.100%29.aspx>

359. <https://stackoverflow.com/questions/2818415/what-are-the-advantages-and-disadvantages-of-plug-in-based-architecture>

T: What are the advantages and disadvantages of plug-in based architecture?

Q: I want to do the architectural design for a software that can be used integrate various third party software's (executable) under one platform.

Standard project types will be added to the platform by default. The project type defines the way in which the different software will be executed and their input and output files.

The user can customize the available standard project type and that will be added to the platform as new project type which defines new custom execution flow.

Also it should support easy extension and customization of the features. I read that plug-in based architecture supports both.

What are the advantages and disadvantages of plug-in based architecture? Do we have any better architecture which can be used for this kind of scenario?

A1: The benefits of a pluggable system are

- extensibility: the application can be dynamically extended to include new features.
- parallel development: since features can be implemented as separate components, they can be developed in parallel by different teams.
- clear development direction: since the plugin framework ideally provides a well-defined interface and documentation for plugin writers, developers have a clear roadmap for development.
- simplicity: a plugin typically has one function, and so developers have a single focus

But some of these strengths are also weaknesses:

- extensibility: does the plugin interface anticipate the ways plugin writers what to extend the app, or does it restrict extension. Designing extensibility to meet all use cases often takes several iterations, or extremely good requirements analysis.
- maintainability: the provider of the plugin framework not only has to make sure the plugin interface satisfies indented use cases, is clear and well documented, but also that it can evolve. Managing versions and backwards compatibility with existing plugins can be very hard. Hard enough that many practical implementations don't bother, and push the onus on plugin writers to update their plugins with each version.
- complexity: although each plugin works when tested alone, interactions between plugins can cause new problems, with bugs appearing only with certain combinations of plugins.
- testing: testing plugins can be difficult if the plugin system does not provide some form of mock plugin runner for testing, which is sometimes not possible, and testing is only available by running the plugin for real, which slows down development.
- artificial separation: a plugin typically has a single focus, but what constitutes a single focus is set by the plugin api provider. If a plugin writer finds he needs a plugin that can reasonably do 2 things (as defined by the plugin api) in close tandem, he may end up having to implement two plugins and find ways of providing communication between them that is not presently provided by the api. He's then having to work around or against the plugin framework.

Designing a good plugin environment has many of the same challenges as designing a good library. If you are producing both the environment and the plugins yourself, then it's not so bad since you can update all the plugins as the environment evolves, but if the plugin api is open to all, then it requires careful planning and execution to get the design right to avoid too many plugin rewrites as the environment evolves.

"[Second-system syndrome](#)" described by Fred Brooks advocates that the second system developed is often excessively generic, aiming for ultimate flexibility, sometimes producing a "platform within a platform"/"[inner platform effect](#)". A pluggable design is often seen as a way out when requirements are non-existent or underspecified. To compensate, the software is made as flexible as possible to try to handle "whatever comes along".

Apologies if this paints a dreary picture - pluggable systems can be fantastic and offer a lot of strengths, but they come at a high price. Before diving into a pluggable system, it's prudent to draw up requirements for all the plugins that you will need to cover the functionality required. This will then help you decide if the pluggable design is worth the effort, or some simpler approach would serve equally well.

A2: The advantages of a plug-in architecture is obviously the increase in flexibility. This allows other developers to extend your application in ways that did not expect in the first place. Note that there are various plug-in architecture ranging from flexible to extreme flexible. The most flexible one is called a Full Plug-in architecture, which is used in [eclipse](#).

The disadvantage is that to be really flexible you have to develop a solid framework that incorporates loading, unloading and communication between plugins. There will also be a slight performance overhead in communication between plug-ins.

For a discussing on how to create a plug-in architecture take a look at [this](#) question.

A3: Though its not easy to maintain plugin based architecture, why people develop in such a way then? Because still its better then other "fixed" approaches. Say if your requirements are changing one after another and design needs to be fixed, then think what will do with other approaches?

Best thing about it is parallel development. When client wants some features ASAP, developers can work in parallel and plug their code as Plugins/Components. Basically Plug-n-Play architecture provides flexibility with complexity, but complexity is for the first time. Once your team is comfortable with it, its easy for them to handle code, bugs etc...

When you want to integrate different 3rd party applications, as you mentioned, it will be better to develop it as plugin OR component/Service based. (I don't want to confuse you but **SOA** might be of interest.) So that you can on/off the service/plugin when its not needed. Even you can get benefit from this when you want to do **SAAS** (Software As A Service) model, where you get revenue for each different service/feature :).

For reference, you can check following JAVA frameworks. There are many ESBs available which provides component/service based plug-n-play architecture.

- [jBPM \(JBoss Business Process Manager\)](#)
- [Apache ServiceMix \(An Enterprise Service Bus\)](#)

360. <https://stackoverflow.com/questions/656252/what-questions-should-i-ask-when-trying-to-determine-if-a-system-should-be-redev/656299#656299>

T: What questions should I ask when trying to determine if a system should be redeveloped?

Q: I've been involved in the assessing whether a number of our systems need to be rewritten from the ground up or if they should be partially rewritten, or if they should just continue as is with patches on top.

In order to better assess the situation I was wondering what questions I should be asking myself and others to help determine the appropriate action to take?

A1: In general, I've found that re-writing code tends to be trouble (it is expensive, time-consuming, and involves a discovery phase that makes the first system look better).

That said, here are a few questions to ask:

4. Would core refactoring suffice? You'll know from evaluating the system whether or not the central issues go deeper than the code. If the issues are in the code base (rather than the technology itself), I prefer refactoring.

5. To what extent is the current system testable? Testability goes a long way toward extending the service life of any system module because testable code generally lends itself more readily to extension and maintainability. This relates to #1 as well.
6. Lastly, would the value provided from a re-write justify the effort. This is a business question, certainly, but one that the developer can and should help make.

A2: I'd recommend you read [Things You Should Never Do, Part I](#). He makes a strong case for not redeveloping. Money quote:

It's important to remember that when you start from scratch there is absolutely no reason to believe that you are going to do a better job than you did the first time. First of all, you probably don't even have the same programming team that worked on version one, so you don't actually have "more experience". You're just going to make most of the old mistakes again, and introduce some new problems that weren't in the original version. Perhaps you should ask yourself if you know the system well enough to fix the problems without re-writing it. If you don't, it might be safe to say you don't know the system well enough to redevelop it from the ground up.

A3: I suggest that you need a context for the discussion, and the best one I'm familiar with is found in Martin Fowler's "Refactoring" book. To me the question really is "Is this application refactorable?"

The first specific guideline would be "Is it written using good OO design principles?" If not, usually you need to either put it on life support, and/or start over. If it is, then the book will provide lots of help; and in my experience there's good reason for hope.

A4: Finally you want to achieve something whenever you rewrite a system from the scratch. You should ask yourself what do you want to achieve? Do you want to:

- Reduce the risk of a system build with old technologies
- Reduce the costs: too expensive to maintain
- ?

You could do a break-even analysis to see when your new system starts to pay out. In my opinion you should be able to reduce rewriting the system to costs and be able to see that a new one costs less than the old.

361. <https://stackoverflow.com/questions/5597512/writing-maintainable-event-driven-code>

T: Writing maintainable Even-Driven code

Q: I have just recently started playing with event-driven architectures, coming from a pretty standard object-oriented mindset.

The first thing I noticed was that the difficulty in understanding and tracing through programs seems to increase exponentially with the size of the program. While small pet projects are easy to follow, it feels like the code will rapidly turn to spaghetti.

I understand that I am new to this development mindset and not all of my object oriented worries carry over. Are there any resources on writing maintainable, understandable event-driven code? What do people who use node.js or Twisted or Event Machine do about this?

A1: There is another post here that shows the inlineCallbacks method, which is cleaner, but requires python 2.5 or newer (meaning not under Centos/RHEL 5 series, which I am sadly stuck with for my app). If you can use it DO SO.

As you can see, this looks like the old school python imperative stuff you know and love, but is WAY easier to maintain without a ton of nested functions and lambdas. I still wish python had blocks though.

As for debugging, you can turn on twisted reactor debugging using the `defer.setDebugging(True)` call somewhere in your initialization code. This will attach the original traceback that raised an exception in your code, so that you can trivially see where the error ACTUALLY occurred. Just remember to redact the `setDebugging` statement before going production, because it results in a HUGE amount of extra introspection (watch it in strace if you want to be utterly horrified).

A2: Obviously there are already best practices and models that will continue to develop over time.

However, consider also the possibility that evented programming provides the opportunity for "small pet projects" to interact with each other. Imagine a world where thousands of distributed individual projects interacted in real time through user-defined callbacks.

Users and developers would be able to rewire the web and applications over existing protocols from the top down instead of relying on existing application design. Application designers would then be free to focus on individual use cases instead of providing one-size-fits-all solutions or worrying about every possible contingency.

Check out Web Hooks and look at how services like Twilio are already operating

362. <https://stackoverflow.com/questions/6952966/what-is-the-difference-between-page-controller-and-mvc-patterns/6968611#6968611>

T: What is the difference between Page Controller and mvc patterns?

Q: What is the difference between Page Controller and mvc patterns? Can you provide links for understanding?

A1: Controller is one of the parts of the MVC pattern, so not sure your question makes too much sense. Unless you mean something else by Page controller?

Model - View - **Controller**

A2: A Page Controller is one part in the MVC pattern, the controller part.

A3: The Model-View-Controller (MVC) pattern separates the modeling of the domain, the presentation, and the actions based on user input into three separate classes

Model. The model manages the behavior and data of the application domain, responds to requests for information about its state (usually from the view), and responds to instructions to change state (usually from the controller).

View. The view manages the display of information.

Controller. The controller interprets request and responses, informing the model and/or the view to change as appropriate.

363. <https://stackoverflow.com/questions/31161062/right-way-to-work-with-dbcontext>

T: Right way to work with dbContext

Q: **Summary**

This question is for a methodology. The answer should be a link to the holy grail in working with contexts for the described scenario.

We have been experiencing different problems in our MVC web application project, related to the use of dbContext.

After reading many question-answer blogs, articles ... including proposals with repositories and injection patterns, Owin, Entity Framework, Ninject, we are still not clear about the right way to work with dbContext's.

Is there any article, demo, with “The Way” to do it in a more complex application than just “CRUD” operations using separation between MVVC-presentation / Domain Entities / Logic / DataAccess layers, including Identity security handling users and roles permissions?

Description

Previously, our approach was to create dbContext objects when needed in each repository. Soon we discovered errors like “dbContext is disposed” since the connection dies together with the repository function. This makes the retrieved objects “partially available” to the upper layers in the app (using the trick .ToList(), limited because we can access collections and attributes but not later navigation into the object child tables, and so on). Also using 2 contexts from different repositories, we got an exception telling that 2 contexts are trying to register changes to the same object.

Due to timed commitments to deliver prototypes, we created a single static dbContext shared for the whole application, which is called from everywhere when needed (Controllers, Models, Logic, DataAccess, database initializers). We are aware that is a very dirty workaround but it has been working better than the previous approach.

Still with problems: dbContext can handle only 1 async method call at a time, and we can have many calls (eg. userManager.FindByNameAsync - there are only async methods). Exception: “A second operation started on this context before a previous asynchronous operation completed”.

We were thinking about creating the context as the very first step when an action is called in the controller, then to carry this object as “relay race” to every other layer or function called. In this way the connection will live from the “click in the browser” until the response is loaded back on it. But we don’t like the idea that every single function must have an extra parameter “context” just to share the connection through the layers for the entire operation route.

We are sure that we are not the first ones wondering about what is the right way to use contexts.

Application layers

We have these (logical) layers, differents workspaces, but same webapp MVC project, top to down:

- **Views:** HTML + Razor + JQuery + CSS. Code here is restricted to the layout, but some HTML might depend on the Role. Method calls are to controllers only, plus utils (like formatting).
- **ViewModels:** The data container to be exchanged between Controllers and Views. Classes only define attributes, plus functions to convert to and from Domain entities only (Translators).
- **Controllers:** Actions called from the browser result in calls to functions in the Logic layers. Authentication here restricts access to actions or limits inside an action. Controllers avoid using Domain entities but ViewModels, so that to communicate with Logic layer ViewModels translation functions are called.
- **Domain Entities:** Used for the logic layer, and used to create database tables by Entity Framework.
- **Logic Classes:** A Domain entity has an EntityLogic class with all the operations. These are the core where all the rules that are common and abstracted from specific consumer clients (ViewModels are unknown).
- **Repositories:** To access the database. Not sure if we do need this since Domain entities are already mapped to objects in database by Entity Framework.

Typical scenario

1. The browser calls an action (POST) in the Products controller to edit a product. The ProductViewModel is used as container of the data.
2. The controller action is restricted to a collection of roles. Inside the action, depending of the role, a different Logic function is called and ProductViewModel is translated to ProductDomainEntity and passed as parameter.
3. The logic EditProduct function calls others functions in different logic classes and also use localization and security to restrict or filter. The logic may or may not call a Repository to access the data, or to use a global context for all, and deliver the resulting domain entity collections to the Logic.
4. Based on the results, the logic may or may not try to navigate the results’ children collections. The results are given back to the controller action as domain entity (or collection of), and depending of this results, the controller may call more Logic, or redirect to another action or respond with a View translating the results to the right ViewModel.

A2: I don't believe there is a "Holy Grail" or magic-bullet answer to this or any other problem with EF / DbContexts. Because of that, I also don't believe that there is one definitive answer to your question, and that any answers will be primarily opinion-based. However I have found personally that using a CQRS pattern rather than a repository pattern allows for more control and fewer problems when dealing with EF semantics and quirks. Here are a few links that you may (or may not) find helpful:

<https://stackoverflow.com/a/21352268/304832>

<https://stackoverflow.com/a/21584605/304832>

<https://www.cuttingedge.it/blogs/steven/pivot/entry.php?id=91>

<https://www.cuttingedge.it/blogs/steven/pivot/entry.php?id=92>

<http://github.com/danludwig/tripod>

Some more direct answers:

...This makes the retrieved objects "partially available" to the upper layers in the app (using the trick .ToList()), limited because we can access collections and attributes but not later navigation into the object child tables, and so on). Also using 2 contexts from different repositories, we got an exception telling that 2 contexts are trying to register changes to the same object.

The solutions to these problems are to 1) eager load all of the child and navigation properties that you will need when initially executing the query instead of lazy loading, and 2) only work with 1 DbContext instance per HTTP request (inversion of control containers can help with this).

Due to timed commitments to deliver prototypes, we created a single static dbContext shared for the whole application, which is called from everywhere when needed (Controllers, Models, Logic, DataAccess, database initializers). We are aware that is a very dirty workaround but it has been working better than the previous approach.

This is actually much worse than a "dirty workaround", as you will start to see very strange and hard to debug errors when you have a static DbContext instance. I am very surprised to hear that this is working better than your previous approach, but it only points out that there are more problems with your previous approach if this one works better.

We were thinking about creating the context as the very first step when an action is called in the controller, then to carry this object as "relay race" to every other layer or function called. In this way the connection will live from the "click in the browser" until the response is loaded back on it. But we don't like the idea that every single function must have an extra parameter "context" just to share the connection through the layers for the entire operation route

This is what an Inversion of Control container can do for you, so that you don't have to keep passing around instances. If you register your DbContext instance one per HTTP request, you can use the container (and constructor injection) to get at that instance without having to pass it around in method arguments (or worse).

ViewModels: The data container to be exchanged between Controllers and Views. Classes only define attributes, plus functions to convert to and from Domain entities only (Translators).

Little piece of advice: Don't declare functions like this on your ViewModels. ViewModels should be dumb data containers, void of behavior, even translation behavior. Do the translation in your controllers, or in another layer (like a Query layer). ViewModels can have functions to expose derived data properties that are based on other data properties, but *without behavior*.

Logic Classes: A Domain entity has an EntityLogic class with all the operations. These are the core where all the rules that are common and abstracted from specific consumer clients (ViewModels are unknown).

This could be the fault in your current design. Boiling all of your business rule and logic into entity-specific classes can get messy, especially when dealing with repositories. What about business rules and logic that span entities or even aggregates? Which entity logic class would they belong to?

A CQRS approach pushes you out of this mode of thinking about rules and logic, and more into a paradigm of thinking about use cases. Each "browser click" is probably going to boil down to some use case that the user wants to invoke or consume. You can find out what the parameters of that use case are (for example, which child / navigation data to eager load) and then write 1 (one) query handler or command handler to wrap the entire use case. When you find common subroutines that are part of more than one query or command, you can factor those out into extension methods, internal methods, or even other command and query handlers.

If you are looking for a good place to start, I think that you will get the most bang for your buck by first learning how to properly use a good Inversion of Control container (like Ninject or SimpleInjector) to register your EF

DbContext so that only 1 instance gets created for each HTTP request. This should help you avoid your disposal and multi-context exceptions at the very least.

364. <https://stackoverflow.com/questions/43244722/is-it-compulsory-to-use-mvp-or-mvc-for-web-development/43245129#43245129>

T: Is it compulsory to use mvp or mvc for web development

Q: I've done some surface reading on mvc and mvp and they all talk about model, controllers and presenters. My looking up on those things didnt give me enough understanding so I want to know how important using an mvc or mvp is to website development, if it is compulsory to use either of them and lastly their benefits.

A: **It is not like you can't develop web applications without the use of either of MVC or MVP.** But they both are designing patterns and helps greatly in development and maintenance of your project and code. At the heart of MVC is Separated Presentation. The idea behind Separated Presentation is to make a clear division between domain objects that model our perception of the real world, and presentation objects that are the GUI elements we see on the screen. Domain objects should be completely self contained and work without reference to the presentation, they should also be able to support multiple presentations, possibly simultaneously.

There are mainly 3 design patterns:

1. MVC (Model View Controller)
 2. MVP (Model View Patterns)
 3. MVVM (Model View View Model)
-

MVC (Model View Controller)

The MVC pattern is a UI presentation pattern that focuses on separating the UI (View) from its business layer (Model). The pattern separates responsibilities across three components: the view is responsible for rendering UI elements, the controller is responsible for responding to UI actions, and the model is responsible for business behaviors and state management. In most implementation all three components can directly interact with each other and in some implementations the controller is responsible for determining which view to display.

Model View Presenter(MVP)

The MVP pattern is a UI presentation pattern based on the concepts of the MVC pattern. The pattern separates responsibilities across four components: the view is responsible for rendering UI elements, the view interface is used to loosely couple the presenter from its view, the presenter is responsible for interacting between the view/model, and the model is responsible for business behaviors and state management. In some implementations the presenter interacts with a service (controller) layer to retrieve/persist the model. The view interface and service layer are commonly used to make writing unit tests for the presenter and the model easier.

Key Benefits

Before using any pattern a developers needs to consider the pros and cons of using it. There are a number of key benefits to using either the MVC or MVP pattern (See list below). But, there also a few draw backs to consider. The biggest drawbacks are additional complexity and learning curve. While the patterns may not be appropriate for simple solutions; advance solutions can greatly benefit from using the pattern. I'm my experience have seen a few solutions eliminate a large amount of complexity but being re-factored to use either pattern.

- **Loose coupling** – The presenter/controller are an intermediary between the UI code and the model. This allows the view and the model to evolve independently of each other.
- **Clear separation of concerns/responsibility**
 - UI (Form or Page) – Responsible for rendering UI elements

Presenter/controller – Responsible for reacting to UI events and interacts with the model

Model – Responsible for business behaviors and state management
Test Driven – By isolating each major component (UI, Presenter/controller, and model) it is easier to write unit tests. This is especially true when using the MVP pattern which only interacts with the view using an interface.

- **Code Reuse** – By using a separation of concerns/responsible design approach you will increase code reuse. This is especially true when using a full blown domain model and keeping all the business/state management logic where it belongs.
- **Hide Data Access** – Using these patterns forces you to put the data access code where it belongs in a data access layer. There are a number of other patterns that typically works with the MVP/MVC pattern for data access. Two of the most common ones are repository and unit of work. (See Martin Fowler – Patterns of Enterprise Application Architecture for more details)
- **Flexibility/Adaptable** – By isolating most of your code into the presenter/controller and model components your code base is more adaptable to change. For example consider how much UI and data access technologies have changed over the years and the number of choices we have available today. A properly designed solution using MVC or MVP can support multiple UI and data access technologies at the same time.

Key Differences So what really are the differences between the MVC and MVP pattern. Actually there are not a whole lot of differences between them. Both patterns focus on separating responsibility across multiple components and promote loosely coupling the UI (View) from the business layer (Model). The major differences are how the pattern is implemented and in some advanced scenarios you need both presenters and controllers.

Here are the key differences between the patterns:

1. **MVP Pattern**
 - View is more loosely coupled to the model. The presenter is responsible for binding the model to the view.
 - Easier to unit test because interaction with the view is through an interface
 - Usually view to presenter map one to one. Complex views may have multiple presenters.
2. **MVC Pattern**
 - Controller are based on behaviors and can be shared across views
 - Can be responsible for determining which view to display

Further More Research on topic to choose best pattern

Further research and also using the term "twisting the triad" will result in a couple of interesting articles to read that always addresses your question.

The most often heard result is this:

1. Do you develop a **web application**? Learn about **MVC**.
2. Do you develop a **winform application**? Learn about **MVP**.
3. Do you develop a **WPF application**? Learn about **MVVM**.

A2: You're definitely not required to use an MVC or MVP framework when writing a web app. People still write apps using nothing more than jQuery. However, many popular frameworks like angular 1, backbone, and knockout do make use of models, views, and/or controllers or some subset of them so it's probably good to know.

As for the benefits, it comes down to maintainability. As applications grow larger they become difficult to modify successfully without some sort of overarching structure to keep things consistent and to ensure good practices are used. Frameworks like angular provide you with this out of the box by using proven and well understood concepts like MVC. Without this you'll eventually have to come up with your own patterns and subsystems, which while doable, can take a lot of time and effort. Either that, or your app buckles under its own weight.

If you're new to development it's difficult to get an appreciation for this without working on a large project and seeing how crazy things get without some structure. I'm not sure it's something you can learn in a vacuum or that you need to concern yourself with too much right now. Eventually it will become painfully obvious to you why it's important.

A3: As mentioned above, it has a lot to do with the ease of maintaining the code as it grows but that's not all.

A framework such as AngularJS allows you to change the way you build sites by applying the MVC methodology. When working with AngularJS is important to shift paradigms from manipulating the DOM to describing the desired effect and watching it happen.

With MVC each component is kept separate which makes testing them a lot easier. The separation and modular nature of this patterns allows for greater flexibility and allows bigger apps to grow at a faster rate without loosing quality.

A great tutorial on AngularJS can be found
at : https://m.youtube.com/playlist?list=PLYxzS_5yYQmX2bItSRCqwiQZn5dIL1gt

365. <https://stackoverflow.com/questions/15368150/service-to-directly-push-or-business-logic-to-handle/15368457#15368457>

T: Service to Directly Push or Business Logic to Handle

Q: Update:

Essentially rather then have Server A's Service write directly to the database, or data table. Have the Service assign values to a series of Properties within the Business Logic. So that all the calculations and data access will be done directly on Server B.

Something that may not have been clear, Server A is the client that is consuming the Service.

So I have a unique quandary, that is what would be the standard way to handle this particular issue. I'm currently faced with an option to use a *Service* or *Inner Logic*. The scenario:

- Two Servers
- Server A: Pushes request to Server B.
- Server B: Takes these request and variables and implements the Business Logic.
- Server B: Is going to be creating relational data access anyways so its doubling workload.

The dilemma is I'm unsure of the *standard* or *best* way to handle this. What I mean, is it better to have *Server A Datamap* directly to the Database? Or is it more viable to have *Server A Store to Properties* then let the inner logic handle it?

The reason I'm asking is obviously solution one will result in rapid development, but will encounter issues in the future or just poor performance.

Such as:

- Server B: Will persistently be filling *Data Tables*
- Server B: All of the persistence at this point will be from it's own retrieval of data from the database.
- Will make it hard to refactor possibly as the project grows.

Those are my initial concerns, so I was leaning towards option two. But as I stated I'm not sure if my mindset is following the norm or standard.

To avoid this being considered a debate;

Do the short comings of option one, tend to impact the fluidity of any project as complexity grows? Will the implementation of option two be more feasible, as I can implement a better commonality of access directly to the Data Access Layer?

Thank you for that help, hopefully I clear expressed myself accordingly to where this makes sense. If not please throw a comment so I may edit accordingly.

A: To a certain degree "it depends". From a particular functional standpoint, whatever works is correct.

You many have many non-functional or design requirements that come into play that might restrict or guide a particular implementation. For example, if your design is supposed to be Service Oriented (SOA) then each server is supposed to be autonomous. This means they *shouldn't* share a database (they shouldn't even share a schema). In cases like this message-orientation is generally a good pattern to go with. You might want to look things like the consumer/producer pattern and message-oriented middle-ware like queues or service buses. In which case Server A would push a message (Command) to Server B which would process it. You might use Request/Reply pattern to get a "reply" back to Server A. Or, Server B might simply send another message (Event) back to A to tell it it's done the work.

update:

The "data" that Server B uses would entirely be sent to it from B in the message.

366. <https://stackoverflow.com/questions/15108815/im-remaking-a-little-app-to-better-use-mvc-pattern-on-ios/15109025#15109025>

T: I'm remaking a little app to better use MVC pattern on iOS

Q: I know there are similar questions, and I've read a lot of them, but I still have some questions.

I have an app that I made earlier, without designing it for MVC. As a result, I have a lot of logic in my controllers. The question I now have is basically; what goes where?

Here is basically my understanding;

Views - Views only display the view with all its information. They receive events triggered by the user and pass them to the controller. It is the only thing a view does.

Controllers - A controller receives events from its view and decides what to do with it. If it needs any data, it asks its model, which returns the needed data. The controller then passes the data to the view, which presents it. The controller does not do any manipulation with the data, the data is ready to be presented when received from the Model. Controllers only pass along messages and put information into the right elements in the view, they do not contain any business logic.

Models - The model is responsible for handling all the data related to its controller. It does not talk with a database directly, but through a data store/dbhandler/etc. Here all the logic for manipulating the data happens, and when the data is ready to be presented it is passed to the controller. Methods like loadStuff and saveStuff is located here.

Is this the correct way of dividing the responsibilities in iPhone?

A: The Model-View-Controller (MVC) design pattern assigns objects in an application one of three roles: model, view, or controller. The pattern defines not only the roles objects play in the application, it defines the way objects communicate with each other. Each of the three types of objects is separated from the others by abstract boundaries and communicates with objects of the other types across those boundaries. The collection of objects of a certain MVC type in an application is sometimes referred to as a layer—for example, model layer.

MVC is central to a good design for a Cocoa application. The benefits of adopting this pattern are numerous. Many objects in these applications tend to be more reusable, and their interfaces tend to be better defined. Applications having an MVC design are also more easily extensible than other applications. Moreover, many Cocoa technologies and architectures are based on MVC and require that your custom objects play one of the MVC roles.

Model Objects

Model objects encapsulate the data specific to an application and define the logic and computation that manipulate and process that data. For example, a model object might represent a character in a game or a contact in an address book. A model object can have to-one and to-many relationships with other model objects, and so sometimes the model layer of an application effectively is one or more object graphs. Much of the data that is part of the persistent state of the application (whether that persistent state is stored in files or databases) should reside in the model objects after the data is loaded into the application. Because model objects represent knowledge and expertise related to a specific problem domain, they can be reused in similar problem domains. Ideally, a model object should have no explicit connection to the view objects that present its data and allow users to edit that data—it should not be concerned with user-interface and presentation issues.

Communication: User actions in the view layer that create or modify data are communicated through a controller object and result in the creation or updating of a model object. When a model object changes (for example, new data is received over a network connection), it notifies a controller object, which updates the appropriate view objects.

View Objects

A view object is an object in an application that users can see. A view object knows how to draw itself and can respond to user actions. A major purpose of view objects is to display data from the application's model objects and to enable the editing of that data. Despite this, view objects are typically decoupled from model objects in an MVC application.

Because you typically reuse and reconfigure them, view objects provide consistency between applications. Both the UIKit and AppKit frameworks provide collections of view classes, and Interface Builder offers dozens of view objects in its Library.

Communication: View objects learn about changes in model data through the application's controller objects and communicate user-initiated changes—for example, text entered in a text field—through controller objects to an application's model objects.

Controller Objects

A controller object acts as an intermediary between one or more of an application's view objects and one or more of its model objects. Controller objects are thus a conduit through which view objects learn about changes in model objects and vice versa. Controller objects can also perform setup and coordinating tasks for an application and manage the life cycles of other objects.

Communication: A controller object interprets user actions made in view objects and communicates new or changed data to the model layer. When model objects change, a controller object communicates that new model data to the view objects so that they can display it.

367. <https://stackoverflow.com/questions/46087915/what-do-we-mean-by-functional-context-in-web-services/46164702#46164702>

T: What do we mean by functional context in web services

Q: What do we mean by "functional context" in web services .

Each service is assigned its own distinct functional context and is comprised of a set of capabilities related to this context

A: In short do one thing and do it well, sort of. Typically in SOA you would have lots of different services each dealing with its own context. For example in a sales system you might have a customer, sales rep and orders service. In a banking architecture you could have customers, products, financial instruments and transaction(debit,credit) services.

One of the interesting capabilities of SOA is that once you have lots of small different services you can start to add functionality the architecture by orchestration of other services. Permit me to use an analogy here. Start thinking of services as lego blocks. They are one piece, one shape and nothing more. You can create a house, a car or anything else with the blocks.

So the functional context is the subject/target of the service. For example in banking we would have a customer service. The capabilities of the customer service means that we have operations relating to that service only. For example create customers, find a list of customers by area, update details etc. YOu would never create a new financial instrument via the customer service.

The idea is to divide all your objects in the problem domain into their own context and develop the capabilities for these object in that context.

One issue that can arise from not sticking to this design pattern is that you have end up with services that have strange operations such as having a customer with a create financial instrument operation. This is incorrect as the customer might be associated with a financial instrument(their saving account, credit card etc) but it is not the owner of the instrument.

Basically all it is saying is that if you create a service it should deal with one area of concern only, and only have operations relating to this concern.

Keep in mind there is nothing to tell you what these contexts are. This is part of the design process you decide on the context.

368. <https://stackoverflow.com/questions/40827678/difference-between-webservice-and-enterprise-service-bus/40828421#40828421>

T: Difference between Webservice and Enterprise Service Bus

Q: I want to know the difference between Webservice and Enterprise Service Bus (Ex- Mule). I didn't get much information from the internet when I googled for it.

According to my understanding Enterprise Service Bus is used for integrating Service so that any other application can use and invoke or integrate. Web service is one of the ways used in Enterprise Service Bus.

Please help me understand. Thanks for your help.

A: First, some general terms:

Service is a general term for exposed functionality that can be invoked from outside consuming applications. Most often services are exposed by the integration layer of applications. Services can be Web Service - SOAP-based, REST etc, so WebService is a subtype of service using SOAP. Connecting all applications to each other does not scale well (communication channels grow exponentially as you add more and more applications to your environment) and this leads to expensive maintenance in the long term. This is why we are using middleware software (ESB being a type of middleware) as the sole point where application services are exposed.

So what is the difference between Service and ESB?

Services "live" on the ESB. They often represent particular functional contexts - for example business context of Customers, Orders. So, if you need to fetch customer info, you don't go directly to the CRM application, you send a request to the ESB service that provides this functionality. Thus you don't need to know anything about the CRM itself.

ESB in practice is a middleware (the integration backbone if you will) that provides the technical infrastructure and tools to easily host and implement services including:

- Routing mechanisms
- Connectors and bridges for different protocols
- Listeners for different events
- Means to implement different communication models
- Data and model transformation means
- Asynchronous queuing
- Monitoring, logging
- Policy centralisation
- etc.

Using a middleware greatly reduces the number of point to point connections between systems, and also leads to better isolation and low level of coupling, which means more agility when you need to implement changes, switch between vendors and so on.

For more information on services I will suggest [see this article](#). The whole site is great and you may want to explore it. Also, you can see [representation of ESB as compound SOA design pattern](#), that you may find helpful.

A2: A Web service is a service offered by an electronic device to another electronic device, communicating with each other via the World Wide Web. The Web service typically provides an object-oriented Web-based interface to a database server, utilized for example by another Web server, or by a mobile application, that

provides a user interface to the end user. Another common application offered to the end user may be a mashup. Web services may use SOAP over HTTP protocol, allowing less costly interactions over the Internet than via proprietary solutions like EDI/B2B. Besides SOAP over HTTP, Web services can also be implemented on other reliable transport mechanisms like FTP.

An enterprise service bus (ESB) is implementing a communication system between mutually interacting software applications in a service-oriented architecture (SOA). It implements a software architecture as depicted on the right. As it implements a software architecture for distributed computing, it implements a special variant of the more general client-server model therefore also. Whereas in general any application using ESB can behave as server or client in turns. ESB promotes agility and flexibility with regard to high protocol-level communication between applications.

369. <https://stackoverflow.com/questions/16815957/differences-between-api-development-platform-e-g-apigee-and-esb/16863186#16863186>

T: Differences between API development platform e.g APIGEE and ESB

Q: Me and my team will be working on APIGEE which is an API development platform to expose some services in our application. I am going through their documentation and also trying to understand the need of APIGEE or any other API development platform like Mashery. One very good article on the need of API proxy as been very well explained in the given link, <http://api evangelist.com/2011/06/11/the-battle-for-your-api-proxy/>. One question that i am confused about is **What is the difference between APIGEE and any ESB like ALSB or Mule**. We know Apigee too supports message transformation via policies and protocols like http/https/soap. Can anyone please tell me the differences between the two? Does Esb support more protocols like SMTP/JMS etc.

A: Though API management definition is still evolving but API management is defined as transforming APIs to reach to your target audience [here is a good description - <http://searchcloudapplications.techtarget.com/definition/API-management>].

This technology has its root in SOA but different from ESB.

ESB is more for system-to-system integration but API tends to be securely exposing your internal systems in a managed fashion to wider audience - we call them "developers".

ESB tends to be equipped with many adapters and strong message oriented middleware for supporting different interaction patterns. It is also generally coupled with business process management software to automate internal processes by integrating multiple services or systems.

API management also does some integrations and orchestrations but focus is more simplifying the interfaces to easier consumption of the services - that's why it is always come with developer on-boarding capabilities, security , caching , api design , oauth etc.

Apigee gateway service [API management platform] has support for limited JMS and SMTP functionality serving our diverse customer base and our technology stack is capable of building other protocol support.

Many API management products [including Apigee gateway] also include API analytics to help you getting insight of API program and API traffic.

A2: Nowadays, APIGEE and Mule are direct competitors in the API management offering realm. In the case of Mule, there was a great transformation on the company, towards API-ification of all systems. Current Mule runtime is integrated with strong API management capabilities including analytics (functionalities from the former Mulesoft's API Gateway product, which was merged into the Mule runtime since v3.8.0), as well the usual ESB capabilities. Further info is available at [Mule dev doc site](#).

370. <https://stackoverflow.com/questions/8878670/how-do-you-partition-functionality-into-separate-services/8902601#8902601>

T: How do you partition functionality into separate services

Q: What is the best way to split a massive web application built with a standard web framework like Ruby on Rails or Django into small pieces and spread them across a large array of servers? If we consider a partitioning in RESTful services and a [service-oriented design](#) or architecture, then one could use one of the methods Paul Dix names in his book "Service-Oriented Design with Ruby on Rails":

- Partitioning on Logical Function
- Partitioning on Read/Write Frequencies
- Partitioning on Minimizing Joins
- Partitioning on Iteration Speed

Is it preferable to partition on logical function and business logic, to partition on Read/Write frequencies, or to partition on minimizing joins and database accesses? Another possible choice are different content types: IDs, (social) graphs, maps, files, images, etc. It is common for example to store images at Amazon S3 or to get maps using Google Maps. What are the best practices?

A: Maybe it is worth to take a look at the internet giants. Amazon and eBay are known for a service oriented approach. These are the internet giants which partition everything into services.

ebay: Randy Shoup explains a number of best practices at eBay to build large-scale Websites, for example in this presentation about [eBay's Architectural Principles](#) and the corresponding [article about lessons from eBay](#). Ebay partitions everything. Every problem is split into manageable chunks in multiple dimensions, by data, load, and/or usage pattern. The two basic partition patterns are (1) functional segmentation and (2) horizontal split, both database and application tier are first segmented by functionality, and second split horizontally. Randy says functional segmentation and functional decomposition is the most important method, related pieces of functionality belong together, while unrelated pieces of functionality belong apart. Paul Dix says the same in his book: "Generally, you want to partition services based on their logical function". [ebay's architecture](#) has about 200 groups of functionality aka "apps". The application tier which runs on 16,000 application servers is divided in [ebay's architecture](#) into 220 separate application pools (Selling, Searching, Viewing Items, Bidding, Checkout, ..). The ebay database tier has over a thousand different logical databases on 400 hosts, where the databases are segmented into functional areas. ebay has written their own ORM layer called Data Access Layer (DAL) which takes care of the the database splits.

Amazon: At Amazon, everything is divided in services. Service-oriented architecture (SOA) is the fundamental building abstraction for Amazon technologies. The [Amazon.com architecture](#) is not only divided in to services, even the developers at Amazon are organized in teams around services. Amazon is really an ecosystem of many internal start-ups which have their own data and their own API. A service is here something which is operated and owned by a small team of developers. The [Amazon.com platform](#) is made of hundreds of services, from primitive, low-level foundation services (Storage, Compute, Queuing, ..) to aggregated, high-level services like Identity Management, Content Generation & Discovery Product and Offers Management, Order Processing, Payments or Fulfillment & Customer Service. To construct a product detail page for a customer visiting Amazon.com, the software calls on between 200 and 300 services to present a highly personalized experience for that customer.

Twitter uses services which correspond to the different content types, IDs, graphs, URLs etc. It uses Snowflake for ID generation. [Snowflake](#) is the network service for generating unique ID numbers at high scale used. Twitter uses FlockDB as social graph storage. [FlockDB](#) is a distributed graph database for storing adjacency lists used by Twitter. It uses SpiderDuck to as URL fetcher. [SpiderDuck](#) fetches all URLs shared in Tweets in real-time, parses the downloaded content to extract metadata of interest and makes that metadata available for other Twitter services to consume within seconds.

371.<https://stackoverflow.com/questions/531451/three-tier-layered-application-using-wicket-spring-hibernate-how-would-you/531755#531755>

T: Three tier layered application using Wicket + Spring + Hibernate. How would you handle transactions?

Q: I'm thinking about using the **Open Session In View (OSIV)** filter or interceptor that comes with Spring, as it seems like a convenient way for me as a developer. If that's what you recommend, do you recommend using a filter or an interceptor and why?

I'm also wondering how it will mix with **HibernateTemplate** and if I will lose the ability to mark methods as **@Transactional(readOnly = true)** etc and thus lose the ability to get some more fine grained transaction control?

Is there some kind of best practice for how to integrate this kind of solution with a three tier architecture using Hibernate and Spring (as I suppose my decision to use Wicket for presentation shouldn't matter much)?

If I use OSIV I will at least never run into lazy loading exceptions, on the other hand my transaction will live longer before being able to commit by being uncommitted in the view as well.

A: It's really a matter of personal taste.

Personally, I like to have transaction boundaries at the service layer. If you start thinking SOA, every call to a service should be independent. If your view layer has to call 2 different services (we could argue that this is already a code smell) then those 2 services should behave independently of each other, could have different transaction configurations, etc... Having no transactions open outside of the services also helps make sure that no modification occurs outside of a service.

OTOH you will have to think a bit more about what you do in your services (lazy loading, grouping functionalities in the same service method if they need a common transactionality, etc ...).

One pattern that can help reduce lazy-loading error is to use Value Object outside of the service layer. The services should always load all the data needed and copy it to VOs. You lose the direct mapping between your persistent objects and your view layer (meaning you have to write more code), but you might find that you gain in clarity ...

Edit: The decision will be based on trade offs, so I still think it is at least partly a matter of personal taste. Transaction at the service layer feels cleaner to me (more SOA-like, the logic is clearly restrained to the service layer, different calls are clearly separated, ...). The problem with that approach is LazyLoadingExceptions, which can be resolved by using VO. If VO are just a copy of your persistent objects, then yes, it is clearly a break of the DRY principle. If you use VO like you would use a database View, then VO are a simplification of your persistent objects. It will still be more code to write, but it will make your design clearer. It becomes especially useful if you need to plug some authorization scheme : if certain fields are visible only to certain roles, you can put the authorization at the service level and never return data that should not be viewed.

A2: If I use OSIV I will at least never run into lazy loading exceptions
that is not true, in fact its extremely easy to run into the infamous LazyInitializationException, just load an object, and try to read an attribute of it, after the view, depending on your configuration you WILL get the LIE

372. <https://stackoverflow.com/questions/783974/how-to-implement-solid-principles-into-an-existing-project/784035#784035>

T: How to implement SOLID principles into an existing project

Q: I apologize for the subjectiveness of this question, but I am a little stuck and I would appreciate some guidance and advice from anyone who's had to deal with this issue before:

I have (what's become) a very large RESTful API project written in C# 2.0 and some of my classes have become monstrous. My main API class is an example of this -- with several dozen members and methods (probably approaching hundreds). As you can imagine, it's becoming a small nightmare, not only to maintain this code but even just **navigating** the code has become a chore.

I am reasonably new to the SOLID principles, and I am massive fan of design patterns (but I am still at that stage where I can **implement** them, but not quite enough to know when to **use** them - in situations where it's not so obvious).

I need to break my classes down in size, but I am at a loss of how best to go about doing it. Can my fellow StackOverflow'ers please suggest ways that they have taken existing code monoliths and cut them down to size?

A: **Single Responsibility Principle** - A class should have only one reason to change. If you have a monolithic class, then it probably has more than one reason to change. Simply define your one reason to change, and be as

granular *as reasonable*. I would suggest to start "large". Refactor one third of the code out into another class. Once you have that, then start over with your new class. Going straight from one class to 20 is too daunting.

Open/Closed Principle - A class should be open for extension, but closed for change. Where reasonable, mark your members and methods as virtual or abstract. Each item should be relatively small in nature, and give you some base functionality or definition of behavior. However, if you need to change the functionality later, you will be able to *add* code, rather than *change* code to introduce new/different functionality.

Liskov Substitution Principle - A class should be substitutable for its base class. The key here, in my opinion, is do to inheritance correctly. If you have a huge case statement, or two pages of if statements that check the derived type of the object, then you're violating this principle and need to rethink your approach.

Interface Segregation Principle - In my mind, this principle closely resembles the Single Responsibility principle. It just applies specifically to a high level (or mature) class/interface. One way to use this principle in a large class is to make your class implement an *empty* interface. Next, change all of the types that use your class to be the type of the interface. This will break your code. However, it will point out exactly how you are consuming your class. If you have three instances that each use their own subset of methods and properties, then you now know that you need three different interfaces. Each interface represents a collective set of functionality, and one reason to change.

Dependency Inversion Principle - The parent / child allegory made me understand this. Think of a parent class. It defines behavior, but isn't concerned with the dirty details. It's dependable. A child class, however, is all about the details, and can't be depended upon because it changes often. You always want to depend upon the parent, responsible classes, and never the other way around. If you have a parent class depending upon a child class, you'll get unexpected behavior when you change something. In my mind, this is the same mindset of SOA. A service contract defines inputs, outputs, and behavior, with no details.

Of course, my opinions and understandings may be incomplete or wrong. I would suggest learning from people who have mastered these principles, like Uncle Bob. A good starting point for me was his book, [Agile Principles, Patterns, and Practices in C#](#). Another good resource was [Uncle Bob on Hanselminutes](#).

Of course, as [Joel and Jeff pointed out](#), these are principles, not rules. They are to be tools to help guide you, not the law of the land.

EDIT:

I just found these [SOLID screencasts](#) which look really interesting. Each one is approximately 10-15 minutes long.

A2: There's a classic book by [Martin Fowler - Refactoring: Improving the Design of Existing Code](#).

There he provides a set of design techniques and example of decisions to make your existing codebase more manageable and maintainable (and that what SOLID principals are all about). Even though there are some standard routines in refactoring it is a very custom process and one solution couldn't be applied to all project.

Unit testing is one of the corner pillars for this process to succeed. You do need to cover your existing codebase with enough code coverage so that you'd be sure you don't break stuff while changing it. Actually using modern unit testing framework with mocking support will lead encourage you to better design.

There are tools like ReSharper (my favorite) and CodeRush to assist with tedious code changes. But those are usually trivial mechanical stuff, making design decisions is much more complex process and there's no so much tool support. Using class diagrams and UML helps. That what I would start from, actually. Try to make sense of what is already there and bring some structure to it. Then from there you can make decisions about decomposition and relations between different components and change your code accordingly.

Hope this helps and happy refactoring!

A3: It will be a time consuming process. You need to read the code and identify parts that do not meet the SOLID principles and refactor into new classes. Using a VS add-in like Resharper (<http://www.jetbrains.com>) will assist with the refactoring process.

Ideally you will have good coverage of automated unit tests so that you can ensure your changes do not introduce problems with the code.

More Information

In the main API class, you need to identify methods that relate to each other and create a class that more specifically represents what actions the method performs.

e.g.

Let's say I had an Address class with separate variables containing street number, name, etc. This class is responsible for inserting, updating, deleting, etc. If I also needed to format an address a specific way for a postal address, I could have a method called GetFormattedPostalAddress() that returned the formatted address.

Alternatively, I could refactor this method into a class called AddressFormatter that takes an Address in its constructor and has a Get property called PostalAddress that returns the formatted address.

The idea is to separate different responsibilities into separate classes.

A4: What I've done when presented with this type of thing (and I'll readily admit that I haven't used SOLID principles before, but from what little I know of them, they sound good) is to look at the existing codebase from a connectivity point of view. Essentially, by looking at the system, you should be able to find some subset of functionality that is internally highly coupled (many frequent interactions) but externally loosely coupled (few infrequent interactions). Usually, there are a few of these pieces in any large codebase; they are candidates for excision. Essentially, once you've identified your candidates, you have to enumerate the points at which they are externally coupled to the system as a whole. This should give you a good idea of the level of interdependency involved. There usually is a fair bit of interdependency involved. Evaluate the subsets and their connection points for refactoring; frequently (but not always) there ends up being a couple of clear structural refactorings that can increase the decoupling. With an eye on those refactorings, use the existing couplings to define the minimal interface required to allow the subsystem to work with the rest of the system. Look for commonalities in those interfaces (frequently, you find more than you'd expect!). And finally, implement these changes that you've identified.

The process sounds terrible, but in practice, it's actually pretty straightforward. Mind you, this is not a roadmap towards getting to a completely perfectly designed system (for that, you'd need to start from scratch), but it very certainly will decrease the complexity of the system as a whole and increase the code comprehensibility.

373. <https://stackoverflow.com/questions/167517/naked-objects-good-or-bad>

T: Naked Objects. Good or Bad

Q: I have recently been exposed to naked objects. It looks like a pretty decent framework. However I do not see it in widespread use like say, Spring. So why is this framework not getting any mainstream application credit. What are its shortcomings as you see?

A: From my experience using NOF 3.0.3...

The good:

- Automagically generates an DnD UI for your domain objects, like what db4o does for persistence.
- This is what MVC was always meant to be, according to the MVC pattern creator.
- The framework only asks your domain objects (POJOs) to be subclassed from AbstractDomainObject that's all the minimum wiring.
- The framework favors convention OVER configuration: lots of annotations no freaking XML config files.
- Works great for prototyping along with db4o for persistence.
- Out of the box functionality for Hibernate.
- In my case, I required like 30 mins from Download to Hello world app. (IntelliJ IDEA IDE)
- Deployment as JNLP, standalone, Web (NOX embedded Jetty or Scimpi flavor) and Eclipse RCP.
- The NOF team is ALWAYS there for you when you ask for help in the forums.
- The Naked Object Pattern is an awesome idea, do yourself a favor and take your time to grok it.
- There's a lot of usability flaming going on around the Drag and Drop GUI, but if your prospective end users simply *can't* work with the DnD UI then you are in deep trouble anyway.

The bad:

- None that I can think of.

The kinda ugly:

- No Swing components allowed, so say goodbye to JGoodies and all your favorite Swing component sets. The UI components are custom made; to get you an idea they look like early 90's VB controls. But there's a SWT port in the works.
- The multiline line field for long strings has some issues. (NOF 3.0.3)
- DnD UI for images is kinda buggy.
- The validation code for getters n setters only fires if the domain object is modified from the UI. (This is probably wrong due to my n00bness, lets hope a NOF committer corrects me)
- If an object is modified from a non-ui thread, lets say a b.g. worker, such object will not update its view on screen. This invalidates a use case such as representing a mail queue in real time on the DnD autogenerated UI. (Again)

A2: I've been working on the naked objects approach for over a year now and I haven't even begun to scratch the surface of the possibilities it provides for your system's architecture. To properly utilize it though, it requires that you create a paradigm shift and seek out full OO solutions and revert from resorting to functional duck tapes, because the paradigm seems to work only when you create a design that would allow for high-level development.

Having said that, I absolutely love how Django has implemented naked objects within it's Django Models. Most of the things I love about the framework have been, what I come to believe, a direct result of it's models and there are some wows off the top I'd like to share about the architecture:

Model fields, that map to table columns, are behaviorally complete objects--they know how they're represented in both the application and database domain, how they're converted between the two and how the information they hold is validated and displayed to the user visually for inputs. All of this utilized with a single line of code in your model. **Wow!**

Managers are attached to models and provide CRUD and any generic operations on collections, such as reusable queries (give me the last five blog posts, most occuring tags, etc.), mass delete\update operations, and business logic performed on instances. **Wow!**

Now consider you have a model that represents a user. Sometimes, you'd only like to have a partial view of all the information a user model holds (when resetting a user's password you may only need the user's email and his secret question). They've provided a Forms API that exactly displays and manages inputs for only parts of the model data. Allows for any customization of the what/how in handling user input. **Wow!**

The end result is that your models are only used to describe what information you use to describe a particular domain; managers perform all the operations on models; forms are used for creating views and for handling user inputs; controllers (views) are only there for handling HTTP verbs and if they work with models it's solely through managers and forms; views (templates) are there for the presentation (the part that can't be automatically generated). This, imho, is a very clean architecture. Different managers can be used and reused across different models, different forms can be created for models, different views can use different managers. These degrees of separation allow you to quickly design your application.

You create a ecosystem of intelligent objects and get a whole application from the way they're interconnected. With the premise that they're loosely coupled (lot's of possibilities for letting them communicate in different ways) and can be easily modified and extended (a few lines for that particular requirement), following the paradigm you really do get an architecture where you a component write once and then reuse it throughout your other projects. It's what MVC should have always been, yet I've often had to write something from scratch even though I did the same thing a few projects ago.

A3: It has been successfully used [here in Ireland](#).

I think reasons why it hasn't been more popular are:

- You need a lot of confidence in the toolkits you are using
- It makes the GUI a risk factor instead of a no-brainer (both technically and in usability testing)

- Its not applicable to the web (as far as I know), which is where most of the focus is as present...

A4: I've only just seen this. A couple of minor corrections, otherwise most of the comments are very fair.

1) 'The framework only asks your domain objects (POJOs) to be subclassed from AbstractDomainObject thots all the minimum wiring.'

Naked Objects does not require the domain objects to be subclassed from AbstractDomainObject, although that is typically the most convenient thing to do.

If you don't want to inherit, all you need to do is provide a property of type IDomainObjectContainer, and the framework will then inject an container into your objects when they are created or retrieved. The container has methods for Resolve(), ObjectChanged() and NewTransientInstance(), which are the three minimalist points of contact with the framework that you must use, so that the framework remains in synch with your domain objects.

2) 'Works great for prototyping along with db4o for persistence'. We're quite keen on the idea of working with db4o, but I'm not aware of anyone who has made Naked Objects and db4o play together. If anyone has done this, I'd like to hear more about it.

3) 'The general model of citizen programmer as espoused in the smalltalk and naked object communities ...'. We have never espoused that idea, and I don't agree with it. Naked Objects is NOT about encouraging users to program. I believe firmly in the role of the professional developer - Naked Objects just helps them to write better software and more productively.

A5: I guess NakedObject definitely has its relevance and its more than time that developer community refocuses on what is really paying them: the business. Instead, we mostly spend our time with infrastructure, protocols and all that technical crap. I have seen such miss constructed applications and I even did some myself following the mainstream, teaching you that layering a system is always a good thing to do. The worst thing is that if you ask some developers about what kind of business the company they are working for does, you'll find at least some who worked for the company for years without gaining a deeper understanding of the business. However, I don't believe that NakedObject will attract a vast majority of developers (even those who are inspired from DomainDrivenDevelopment) simply because people love to construct UIs and taken that job away from them, directing their work towards businesses needs, is simply not what they want: We are all VB jerks.

374. <https://stackoverflow.com/questions/141912/alternatives-to-the-mvc/1623930#1623930>

T: Alternatives to the MVC

Q: What are the alternative "design methods" to the Model View Controller? MVC seems to be popular (SO was built with it, I know that much) but is it the only method used?

A1: There are many others:

- [Model View Presenter \(MVP\)](#)
 - [Supervising Controller](#)
 - [Passive View](#)
- [Model View ViewModel \(MVVM\)](#)
 - This is common in WPF applications (though [Prism](#) uses the MVP pattern (usually))

A2: One of the best write-ups of several different Interactive Application Architecture Patterns out there, is [this very detailed and well-researched blog-post](#). It covers Model-View-Controller, three different flavors of Model-View-Presenter, several different flavors of Presentation-Abstraction-Control, Supervising Controller, Passive View and Hierarchical MVC.

Another interesting pattern is the [Presenter First](#) pattern by Atomic Objects. It's not just a Design Pattern, it's also a Process Pattern. IOW: the name "Presenter First" is not arbitrary, it actually describes a development process, in which the Presenter gets written first, driving the design of the rest of the system

A3: MVC is an architectural pattern. These are the other Architectural patterns you can try (from Wikipedia):

- Layers
- Multi-tier Architecture
- Presentation Abstraction Control (PAC)
- Model View Presenter (MVP)
- Model View ViewModel (MVVM)
- Pipeline
- Implicit Invocation
- Blackboard System
- Peer-to-Peer
- Service Oriented Architecture (SOA)
- Naked Objects

These are available [here in Wikipedia](#).

A4: MVC is part of a greater group of design patterns. I have no idea how much experience you have, so I'm not sure how to target this response. I'm a .NET programmer, but I found the Java book [Head First Design Patterns](#) extremely helpful. Design patterns are usually broken into groups with other patterns that help solve similar problems.

I also found the [Data Object Factory website](#) quite helpful as well. You should look around for some resources in your favorite language.

A5: How about flux.js from Facebook? I know it's platform dependent, but it's a data flow architecture used by FB as a replacement for MVC, so I believe you can get some ideas from there too.

375. <https://stackoverflow.com/questions/24496/what-alternatives-are-there-to-model-view-controller/3164232#3164232>

T: What Alternatives Are There to Model-View-Controller?

Q: While going through university and from following the development of SO, I've heard a lot about the Model-View-Controller architectural design pattern. I inadvertently used the MVC pattern even before I knew what it was, and still use it in my everyday job. From what I've seen, it's probably the most popular pattern used today. What I haven't heard much about though, are the alternative patterns you can use instead of MVC. What options are there, and for what reasons would you decide to use them over MVC? I'm also interested in knowing the types of systems they are typical of being used for. Finally, what are the pros and cons that come along with using them?

1. A: Passive View - <http://martinfowler.com/eaaDev/PassiveScreen.html>
2. Supervising Controller - <http://martinfowler.com/eaaDev/SupervisingPresenter.html>
3. Model-View-Presenter - <http://martinfowler.com/eaaDev/ModelViewPresenter.html>

My personal favorite is the *Passive View*. More testable than others I've seen including MVC.

A2: Some other architectural patterns including MVC.

Layered Systems

TCP/IP

Object-Oriented Organization

Model-View-Controller, Presentation-abstraction-control, Model View Presenter and Model View ViewModel.
Examples would be ASP.NET's MVC, Ruby on Rails, and bunch of others.

Event Based, Implicit invocation

Browser environment (DOM)

Pipe and filter architecture

Unix pipes

Repositories

Table Driven Interpreters

A3: I've occasionally seen MVC without the C, where the view listens for changes in the model's data and alters rendering accordingly, and where the methods in the model are bound to event handlers for the view.

For projects where the view is by necessity tightly couple with the data (such as when there are visual components that directly relate to the model or attributes of the model), this can be rather useful, as it cuts out the "middle man."

I think many would argue, though, that this is still MVC, just a hybridized version, and that the bindings established between the view and model are controller logic.

A4: Well, there's Model-View-Presenter, but I think you'll find that the most common "alternative" to MVC is really a lack of proper separation. As an extreme example, consider classic ASP pages where HTML, VBScript and SQL are found side-by-side in the same file. (That's not a bash of ASP — you'll find plenty of such examples in other languages.)

A5: Although the above answers are quite correct, I think it's much more important to note that the words "design pattern" are completely unknown to 90% of all people who create software. They just start writing code.

The challenge is not selecting the best design approach, it's convincing others that design has value.

A5: What about the [Observer](#) pattern. If I am not mistaken , MVC was introduced in Smalltalk and thereafter several publish/ subscribe patterns have come into picture.

The observer pattern (a subset of the publish/subscribe pattern) is a software design pattern in which an object, called the subject, maintains a list of its dependents, called observers, and notifies them automatically of any state changes, usually by calling one of their methods. It is mainly used to implement distributed event handling systems.

Ex : The Save button gets enabled in an editor, only when there is data to be saved. Another example of the observer pattern is Document View architecture in MFC, where the view gets updated when the document changes .

376.<https://stackoverflow.com/questions/13441918/can-one-class-implement-both-subject-and-observer-sections-of-the-observer-design/13442142#13442142>

T: Can one class implement both subject and observer sections of the observer design pattern?

Q: I'm designing an enemy framework for java and working with observer. I'm wondering if it is possible | worth the effort to have one class implement both observer and subject in java?

I want to have an enemy interface which implements both subject and observer so that the enemies within a certain distance of each other can alert each other if a player or enemy is sighted.

Is there a better pattern to use here?

A: I think one of these would be slightly more appropriate to use than observer pattern, depending on actually how you want to implement your framework:

- [Implicit Invocation](#)

- [Event-Driven](#)
- [Publish-Subscribe](#)

The trouble with subject / observer is that they involve registering / deregistering when your enemies move in / out of range of each other.

I would recommend implicit invocation or event-driven as follows:

- Each time an enemy sights a player, generate an "event" that gets broadcast to all other enemies.
- This event will have a coordinate to specify from where it was broadcasted.
- For each enemy that receives the event (which is all of them), look at the coordinate and see if it's within a certain range of itself
 - If not, ignore it (and pretend as if it never heard it)
 - If so, do something as required.

377. <https://stackoverflow.com/questions/4010265/how-to-let-nhibernate-retry-deadlocked-transactions-when-using-session-per-request/4957089#4957089>

T: How to let NHibernate retry deadlocked transactions when using session per request?

Q: What pattern/architecture do you use in a 3-tiered application using NHibernate that needs to support retries on transaction failures, when you are using the Session-Per-Request pattern? (as ISession becomes invalid after an exception, even if this is a deadlock or timeout or livelock exception).

378. <https://stackoverflow.com/questions/22186500/is-peer-to-peer-possible-with-pythons-asyncore>

T: Is peer to peer possible with python's asyncore?

Q: "This module provides the basic infrastructure for writing asynchronous socket service clients and servers." <http://docs.python.org/2/library/asyncore.html#module-asyncore>
If I want a non- client-server architecture, such as peer to peer, can asynchat/asyncore still do the job, or does it force a client-server paradigm?

A: By the very definition peer to peer implies direct connectivity, omitting the idea of central server (at least for the sake of sending data, it still may be used to set up users together for example). And peer to peer doesn't differ much from peer-server communication at its core - it's a socket communicating between A and B. Of course running it peer to peer instead via server comes with certain drawbacks, for example you will have to negotiate NAT between peers to figure out which one will be the host, and which one will connect to it. You also need something in place for the case where both users are behind NAT.

379. <https://stackoverflow.com/questions/12380587/can-anyone-give-me-a-sample-java-socket-programming-for-doing-a-peer-to-peer-for>

T: Can anyone give me a sample java socket programming for doing a peer to peer for 3 systems?

Q: I am doing an university project. I need some sample programs on peer to peer programs in java socket programming. Every where people are telling to add a server socket in the client program.

I am in a confusion. Can a single program having server socket and client socket will do or i have to create two programs of one initiating a system and another peer program running thrice to solve the problem. or

i need to create three programs for three peer systems. I am not clear on the architecture of building peer to peer programs using java sockets. Can some one help me giving a simple program on how to create a peer to peer connection between three systems.

I know how to do a socket program for client server model and clear on the concept. But creating a peer to peer architecture sounds complex for me to understand.

I also referred this thread.[developing peer to peer in java](#)

The person commented second says " To make peer2peer app each client opens server socket too. When client A wishes to connect to client B it just connects to its socket. "

Need some more sample and an explanation on how peer to peer java socket program works I dont want any external api like jxta to do this task. I need a clear picture on how it works alone with an example.

A: Can a single program having server socket and client socket will do
Yes. In fact, that is the normal way to implement a P2P application.

But creating a peer to peer architecture sounds complex for me to understand.

There is nothing particularly complicated. A peer-to-peer program is really just a client/server program that can fulfil *either* role. And the "architecture" word doesn't really add much here because there is no such thing as a generic "one size fits all" peer-to-peer architecture. The label "peer-to-peer" is really about the general characteristics of the system rather than about any specific architecture, framework or API. (Though frameworks and APIs do exist ...)

However, I came across this [introduction](#) that includes some example code in Java. I don't know if this approaches the problem starting at the socket level, but to be honest if you know how to develop socket-level client / server AND you understand concurrent programming, it is straight-forward programming to put the two together to give you simple P2P.

380.<https://stackoverflow.com/questions/10801673/peer-to-peer-spreadsheet-application-in-java>

T: Peer to peer spreadsheet application in Java

Q: I have a college project where I need to extend an existing spreadsheet application ([CleanSheets](#) - open source).

Right now, it's just a simple spreadsheet application. What I was asked to implement is a menu option that allows a user to share a sheet (i.e. the user selects 'share a sheet' - it's the current one - and then selects the area that they wish to share: A1:A9, for example). Then they can specify a local port and the share is created.

The other users who wish to connect to that share will have to know the machine's IP and the port to connect. Once they input that info under a menu option called 'join a shared sheet' then that shared area will appear in their current sheet, and they are free to edit and view what others are typing in those cells.

Everyone has read/write access - that must be controlled by threads (because we can have 1 person sharing and 3 peers connected to that sheet, all viewing the changes and making their own). Multiple exclusion will have to be guaranteed (this can be done with Semaphores and/or Reentrantlocks).

The sharing implementation has to implemented in a peer to peer architecture.

Now my question is: how to I start developing with sockets in Java? I've read some documentation in Java, especially about JXTA, but that's most likely not what I need. I don't need a complex P2P application, just that sharing ability.

I'm assuming I need to use UDP (because TCP is mostly server-client, and anyone can be a server or a client here) and I don't need packet control. I already know about sockets in C. Which classes should I use in Java related to sockets?

A: java.io and java.net have some useful classes you might want to look at. This is a pretty simplified example because I've ignored catching/throwing but hopefully it'll sort of show what you can do for tx/rx.

write bytes ought to be able to take in something serializable.

381.<https://stackoverflow.com/questions/8158354/is-it-helpful-to-use-zeromq-to-build-a-peer-to-peer-workload-scheduler>

T: Is it helpful to use ZeroMQ to build a peer-to-peer workload scheduler?

Q: I am coding a workload scheduler. I would like my piece of software to be a peer-to-peer scheduler, ie. a node only knows some neighbours (other nodes) and use them to reach other nodes.

Each node would have its own weighted-routing table to send messages to other peers (basically based on the number of hops), ie. "I want the master to give me my schedule" or "is resource A available on node B ?" : which neighbor is the closest to my target ?

For instance I have written my own routing protocol using XML-RPC (xmlrpc-c) and std::multimaps / std::maps. I am thinking of using ZeroMQ to optimze my data streams :

- queueing can reduce the network load between peers ;
- subscriptions can be used to publish upgrades.

As a consequence :

- I would need to open as many sockets as I would create new types of connections ;
- Each node would need to be a client, a server, a publisher, a subscriber, a broker and a directory ;
- I am not sure that my "peer-to-peer architecture" is compatible with the main purpose of ZeroMQ.

Do you think that ZeroMQ can be a helpful concept to use ?

A: It would be helpful to know exactly what you mean by "routing protocol". That sounds like you mean the business logic of routing to a particular peer. Knowing more fully what you're looking to achieve with ZeroMQ would also be helpful.

Have you read the [ZeroMQ Guide](#)? ZeroMQ is a pretty different beast and without spending some time to play with it, you'll likely find yourself confused. As a bonus, reading the guide will also help you answer this question for yourself, since you know your requirements better.

ZeroMQ was designed to build robust distributed and multi-threaded applications. Since distributed applications can often take the form of "peer-to-peer", ZeroMQ could indeed be a good fit for your needs.

382. <https://stackoverflow.com/questions/40815433/how-to-get-the-portnumber-used-by-a-host-in-a-peer-to-peer-network>

T: How to get the portNumber used by a host in a peer to peer network

Q: So I am working on a poker game that is using a peer-to-peer network architecture for a school project. Right now I am currently working on the whole multiplayer element of the game and I am designing my peers to be connecting a ring style format such as what is seen below

A: I've only just seen this. A couple of minor corrections, otherwise most of the comments are very fair.

1) 'The framework only asks your domain objects (POJOs) to be subclassed from AbstractDomainObject thats all the minimum wiring.'

Naked Objects does not require the domain objects to be subclassed from AbstractDomainObject, although that is typically the most convenient thing to do.

If you don't want to inherit, all you need to do is provide a property of type IDomainObjectContainer, and the framework will then inject an container into your objects when they are created or retrieved. The container has methods for Resolve(), ObjectChanged() and NewTransientInstance(), which are the three minimalist points of contact with the framework that you must use, so that the framework remains in synch with your domain objects.

2) 'Works great for prototyping along with db4o for persistence'. We're quite keen on the idea of working with db4o, but I'm not aware of anyone who has made Naked Objects and db4o play together. If anyone has done this, I'd like to hear more about it.

3) 'The general model of citizen programmer as espoused in the smalltalk and naked object communities ...'. We have never espoused that idea, and I don't agree with it. Naked Objects is NOT about encouraging users to

program. I believe firmly in the role of the professional developer - Naked Objects just helps them to write better software and more productively.

A2: Probably the reason it hasn't gotten more attention is that the J2EE world has become so used to piling on so many layers onto an application, that naked objects comes across as naive.

Where are our services? You mean that any naked object gives me immediate access to the database? What if we needed to expose the application with RMI calls?

Plus there isn't as much to market, because it puts the burden of developing a successful application squarely on the application developers not the framework developers :)

A3: Gareth makes some excellent points.

There are other issues, such as the fact that it's hard to control the look and feel, and they are counter-intuitive to people who have become used to the window model. There is also something of a modelling issue, in that not all application domains lend themselves well to direct object representation.

The general model of 'citizen programmer' as espoused in the smalltalk and naked object communities also comes to bear as a questionable idea. Most users don't seem to be hugely bothered with changing the functionality themselves, so thinking in objects is not that useful.

383. <https://stackoverflow.com/questions/3831771/what-good-patterns-for-a-web-framework-are-out-there/3831842#3831842>

T: What good patterns for a web framework are out there?

Q: What are design patterns that would be useful for a web framework **besides MVC**, the Rails-induced frenzy? Not saying it's a bad thing, but it is now practically ubiquitous in web frameworks.

Ideally the pattern should make easier:

- **Separation of concerns**
- Modularity / reusability of code
- Unit testing

What patterns fit the bill? Are there example of frameworks out that follow it?

A: MVC is *not* a Rails-induced frenzy. It goes back to Smalltalk. You can check out the history in the GoF book as well, which pre-dates Rails.

I don't know about patterns beyond the GoF book, but I'd say that general ideas of layering (e.g., separate web, service, and persistence tiers) and decomposition apply regardless.

A2: The [Lift](#) web framework follows what its creators call [View First](#).

Where this differs from MVC is that control is handled first by the view, not by a controller. The view may call logic in several *snippets* (the closest to an analogue of controllers).

I see this as an inversion of RESTful design, where URLs are mapped to resources, and views are a way of displaying these resources. In View First, URLs map to views, which may pull out and display any arbitrary collection of resources.

The reasoning behind this is that often, a page on a web site or application needs to display much more than simply the resource that was requested: it might have a list of recent blog comments, a 'shout box', et cetera. Other frameworks handle this by having secondary mechanisms for showing content and handling input (such as Django's template inclusion tags and middleware), and leaving the controller* to handle the primary resource that the page is displaying.

(* It's tricky to involve Django in discussions like this because essentially it is MVC, although for subtle reasons its creators use the terms Model-View-Template. Here, though, I will call Django's *view* a *controller*.)

A3: Have you looked at [MVP](#)?

It's a well-known alternative to MVC, and is covered in many of the "well-known" pattern books.

You can read [here](#) that Martin Fowler has actually split the MVP into two patterns.

Here is one [MVP framework for PHP](#).

And here is [one for .NET](#).

It's worth noting that the .NET guys responsible for MVC were also influenced by django, not just rails.

A4: Naked Objects

<http://www.nakedobjects.net/home/index.shtml>

I should clarify that this uses MVC but in a very different way

A5: Although MVVM (or DM-V-VM) was already mentioned, there is a good series about it on the [MSDN network](#) (although it mainly concerns WPF). If you're looking for another DM-V-VM example, I happen to have written a [PHP framework](#) largely following the pattern.

Furthermore, I believe there are quite a lot of different interpretations of MVC in web application development. Just compare the ideas (regarding MVC) behind [Apache Struts](#) and [CakePHP](#) for instance. I haven't used RoR, but I would look further than just RoR to get a good view on MVC (again, in web app dev ;).

384. <https://stackoverflow.com/questions/746565/why-is-ui-programming-so-time-consuming-and-what-can-you-do-to-mitigate-this/746591#746591>

T: Why is UI programming so time consuming, and what can you do to mitigate this?

Q: In my experience, UI programming is very time consuming, expensive (designers, graphics, etc) and error prone - and by definition UI bugs or glitches are very visible embarrassing.

What do you do to mitigate this problem?

Do you know of a solution that can automatically convert an API to a user interface (preferably a Web user interface?).

Probably something like a JMX console

- with good defaults
- can be tweaked with css
- where fields can be configured to be radio button or drop down list, text field or text area, etc
- localizable
- etc

A: Developing UI is time consuming and error-prone because it involves [design](#). Not just visual or sound design, but more importantly interaction design. A good API is always interaction model neutral, meaning it puts minimal constraints on actual workflow, localisation and info representation. The main driver behind this is encapsulation and code re-use.

As a result it is impossible to extract enough information from API alone to construct a good user interface tailored to a specific case of API use.

However there are UI generators that normally produce [CRUD](#) screens based on a given API. Needless to say that such generated UI's are not very well-suited for frequent users with demands for higher UI efficiency, nor are they particularly easy to learn in case of a larger system since they don't really communicate system image or interaction sequence well.

It takes a lot of effort to create a good UI because it needs to be designed according to specific user needs and not because of some mundane API-UI conversion task that can be fully automated.

To speed the process of building UI up and mitigate risks it is possible to suggest either involving UI professionals or learning more about the job yourself. Unfortunately, there is no shortcut or magic wand, so to speak that will produce a quality UI based entirely and only on an API without lots of additional info and analysis.

Please also see an excellent question: "[Why is good UI design so hard for some developers?](#)" that has some very insightful and valuable answers, specifically:

- Shameless plug for [my own answer](#).
- [Great answer](#) by Karl Fast.

A2: I don't believe UI programming is more time consuming than any other sort of programming, nor is it more error prone. However, bugs in the UI are often more obvious. Spotting an error in a compiler is often much more tricky.

One clear difference between UI programming is that you have a person at the other end, instead of another program, which is very often the case when you're writing compilers, protocol parsers, debuggers, and other code which talks to other programs and computers. This means that the entity you're communicating with is not well-specified and may behave very erratically.

EDIT: "unpredictable" is probably a more appropriate term. /Jesper

Your question of converting an API to a user interface just doesn't make sense to me. What are you talking about?

A3: Looks like you are looking for the 'Naked Objects' Architectual pattern. There are various implementations available.

http://en.wikipedia.org/wiki/Naked_objects

A4: I'm not providing a solution, but I'll attempt to answer the why.

So I don't speak for everyone, but for me at least, I believe one reason is because programmers tend to concentrate on functionality more so than usability and they tend not to be too artistic. I think they just tend to have a different type of creativity. I find that it takes me a long time to create the right graphics, compared to how long it takes me to write the code (Though, for the most part, I haven't done any projects with too many graphical requirements).

A5: You are absolutely correct when you say that UI is time consuming, costly and error prone!

A great compromise I have found is as follows...

I realized that a lot of data (if not most) can be presented using a simple table (such as a JTable), rather than continuously try to create custom panels and fancy GUI's. It doesn't seem obvious at first, but it's quite decent, usable and visually appealing.

Why is it so fast? Because I was able to create a reusable framework which can accept a collection of concrete models and with little to no effort can render all these models within the table. So much code-reuse, its unbelievable.

By adding a toolbar above the window, my framework can add to, remove from or edit entries in the table. Using the full power of JTables, I can hide (by filtering) and sort as needed by extending various classes (but only if/when this is required).

I find myself reusing a heck of a lot of code every time I want to display and manage new models. I make extensive use of icons (per column, rows or cells, etc) to beautify the screens. I use large icons as a window header to make each screen 'appear' different and appealing and it always looks like new and different screens, but its always the same code behind them.

A lot of work and effort was required at first to do the framework, but now its paying off big time.

I can write the GUI for an entirely new application with as many as 30 to 50 different models, consisting of as many screens in a fraction of the time it would take me using the 'custom UI method'.

I would recommend you evaluate and explore this approach!

A6: Automatically generating user interfaces may be possible to some extent, in that it can generate controls for the required input and output of data. But UI design is much more involved than simply putting the required controls onto a screen. In order to create a usable, user friendly UI, knowledge from disciplines such as graphics design, ergonomics, psychology, etc. has to be combined. There is a reason that human-computer interaction is becoming a discipline of its own: its not trivial to create a decent UI.

So I don't think there's a real solution to your problem. UI design is a complex task that simply takes time to do properly. The only area where it is relatively easy to win some time is with the tooling: if you have powerful tools to implement the design of the user interface, you don't have to hand-code every pixel of the UI yourself.

385.<https://stackoverflow.com/questions/536888/mvc-mvp-framework-for-net-winforms-applications/538893#538893>

T: MVC/MVP framework for .NET WinForms applications

Q: Does anybody know a useable MVC/MVP framework for enterprise WinForms applications?

Before there was [User Interface Process Application Block for .NET](#). But it is not longer under development since [Windows Workflow Foundation](#) has been released (which also will be completely rewritten with .NET 4.0).

Maybe i am not up-to-date, but i seems to me like there is a gap at the moment.

A1: Microsoft has the Composite Application Block (CAB) for use with WinForms applications. While not technically an MVC/MVP implementation, it does provide nice separation between UI code and non-UI code: <http://msdn.microsoft.com/en-us/library/aa480450.aspx>

It is also fairly popular to just do it yourself without using any frameworks as long as you are comfortable with the relevant patterns. Jeremy Miller has an excellent series of articles on some best practices when taking this approach:

[Build your own CAB Part #1 - The Preamble](#)

[Build your own CAB Part #2 - The Humble Dialog Box](#)

[Build your own CAB Part #3 - The Supervising Controller Pattern](#)

[Build your own CAB Part #4 - The Passive View](#)

[Build your own CAB Part #5 - The Presentation Model](#)

[Build your own CAB Part #6 - View to Presenter Communication](#)

[Build your own CAB - Answering some questions](#)

[Build your own CAB Part #7 - Whats the Model?](#)

[Build your own CAB Part #8 - Assigning Responsibilities in a Model View Presenter Architecture](#)

[Build your own CAB Part #9 - Domain Centric Validation with the Notification Pattern](#)

[Build your own CAB Part #10 - Unit Testing the UI with NUnitForms](#)

[Build your own CAB Part #11 - Event Aggregator](#)

[Build your own CAB Part #12 - Rein in runaway events with the "Latch"](#)

[Build your own CAB Part #13 - Embedded Controllers with a Dash of DSL](#)

A2: Have you tried [MVC#](#)? I started using it a while back, but the project fell by the wayside, so I can't vouch for it to much - sorry!

EDIT: I just found [this](#) article which looks pretty good too.

A3: We use the Smart Client Software Factory from MS. It provides IDE integration, full MVC support and once you get over the concepts behind it is a very competent implementation. You can acquire it from: <http://msdn.microsoft.com/en-us/library/aa480482.aspx>

A4: I've always rolled my own - it's not really difficult and the more I am in 'control' of my codebase the better I feel.

I just wonder how an MVC framework would fit in with, say, CastleWindsor or the like?

This probably isn't the most helpful of answers but just wondering if you have already considered this option!

A5: All these standard frameworks are not suitable for large complex application developments and they assume that the displays will be static. I have developed my own as well due to the common requirement that the screen controls have to be dynamic, even the MVC/MVP patterns assume that the display will be static so when the fields displayed in a control depend on what role a user has the MVC/MVP patterns are not suitable. I have developed a tool where you can build the screens from loading up the business objects and their properties into a database then the user just selects the objects and object properties she wants to display, a control can be made up of any number of control groups, each control group can contain any business object property, the business objects are generated from views by my Linq ORM. A control will therefore only display the fields of the control groups that a user has access to. You could also use Aspect orientated programming to provide the glue for the MVC pattern but when the displays have to be dynamic based on the role this overhead would probably add a little to much complexity and performance cost.

A6: I didn't like Prism, CAB or SmartClient for being too complex and ended up rolling out my own implementations, in the end.

As time goes, some common patterns are emerging. These are get reused from an application to an application. Here is an example: [DDD and Rule driven UI Validation in Windows.Forms with MVC](#).

386. <https://stackoverflow.com/questions/4201990/enhancement-for-access-so-it-can-be-used-on-an-intranet/4202841#4202841>

T: Enhancement for Access so it can be used on an Intranet

Q: Is there a simple and easy to use product that will allow users to view/run Access DB queries on the web? We'd also like reports to be available too.

We have a large number of Access databases, many of which act as front ends to data pulled from other DB systems (Oracle and SQL Server mainly). Access allows our power users to construct queries and reports relatively easily, link in new tables and so on. But other users can't easily use those DBs without messy file shares and other network headaches.

In an ideal world we could deliver the output from queries and reports straight onto the web, but AFAIK that's not possible without writing bespoke code? I've seen that Sharepoint might solve our probs, but that's looking like a hammer for our particular nut.

A: If using Access 2010, Web Databases seems the best option. However, they currently only work with SharePoint afaiak.

In the future, they will work with Azure at least.

One to watch out for is LightSwitch. Version 1 still in beta, so a long way to go before that proves its metal. Or otherwise.

A third alternative is [Naked Objects for MVC](#). So long as you know how to build a domain model, Naked Objects will auto generate an ASP.NET MVC app that does what it sounds like you want. They have a couple of good videos highlighting what NO for MVC does and how to use it.

387. <https://stackoverflow.com/questions/1489908/do-you-know-of-any-asp-net-mvc-code-generators/11831190#11831190>

T: Do you know of any ASP.NET MVC code generators?

Q: Does anyone know of a good/usable ASP.NET MVC code/solution generator. Ideally it would build from a domain model, but from a data model is also acceptable.

If you do, can you answer the following:

1. Does it produce "good" code?
2. Can it be extended?
3. What do you like and not like about it if you have used it?
4. What great features does it come with that stand out?

If there isn't one you know of then do you think this is something missing from the community or do you not think it is needed? What features would you like to see in one?

Can't wait to hear your answers...

A1: You could try a Visual Studio 2010 extension called [Radarc](#). It has a repository of extensions (called Formulas) which allows you to generate solutions for different architectures and technologies. Using Radarc with MVC Formula you can create ASP.NET MVC 3 applications with EF Code First either from a new domain model or importing an existing database.

I am working in this product team so I am not too objective to reply all your questions, but yes it can be extended.

A2: Have you taken a look at [Naked Objects MVC](#)? At least for academic reasons is very interesting. The Naked Objects MVC framework will take a Domain model (written as POCOs) and render it as a complete HTML application without the need for writing any user interface code - by means of a small set of generic View and Controller classes. The framework uses reflection rather than code generation. The developer may then choose to create customised Views and/or Controllers, using standard ASP.NET MVC patterns, for use where the generic user interface is not suitable.

A3: Try AspxFormsGen MVC3. It generates models, views, controllers, view models, stored procedures, middle tier code, data layer code by reading your MS SQL database, all in one click too. <http://www.junnark.com/Products/AspxFormsGenMVC3>

A4: Try www.datatreepages.com.

You connect the designer at your database and it generates data entry pages with sorting/searching/paging. You can also design layouts which allow you to link data pages together on the screen for master/detail relationships.

The controllers, data access, models, view models, cshtml, javascript/jquery, html/css are all written for you. The code produced is simple and extendable.

388. <https://stackoverflow.com/questions/2687131/why-i-sould-not-develop-an-opensource-runtime-ui-autogeneration-from-domain-obje/2695092#2695092>

T: Why I should not develop an opensource runtime UI Autogeneration from domain objects?

Q: I'm using for my projects a rather complete UI auto-generation tool from database entities for windows forms and asp.net I wrote. Now I've built a working prototype UI auto-generation tool from domain objects. Right now it is in early stage of development and by reflection it generates user interface for creating and updating domain objects.

I searched a bit and I didn't find other opensource projects that have the same goal. Why? This type of tool is not useful? Is this idea fundamentally flawed?

Thanks.

Edit:

In my actual implementation you can drive the ui generation by putting predetermined attributes in the fields, properties and classes. You can decide the position, if a field is visible, if it is the primary key of that object, the default method to get a collection of that object type, the max size, and so on..

A: There is no reason at all not to re-invent the wheel.

Seriously.

This is one of the best ways to learn.

Take an honest run at it, take *surface* looks at other implementations.

Once you arrive at either a) a beta that does what you want or b) a deep dark corner where there be dragons - pull *and read* the source for an existing implementation.

Not only will you have a better perspective for appreciating the code, you will understand better why some things are done certain ways.

There is no reason at all not to re-invent the wheel.

A2: For Java, there is the Naked Objects framework and related sister projects (all under Apache v2 license).

For .NET, there is the Naked Objects.NET framework. This isn't, admittedly, open source, but is very modest costs IMO.

Disclosure: I'm a committer on the Java version, but not involved commercially with the .NET version.

HTH Dan

389.<https://stackoverflow.com/questions/9523258/is-model-driven-architecture-worth-it-and-what-is-the-state-of-the-art-in-the-to/9525269#9525269>

T: Is model driven architecture worth it and what is the state of the art in the tooling?

Q: We have a recurring problem in our shop where we end up with 3 or 4 different representations of the same class/entity.

A java version, an xml version, a hibernate version, a json version... you get the point.

Obviously this creates maintenance problems.

Model driven architecture is probably more than this, but what I'd really like is a system that lets me define a class or an entity once, in one way, and then generate various representations. (maybe I am not using the correct terminology for this)

It really isn't that straight forward, of course, because let's say we have a java object that we want to turn into JSON for sending over the wire - there might not be an exact 1-1 correspondence between the members in the java object to the fields in JSON - there might be some optimizations, or whatever.

I've looked at things like AndroMDA and EMF in the past, and found them either lacking or clumsy. I do not know how they stack up these days, or what other systems there are.

What are SO's opinions on MDA and or meta-data driven programming? Have the tools become mature enough for serious consideration?

A1: Check out Naked Objects

<http://nakedobjects.codeplex.com/>

and it's apache equivalent

<http://isis.apache.org/index.html>

The fact that both of these frameworks are almost unheard of should answer your question IMHO. I think ending up with inconsistent representations of the same objects indicates a flaw in your process, which isn't something you should try and solve with a framework.

A2: To address your core concern, you can define a Java class for your domain object. Then, you can annotate the class with JAXB and Hibernate annotations. This way you have a single definition of your entity(the Java class) that can be output in various representations, JAXB for JSON and XML, Hibernate for persistence.

390. <https://stackoverflow.com/questions/4325079/architecture-to-develop-an-application-in-java-that-could-be-used-with-desktop-a/4325163#4325163>

T: Architecture to develop an application in java that could be used with desktop and web interface too

Q: I'm developing a java application or service for execute remote commands or another applications and receive the results of these commands. And I think about to project this application to be possible his use with a swing interface or a web interface.

I have to take care with the parameters to pass for my businnes classes and how I will deal with the results. I need to use a architecture and project that let me able to use my classes with a desktop application or web application too.

I believe this is related with API and service design. Some popular applications have a web interface or dashboard for control services, and the services are manageable by agents installed for execute some demons, services or applications. To do start or stop commands for database systems, directory services an other tasks

There are some guides to how develop applications and services in java that can I use with web and desktop environments?

I felling a bite confusing about this, because in my mind if I choose to develop this with a swing approach all the thinks turn clear for me. But when I imagining the same project using the web perspective I lose my directives.

Sorry and Ihope that someone could undertand me.

A: I have been in a similar situation recently while I started working on a simple CMS. I wanted my cms engine to be free of what UI/client is used to interact with it and finally I settled for a Web Service oriented approach. As a student of RESTful WS/ROA I usually like to take that approach.

If I understand your problem correctly, I would design it to be, each external program, service, web service I want to provide remote access to would be a 'Application' to my web service, where 'Application' would be a 'Resource'. Performing actions on the 'Application' resource would mean executing GET requests with different query parameters. How the 'Application' infers would depend on the 'Application' resource.

A similar approach I took in the CMS engine is for generating representations for a content. I support Ruby (JRuby), Groovy, JavaScript (Rhino) and Velocity template for generating representation. User creates the template script as a resource and refers then in the content type definition. Clients are provided URI's to the representation from the content generic media formats (Atom XML, JSON) and upon fetching them receives the output generated by the script. I am tempted to take a similar approach for your problem. It would not only separated the UI from the business objects, but also provide flexibility to add new backend services in the long run.

As tools for RESTful WS over Java I would recommend, [Jersey](#), [Abdera](#), [Jackson](#). As an example for how use them together you can have a look at the CMS project I was [referring to](#).

A2: Consider [spring](#) and [MVC](#) architecture. Neither of them is constrained to Web development only, however they are extensively used as such.

A3: You might look into [Naked Objects](#), where you develop a domain object model and gets the UI more or less for free (You can get a desktop GUI, and various forms of web UIs). This is probably not a feasible approach if you're developing a public facing application, but more suited towards applications developed for expert users.

A4: Hi i would suggest you to build your system with a modular approach such that you have all your business logic is exposed as a service which can be accessed by REST, in addition create you can have web application layer and a desktop layer.

schemantically it will look like be at a higher level

weblayer/desktop-----{REST interface} ----- {business logic}----EIS

and for modularisation you can consider OSGI hope this helps

391.<https://stackoverflow.com/questions/2770381/question-about-domain-models-their-visibility/2770881#2770881>

T: Question about domain models & their visibility

Q: I was involved in an interesting debate about the visibility of domain models & was wondering if people here have any good guidance.

- Per my understanding of MDA, we need not expose the domain model throughout the application layers & tiers
- The reason being that any change to the domain model has an impact in the overall application
- The wise thing to do would be to expose light-weight object (DTO's) which are a small sub-set of the domain model to abstract the actual model
- On the flip side, any change to the domain model would mean changing various DTO's throughout the application for the change to be visible, while if we do expose the domain model, then the change is in a single location

Hope to see some comments & thoughts about this.

A1: No, that isn't what MDA is about. It's about insulating oneself from specific platforms, using a higher level notation (UML and its action language) to specify the behaviour of the system.

Whether you should expose your domain model depends on the application. For users who use the application regularly (think about your IDE), then the domain model is clearly exposed, and you manipulate the objects in that domain directly. But for an app used occasionally (think about a kiosk at an airport for check-in) then the app should guide the user through the workflow.

Even if you are going to shield the domain objects, DTOs aren't necessarily necessary; it depends on whether the domain objects are in the same process space as the layer that renders the UI. Architectures that require DTOs aren't very good at adapting to new requirements, because they violate the DRY principle.

It is, in fact, possible to build enterprise apps solely out of directly exposed domain objects; this is the objective of the Naked Objects pattern. There are several open source frameworks that implement this, including the original, Naked Objects Framework (on Java). There's also an commercial equivalent for .NET.

For more discussion in general on domain objects, I recommend you check out Evans' book, Domain-Driven Design. There's also an active newsgroup up on yahoo.

Dan

full disclosure: I'm a committer to the NOF for Java, not directly involved in the .NET version.

A2: I'm not too knowledgeable in this area, but I read this [blog post by Gojko Adzic](#) recently which I think is relevant, about how DTOs aren't necessarily a good idea and that it's Ok to have your domain model repeated on separate tiers so as not to violate DRY.

A3: I concur with Dan. One way of tackling this is to use interfaces. You make your public methods return an interface which your domain objects initially implement. When you find that returning your domain objects

from your application is no longer working you introduce your DTOs and implement the relevant interface. Whilst the internals of your library have now changed any consuming applications will remain unaffected.

392. <https://stackoverflow.com/questions/3091477/any-experience-of-using-naked-objects-frameworks-for-.net/3094013#3094013>

T: Any experience of using Naked Objects frameworks for .net?

Q: On first sight, [Naked Objects](#) look very promising in that they allow a full system with a basic UI to be created quickly, then refined.

Has anyone got real life experience using any of the .net Naked Objects frameworks?

How should I choose between the different Naked Objects frameworks?

Does anyone know of a .net Naked Objects frameworks that is open source, or at least does not have a per user licence cost when the finished application is deployed?

A: (FYI, we are very close to launching a brand new version of the product - Naked Objects MVC. This works with ASP.NET MVC 2 and gives you a complete HTML UI from the same domain objects, and then (if you really need to!) you can customise this UI using standard ASP.NET MVC patterns.

Best of all - from the point of view of your question - this will not have a per user license cost. There will be a per-developer cost (not yet fixed, but realistically priced) and there will be a free time-unlimited evaluation version (which runs locally but not on a remote IIS Server).

If you're interested in trying this out, please get in touch with me (rpawson at nakedobjects.net)

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A2: Naked Objects MVC does include (in the licensed version) the source code of the MVC UI part - though it does not include the source code of the underlying Naked Objects for .NET framework. The latter is in use in a big way in the Irish government. FYI, part of the commitment to that client is that in the event that our company is no longer able/willing to actively develop and support the product, then it will automatically revert to an open source license - I think that's as fair a commitment as one can make.

Also, FYI, though Dynamic Data has some similarities, it is not really the same thing: it does not expose object behaviour in the form of actions. This is a much bigger deal than it might sound. I agree that Microsoft does not appear to be actively promoting DD now, though. There was an attempt to re-implement DD within ASP.NET MVC, but that also has since been removed from CodePlex.

A3: As there is not an open source port of Naked Object to .net, the options at present seem to be:

- [Naked Object MVC](#) (Naked Objects is now [open source](#) on .net)
- [ASP.NET Dynamic Data](#) – A attempt by Microsoft to solve the same problem. (free, no source code, [does not seem to be “actively promoted” by Microsoft](#))

In both cases I have to ask myself how long will they be actively developed.

393. <https://stackoverflow.com/questions/167517/naked-objects-good-or-bad/3713973#3713973>

T: Naked Objects. Good or Bad

Q: I have recently been exposed to naked objects. It looks like a pretty decent framework. However I do not see it in widespread use like say, Spring. So why is this framework not getting any mainstream application credit. What are its shortcomings as you see?

A: From my experience using NOF 3.0.3...

The good:

- Automagically generates an DnD UI for your domain objects, like what db4o does for persistence.
- This is what MVC was always meant to be, according to the MVC pattern creator.
- The framework only asks your domain objects (POJOs) to be subclassed from AbstractDomainObject that's all the minimum wiring.
- The framework favors convention OVER configuration: lots of annotations no freaking XML config files.
- Works great for prototyping along with db4o for persistence.
- Out of the box functionality for Hibernate.
- In my case, I required like 30 mins from Download to Hello world app. (IntelliJ IDEA IDE)
- Deployment as JNLP, standalone, Web (NOX embedded Jetty or Scimpi flavor) and Eclipse RCP.
- The NOF team is ALWAYS there for you when you ask for help in the forums.
- The Naked Object Pattern is an awesome idea, do yourself a favor and take your time to grok it.
- There's a lot of usability flaming going on around the Drag and Drop GUI, but if your prospective end users simply *can't* work with the DnD UI then you are in deep trouble anyway.

The bad:

- None that I can think of.

The kinda ugly:

- No Swing components allowed, so say goodbye to JGoodies and all your favorite Swing component sets. The UI components are custom made; to get you an idea they look like early 90's VB controls. But there's a SWT port in the works.
- The multiline line field for long strings has some issues. (NOF 3.0.3)
- DnD UI for images is kinda buggy.
- The validation code for getters n setters only fires if the domain object is modified from the UI. (This is probably wrong due to my n00bness, lets hope a NOF committer corrects me)
- If an object is modified from a non-ui thread, lets say a b.g. worker, such object will not update its view on screen. This invalidates a use case such as representing a mail queue in real time on the DnD autogenerated UI. (Again)

A2: I've been working on the naked objects approach for over a year now and I haven't even begun to scratch the surface of the possibilities it provides for your system's architecture. To properly utilize it though, it requires that you create a paradigm shift and seek out full OO solutions and revert from resorting to functional duck tapes, because the paradigm seems to work only when you create a design that would allow for high-level development.

Having said that, I absolutely love how Django has implemented naked objects within its Django Models. Most of the things I love about the framework have been, what I come to believe, a direct result of its models and there are some wows off the top I'd like to share about the architecture:

Model fields, that map to table columns, are behaviorally complete objects--they know how they're represented in both the application and database domain, how they're converted between the two and how the information

they hold is validated and displayed to the user visually for inputs. All of this utilized with a single line of code in your model. **Wow!**

Managers are attached to models and provide CRUD and any generic operations on collections, such as reusable queries (give me the last five blog posts, most occurring tags, etc.), mass delete\update operations, and business logic performed on instances. **Wow!**

Now consider you have a model that represents a user. Sometimes, you'd only like to have a partial view of all the information a user model holds (when resetting a user's password you may only need the user's email and his secret question). They've provided a Forms API that exactly displays and manages inputs for only parts of the model data. Allows for any customization of the what/how in handling user input. **Wow!**

The end result is that your models are only used to describe what information you use to describe a particular domain; managers perform all the operations on models; forms are used for creating views and for handling user inputs; controllers (views) are only there for handling HTTP verbs and if they work with models it's solely through managers and forms; views (templates) are there for the presentation (the part that can't be automatically generated). This, imho, is a very clean architecture. Different managers can be used and reused across different models, different forms can be created for models, different views can use different managers. These degrees of separation allow you to quickly design your application.

You create a ecosystem of intelligent objects and get a whole application from the way they're interconnected. With the premise that they're loosely coupled (lot's of possibilities for letting them communicate in different ways) and can be easily modified and extended (a few lines for that particular requirement), following the paradigm you really do get an architecture where you a component write once and then reuse it throughout your other projects. It's what MVC should have always been, yet I've often had to write something from scratch even though I did the same thing a few projects ago.

A3: It has been successfully used [here in Ireland](#).

I think reasons why it hasn't been more popular are:

- You need a lot of confidence in the toolkits you are using
- It makes the GUI a risk factor instead of a no-brainer (both technically and in usability testing)
- It's not applicable to the web (as far as I know), which is where most of the focus is at present...

A4: I've only just seen this. A couple of minor corrections, otherwise most of the comments are very fair.

1) 'The framework only asks your domain objects (POJOs) to be subclassed from AbstractDomainObject that's all the minimum wiring.'

Naked Objects does not require the domain objects to be subclassed from AbstractDomainObject, although that is typically the most convenient thing to do.

If you don't want to inherit, all you need to do is provide a property of type IDomainObjectContainer, and the framework will then inject a container into your objects when they are created or retrieved. The container has methods for Resolve(), ObjectChanged() and NewTransientInstance(), which are the three minimalist points of contact with the framework that you must use, so that the framework remains in sync with your domain objects.

2) 'Works great for prototyping along with db4o for persistence'. We're quite keen on the idea of working with db4o, but I'm not aware of anyone who has made Naked Objects and db4o play together. If anyone has done this, I'd like to hear more about it.

3) 'The general model of citizen programmer as espoused in the smalltalk and naked object communities ...'. We have never espoused that idea, and I don't agree with it. Naked Objects is NOT about encouraging users to program. I believe firmly in the role of the professional developer - Naked Objects just helps them to write better software and more productively.

394. <https://stackoverflow.com/questions/454937/the-future-of-naked-objects-pattern-and-ui-auto-generation/3605084#3605084>

T: The future of Naked Objects pattern (and UI auto-generation)

Q: I ask about the [pattern](#), not [framework](#). This is kind of follow-up to a question on [UI auto-generation](#).

1. Do you believe in the concept of UI auto-generation from metadata?
2. What kind of problems can be approached this way?

The question arose when I've created a [small library](#) to support my student projects, which generates interactive CLI in runtime based on object's metadata. And I think CLI it generates is quite decent.

On the other extreme is the [Naked Objects Framework](#), which is rather universal, but UI it generates is horrible, IMO.

It's clear, every problem is specific and needs specific UI, but maybe there are several classes of problems where auto-generation is acceptable?

A1: Yes, I believe the concept of metadata-based auto-generated applications is very sound - mainly because it drastically reduces development time and improves code quality by reducing the massive redundancy you have in most applications where each domain data field is represented in the database, in the model, in the UI, and often also several times in various mapping layers.

I think the future is auto-generated apps that can be modified wherever necessary. Currently, this is AFAIK not really possible; for example, Rails only allows you to fully customize the UI when you use static scaffolding, which basically means code generation, i.e. many further changes in the domain model are then not automatically represented in the UI because the duplication has happened when the code was generated.

I believe the first framework that manages to combine complete auto-generation with complete modifiability afterwards will become the de-facto development standard to a previously unknown degree. Though most likely we'll get there in small steps so that there will not be such a single dominating framework.

A2: Take a look at JMatter, which is a rather better-looking implementation of Naked Objects.

<http://www.jmatter.org>

There is also Chris Muller's work on MAUI, and Lukas Renggli's work on Magritte (both Squeak /Smalltalk)

We have lots of generated UI in the configuration part of our apps. All those lists that are around forever and changed once in a blue moon by a system administrator.

I find that most applications with a database back-end tend to have a bad design from an OO and NO perspective, as already shown in the NO book by Pawson and Matthews.

A3: One way to look at this is to consider the difference between the user interface you get from something like Toad or MySQL Browser, where the user interface is directly constructed from the tables and their associated meta data, and the user interface that a skilled designer would develop for the actual application. IF there not too dissimilar then it should be fairly low hanging fruit for an auto-generation framework.

As you say there are classes of problems which will work quite well with this kind of auto generation and some which wouldn't. To my mind the key things are how well the implementation model (or portion thereof) which you are exposing in the user interface maps to the conceptual model of the user. Secondly how well can the behavior of the application can be expressed through a limited set of user interface components (assuming this is a general purpose UI generation framework).

This article "[Universal Model of a User Interface](#)" may be of interest .

A4: Getting a basic UI up **quickly** that lets the customer try out the system and **create test data** must be of value. Naked Objects frameworks can help for the "**boot strapping**" even if you have to have replace it with "hand crafted" UI before you ship.

In most system I have worked on, there have been lots of simple **housekeeping tables**. All these tables need a UI to edit and view them etc. There is also great value in these simple editors being consistent. Here a naked Objects framework could save a lot of time, even if the main "day to day" UI is "hand crafted"

A5: I have seen a couple of failed projects (cases where I was brought in as a rather expensive consultant to help architect the replacement) which used the "naked objects" approach (not the framework, AFAIK) - all with simply atrocious UIs, and worked replacing a lot of the UI on one project which, in its original incarnation, had

a similar approach (the entire application was a tree of objects accessed through context menus and property sheets - this was NetBeans 2.0 circa 1998 - IDE as a giant hierarchical JavaBean).

The bottom line is, your users don't care about your architecture, they care about getting what they need to do done in the most comprehensible-to-mere-mortals set of interactions you can come up with. If that happens to align with your architecture, you are having a lucky day - but it really is serendipity. Trying to *force* users to care (or even know) about your architecture is a recipe for software nobody wants to use.

Code generally needs to be designed around two not-always-compatible goals:

1. Maintainability - people who didn't write the code can understand the code
2. Stability and performance - i.e. the activities the code asks the computer to physically do are both possible, and can be completed within a reasonable time frame

The abstractions and code structures that it makes sense to create to meet those two goals very, very rarely map exactly to user interface elements of any sort. Sometimes you can get away with it - barely - if your audience is technical. But even there, you are likely to please more users with at least a "presentation layer" adapter layer on top of the architecture that makes sense for programmers and machines.

A6: I think the idea of automatically generated UIs has a lot of potential especially for your average form-and-table layout database user interface. However, even there a human needs to be in the loop, having the ability to override the output without it being overwritten with the next regeneration.

I suspect automatically generated UIs would be more successful today if interaction designers were more involved in developing the generation algorithms. My impression is that historically the creators of these systems don't know what kinds of UI-related metadata to include or how to use it. Specifying labels, value ranges, formats, and orders for fields is a start, but more high level information is needed. Sufficient modeling of the tasks and user roles in particular tends to be lacking, along with some basic style-guide-level principles for UI.

Oracle's Designer 2000, for example, was on the right track in including not only the entities and relations in the model, but also the tasks in the form of a functional hierarchy. Then they blew it by misapplying this metadata (e.g., assuming that depth is always preferred to breadth) and including fundamental flaws when generating the UI (e.g., only one primary window can be opened at a time). The result was UIs that were not even consistent with Oracle's own Applications User Interface Standards.

395. <https://stackoverflow.com/questions/19484918/two-types-of-repositories-and-two-possible-layer-location-in-a-domain-driven-des/19494602#19494602>

T: Two types of repositories and two possible layer location in a Domain Driven Design context?
I've worked on a project that implements a three-tier architecture with the following design:

Q: I have been reading about what people said regards repositories location (in which layer) in DDD context and found things that don't feel right to me. Example:

Is true that "in terms of more "classical" DDD, yes domain objects are typically not allowed anywhere outside of the domain."

from [here](#)

Can any body point me to some other reference that state something like that? or at least an explanation why?

What feel right to me is that *some* repositories belong to Domain Layer. As Evans said, repositories must *mainly* used to return Aggregates to avoid:

...breach the encapsulation of domain objects and AGGREGATES...
and follow:

...A REPOSITORY lifts a huge burden from the client, which can now talk to a simple, intention-revealing interface, and ask for what it needs in terms of the model...

so if **Aggregates is a Domain Object** and is returned by *some* repositories that lead us to have repositories that must know how to reconstruct those Domain Objects, such repositories implementations will have a very close

relationship with others parts of Domain Layer like simple Aggregates class definition or reconstruction factories.

These thoughts lead me to the second question, is habitual that App Layer retrieve Domain Object from the repositories outside a *Naked Object* context? I feel that yes, and that the use of Data Transfer Objects is just needed when performance or another specific reason justified it, but if we design the Domain Layer interface in a way that knowledge leak is avoided (just exposing Domain Objects and Domain Services needed to the App Layer and not the internal ones), we will be safe. Has sense that line of thought?

I said *some* in the previous paragraphs cos I think that some repositories could be not so tied to the Domain Layer, I talking about repositories to access some kind of values or enumerable objects or in general, objects that are no so tied to the Domain. Evans talk about too, he considered that sometimes have sense a global search, and that such global search will not get any harm to the a design.

Another reason to the existence of repositories is avoid:

Exposure of technical infrastructure and database access...

and

decouple application and domain design from persistence technology, multiple database strategies, or even multiple data sources.

This other goals of the repository pattern let me to think at first that repositories can't be on the Domain Layer, that is contradictory with what I already said.

At the end, I think that exist two type of repositories if we classified them accord to its layer location:

1-One that belong to Infrastructure Layer witch an interface returning non Domain Layer objects, avoiding that lowest layers depend on highest layers. This kind of repositories will be used by Application Layer mostly to retrieve some kind of VALUES/ENUMERABLE objects.

2- The other type of repositories return Domain Objects and reside into the Domain Layer. This type of repositories depend of interfaces provided by the Infrastructure Layer for basically *decouple application and domain design from persistence technology* while allow Application Layer talk with the domain in an *intention-revealing interface, and ask for what it needs in terms of the model*. These kind of interfaces provided by the Infrastructure could be expressed in terms simple and raw data contracts and could be seem like a second form of repository through which Domain Layer ask the data (to the Infrastructure Layer) it need to form a Domain Object and reply a request from the Application Layer. Seem to me that in practice I can end with *duplicate code* in cases where Domain Object are very simple and similar in form to how they are stored in database. I will appreciate any comment about these problems and how the code is organized to solve them in the context of DDD.

I will thank critics to these thoughts, mainly those whose highlight its soft points ;)

Here a diagram of what I'm talking about

A: avoiding that lowest layers depend on highest layers

- It's the contrary that should be avoided ;) [High-level modules shouldn't depend on low-level details](#).
- If lower level details are at the bottom, the Domain layer is misplaced on your schema. It should appear at the top.

Think of it that way : the Domain layer contains your core business concepts and behavior. Are you ever going to swap out that Domain entirely while keeping the same Application layer ? Not likely to work/make any sense.

In contrast, you could keep the Domain module and change the Application layer (think mobile app, web services that expose your domain, etc.) Same for the Infrastructure - you could change database, you could change your mail sender for another one. The Application is dependent on the Domain and tailored for it.

The Infrastructure is dependent on the Domain as well. Not the other way around.

Which gives the typical following design :

- Repository **abstractions** (interfaces) in the Domain layer. These expose contracts that manipulate domain objects (aggregate roots).
- Repository **implementations** in the Infrastructure layer. The Infrastructure depends on the Domain, so no problem deriving your concrete repositories from the abstractions mentioned above.

- (optional) Repository base classes in the Infrastructure layer. These are here to factor out elements that are common to all repositories, most often with regard to the underlying persistence technology (a database connection, an ORM change tracker, etc.)
- Application layer classes only know about repository abstractions from the Domain layer, but at runtime are *injected* with their concrete implementations defined in the Infrastructure.

These thoughts lead me to the second question, is habitual that App Layer retrieve Domain Object from the repositories outside a Naked Object context? I feel that yes, and that the use of Data Transfer Objects is just needed when performance or another specific reason justified it, but if we design the Domain Layer interface in a way that knowledge leak is avoided (just exposing Domain Objects and Domain Services needed to the App Layer and not the internal ones), we will be safe. Has sense that line of thought?

That's correct (not to mention "internal" Domain objects and services have little reason to exist).

396. <https://stackoverflow.com/questions/13202174/what-is-the-best-way-to-write-a-function-which-returns-an-object-in-c/13202393#13202393>

T: What is the best way to write a function, which returns an object in C++?

Q: Hello, guys!

If I need to return an object from function (and it is not a getter, and also this function for some reason cannot be implemented as a constructor, for example there is a constructor with the same signature and different semantics), how better to implement this?

For example, one can propose the following options:

In this case, code becomes ugly and poorly readable

What is the best practice? Which one do you use in your projects and which criteria are the most important when you are working on a big project?

A1: Two is pretty straightforward. Yes, malloc can be slow, but does it matter in your case? You need space for that object from somewhere. Also note the answers in the question you point to, it's only across logical units that there is an issue. See if you have the problem and then try to fix it rather than pre-optimizing.

You could potentially make your own version of new that uses a free store and managers resources itself. However, unless you've measured and found new to be a problem it's error prone.

One way you can help ameliorate problems with freeing pointers is by using a `std::shared_ptr`. That way you don't have to worry about freeing the object as long as you always use it through the smart pointer.

A2: You omitted the obvious opportunity of returning a move constructible object: return value may still reduce overhead in many cases but you don't run the risk of accidental copies. Where C++ 2011 isn't available, I would make the type copyable and return by value.

Where neither move nor copy is an option, I would return a pointer. Of course, I wouldn't return a naked pointer but a `std::unique_ptr<T>` (or `std::auto_ptr<T>` where unavailable): Using a smart pointer avoids the risk of a memory leak but the choosing a lightweight pointer rather than, e.g., `std::shared_ptr<T>`, doesn't make a final policy decision on how the object is maintained. In cases where the object needs to be released in some funny way it may come with a deleter.

397. <https://stackoverflow.com/questions/45859563/multiple-properties-in-same-ecs-component>

T: Multiple properties in same ECS component

Q: I understand the ECS pattern and what it aims to solve. However I'm struggling to find the best way to identify the components.

For example, I'm working on a game where you have a ship and you can attack other players/npc and collect resources.

Do I need to have a component for each property or can I group *apparently unrelated* properties in the same component?

A:

Q: I'm working on a web-based application that is intended to have at least a 6 year lifetime. Once the application is delivered, chances are that it won't be modified during that time frame.

We're considering using the asp.net MVC framework and jQuery, but I'm wondering if that's a good choice. The customer is probably not going to want to spend additional time and money down the road because javascript, browser standards, etc have changed.

What's the best option to minimize the chances that the application would require maintenance over the next 6 years?

A: I usually group properties with the systems that use them.

For instance you would have a system for animation and a system for rendering. You would then have a texture component which contains all texture related data, and an animation component which contains all animation related data.

If you have some data that is used by multiple systems then keep them separate like a transform component which holds the entity position, rotation, size etc. Which would then be used by both the animation system and the render system.

In your example data you would keep position and velocity in the same component as they will most likely both be used for working out the position of the entity.

However, these are not set rules and you can have all components separate which will give you more flexibility later. For example you may want to add a system later which only works on entities that have a velocity. Having the components separate allows you to create a family from the component without any changes to the current systems. If you had your velocity in a transform component you would then have to separate it to create a family or use the transform component and add some condition in your system.

398. <https://stackoverflow.com/questions/39358814/how-to-store-pointers-of-vectors-containing-different-types>

T: How to store pointers of vectors, containing different types

Q: I am currently learning more about the ECS pattern and have been attempting to create my own implementation as practice. I decided I want to make it more cache friendly when looping through the components by packing all my different components into vectors, instead of having a vector of pointers.

A: Assuming that:

- your question is [an XY problem](#) and you only think storing pointers to vectors of different types might be *a* solution rather than *the* solution, and
- you know the list of component types at compile-time (as opposed to allowing runtime-registration), then this is relatively easily achieved by way of a tuple and some mechanism to iterate over it.

First, we want a metaprogramming function to produce the correct tuple type given a list of component types:

399. <https://stackoverflow.com/questions/32190941/entity-component-communication-correctness>

T: Entity-Component communication correctness

Q: I am writing a game following an Entity Component-style design pattern, and have run into an issue I have been able to solve, but am not sure if it is a best practice (or if there even is such a thing).

I have a state machine that handles the main states of the game (menu, in-level, paused, background), and an inner state machine in one of the gameplay components that handles more piecemeal game states (new level, level over, next level, game over and summary). I want to let the outer state machine know that the game has ended from the inner component, but it has no reference to the main controller class. Normally, I'd use a protocol to delegate information up the chain, but this seems to me, in my limited ECS experience, to break the paradigm. What I am doing is querying the app delegate for the window's root view controller, and calling convenience methods on it depending on the inner state...this would be a horrendous way to do MVC, but seems like it is fine in ECS.

Could anyone confirm that this is not as terrible as I think it is, or if it is, recommend a new paradigm? It would be greatly appreciated.

Basically it is working like this (I think it is too much code to post in its entirety):

MainMenuViewController has an ApplicationEntity, which has an ApplicationLifecycleComponent that contains a state machine. On pressing a 'start game' button, the state machine passes into ApplicationGameState.

ApplicationGameState uses a weak reference to the MainMenu VC (which is root) to present a GameViewController that loads a SpriteKit scene. Game logic happens here through a bunch of inner components and state machines that eventually report a 'game over'.

On game over, the ApplicationLifecycle's state machine should exit ApplicationGameState and enter MainMenuState (or any other state, as necessary), but since I can't get at the root VC from the scene, I ask the AppDelegate for the root vc, cast it as a MainMenuViewController, grab its entity and tell its lifecycle component to change state, as below:

Rephrasing the question, should I push a weak reference of the root view controller down the chain from application start to get to this state? Is there a best practice for notifying a higher-level entity that something happened?

400. <https://stackoverflow.com/questions/34609663/too-many-actors-in-libgdx/34609886#34609886>

T: Too many actors in LibGDX?

Q: I'm programming my first game in LibGDX and part of the gameplay has a mixing logic between elements (similar to Doodle God or Little Alchemy). By reading and watching guides, I've attempted to design this logic using LibGDX classes Stage, Actor (for the elements) and Group(for organising elements), but then I realised I would need an actor for each element. Since I intend to have over 150 of them, creating a java class for each one really doesn't feel optimal. Neither do I know an efficient way to store all the logic so I can look for combinations with a single call (I don't want to write a million if statements in a method).
I would like to know if there's a simple and elegant way for doing that. Thanks in advance!

P.S.: The only differences between elements are their textures, the groups they go into and the elements they combine with.

A1: There is indeed a pattern that is currently well used for doing what you expect. It's called entity-component-system (or ECS).

It requires a shift in thinking how to develop games, but it's worth it, especially for its modularity and reusability.

Wikipedia has a much [detailed article about it](#).

And it's a good thing that libgdx has [Ashley](#), their ECS implementation.

A2: If you can, reuse Actors maybe?

If we talk about logic. You can group logics and write a function for every group. Don't use ifs, use switch and enums.

Maybe if you tell us more then we can come with something innovative.

401. <https://stackoverflow.com/questions/40151216/using-queues-to-create-loosely-coupled-and-higher-reliability-applications-are>

T: Using queues to create loosely coupled and higher reliability applications - are local queues required for reliability?

Q: I read [Queue-Centric Work Pattern \(Building Real-World Cloud Apps with Azure\)](#) which among other things speaks about using queues to increase reliability of applications. First, a tightly coupled application is shown:

402. <https://stackoverflow.com/questions/3297118/method-including-sqlconnection-good-approach/3297167#3297167>

Q: This code is called from an aspx.cs page. Is it a good approach to have the SQL connection stuff and the adapter inside the method? If not, how can that be refactored? Somehow I think this is not good for testing for example

A: No it is not good approach to make a data access in from the page code. Try to make your application in layered approach N-Tier, or use MVC Design pattern. Try to separate the Data Access logic and Business logic in your application so it will be easier for code maintainability and readability; you can even use auto generating tools to increase the code speed and quality by eliminating redundant work. Read more about ORM; it will help you a lot about good coding practices.

The benefit is stated as:

If any of the backend services – such as the SQL database or the queue listener -- go offline, users can still submit new Fix It tasks. The messages will just queue up until the backend services are available again.

My question is - unless the queue exists local (and maybe just exist as a set of file system directories w/o a separate queue application running) to the application submitting the queue messages, don't we still have the same reliability issue? Queues can break like database servers can break and the network connecting them can break the same.

(Granted, the article speaks of Microsoft's quoted reliabilities for their various services and shows queues as having slightly better uptime given their SLA's. However, in this example I consider the fact that the application is on Azure and using Azure services to be an implementation detail. I've certainly seen this pattern/architecture generalized.) That's why I get back to my question about the locality of the queues.

403. <https://stackoverflow.com/questions/6553121/what-is-the-best-architecture-for-a-business-application-using-wpf-ef>

T: What is the best architecture for a business application using WPF & EF?

Q: I'm confused about the architectures which we can use to develop a business application with WPF 4.0 and EF 4.0 technologies.

My first choice was a traditional N-tier architecture contains: UI, Business Logic Layer & Data Access Layer with a disconnected behavior.

In this way I create 3 project for each layer and another project for my Entities/DTOs (Each layer is an assembly). Each layer references only to its upper and lower layers (That is: UI can see the BLL but can't see the DAL). But all layers have access to the Entity/DTOs assembly for communication purposes. The problem starts when I want to create a simple CRUD form with a DataGrid for example. The BLL disposes the DataContext of the DAL when returns an Entity/DTO, this is the reason that forced me to use STEs. But yet there are several problems. For example I should call "StartTracking" method for each entity returned from BLL to the UI. In short, I don't sure about this pattern reliability or I think I have to forget about automatic handled CRUD forms.

I use the repository model in my DAL layer but when I search about the repository pattern I find it different. It seems that it's not bad to reference to both of the DAL/Repository and the BLL/Services(Not WCF nor WebServices) layers from the UI and thus we can have a connected environment (Without using STEs).

I see an example in which we can get a person from repository but do something on it using BLL or services:

Or something like that...

With this pattern we can send the Entities/DTOs to the UI in a connected way while the DataContext is alive.

I don't know if I understand the way of using the repository pattern in big projects. I think it's not clear to naming the BLL or services classes and methods in this way. More over the developers might be confused about where to use the repository methods or BLL/service methods or about where to create the methods (in repositories or BLL/service).

I prefer the N-Tier architecture using a good approach to track the Entities/DTOs changes automatically like STEs.

Would you please recommend the best pattern in such situations or/and reference me to some good books or documents about that.

A: I put together a sample app that may help with some of your questions. You can review the presentation notes and the sample via my blog post here:

http://blog.alner.net/archive/0001/01/01/wpf_ef_4_sig_presentation_2010.aspx

The sample shows using STEs and includes some helpers to make the Entity Framework STEs work better in a desktop client app.

Repositories are there to hide the details of how you get the data. The idea is that you could swap the implementation of a repository from one that uses a local database, to one that uses a remote web service without the upper layers knowing about it.

404. <https://stackoverflow.com/questions/34298095/zeromq-lazy-pirate-pattern-fairly-servicing-multiple-clients>

T: ZeroMQ “lazy pirate pattern” fairly servicing multiple clients

Q: I need an architecture for a single server reliably servicing multiple clients, with clients responding to unresponsive server similar to the lazy pirate pattern from the 0MQ guide (ie, they use zmq_poll to poll for replies; if timeout elapses, disconnect and reconnect the client socket and resend the request).

I took the "lazy pirate pattern" as a starting point, from the ZMQ C language examples directory (lpclient.c and lpserver.c). Removed the simulated failure stuff from lpserver.c so that it would run normally without simulating crashes, as follows:

Server has a simple loop:

1. Read next message from the socket
2. Do some simulated work (1 second sleep)
3. Reply that it has serviced the request

Client has simple loop:

1. Send request to server
2. Run zmq_poll to check for response with some set timeout value
3. If timeout has elapsed, disconnect and reconnect to reset the connection and resend request at start of next iteration of loop

This worked great for one or two clients. I then tried to service 20 clients by running them like:

```
$ ./lpserver &  
$ for i in {1..20} do ./lpclient & done
```

The behaviour I get is:

1. Clients all send their requests and begin polling for replies.
2. Server does one second work on first message it gets, then replies
3. First client gets its response back and sends a new request
4. Server does one second work on second message it gets, then replies
5. Second client gets its response back and sends a new request
6. Server receives third client's request, but third client times out before work completes (2.5 second timeout, server work period is 1 second, so on the third request clients start dropping out).
7. Multiple clients (fourth through Nth) timeout and resend their requests.
8. Server keeps processing the defunct requests from the incoming message queue and doing work which hogs up the server, causing all clients to eventually timeout as it takes 20 seconds to get through each round of the queue with all of the defunct messages.

Eventually all clients are dead and server is still spitting out responses to defunct connections. This is terrible because the server keeps responding to requests the client has given up on (and therefore shouldn't expect that the work has been done), and spending all this time servicing dead requests guarantees that all future client requests will timeout.

This example was presented as a way to handle multiple clients and a single server, but it simply doesn't work (I mean, if you did very quick work and had a long timeout, you would have some illusion of reliability, but it's pretty easy to envision this catastrophic collapse rearing its head under this design).

So what's a good alternative? Yes, I could shorten the time required to do work (spinning off worker threads if needed) and increase the timeout period, but this doesn't really address the core shortcoming - just reduces its likelihood - which isn't a solution.

I just need a simple request / reply pattern that handles multiple clients and a single server that processes requests serially, in the order they're received, but in which clients can time-out reliably in the event that the server is taking too long and the server doesn't waste resources responding to defunct requests.

405. <https://stackoverflow.com/questions/11443338/advice-on-learning-software-development-and-design-patterns/11443497#11443497>

Q: I've been programming for a while and I know basics of Java, C, and C++. I know a bit of Object Oriented Programming. At the moment, I'm trying to improve my knowledge (and I need to use C# for a programming project).

But I feel really lost and frustrated in this path. I want to learn more than just the basics of a language. I want to learn Design Patterns and developing and planning a software project but I don't know how to proceed.

I tried reading books on Design Patterns but they feel so abstract when I don't have a specific project to do. I'm really confused on this, how did you learn Object Oriented Design and Design Patterns? I feel that if I just read a book, I won't learn much.

I feel that Head First Design Patterns book tries to make it too simplistic. And the Gang of Four book feels too theoretical (and it says you need to learn Object Oriented Design first). I like books/resources that are more direct-to-the-point and have some exercises.

What would your suggestion be in this situation?

A1: You need to read some great books that really explain what is going on. I'd go with [SICP](#) and [Designing Object-Oriented Software](#). Those books won't teach you design patterns directly, but you'll learn how to create great design solutions for every problem you face. Design Patterns are pre-cooked solutions for only a few cases. You need to be able to solve every possible problem on your own. After that, learning Design Patterns is a child's play...

A2: A middle road you may find of interest (between the abstract nature of the Gang of Four book, and simple Head First Design Patterns) - try:

Martin Fowler - Patterns of Enterprise Application Architecture (the book). You can see at preview of the pattern catalog at <http://martinfowler.com/eaaCatalog/>
Also consider: Michael T. Nygard - Release It - contains some excellent patterns related to reliability, scalability, and similar concerns: <http://pragprog.com/book/mnnee/release-it>
These books may be at a higher level (application architecture) than you are seeking, but provide very concrete problems and solutions.

406. <https://stackoverflow.com/questions/14343920/how-do-frameworks-influence-applications-architecture/14344645#14344645>

T: How do frameworks influence application's architecture?

Q: I have read in "Design Patterns" book for the gang of four that the framework influences the overall architecture of the Application. Now I know for example when using .NET that you need to inherit from System.Windows.Form to make a form (*Although I think I am having a big misconception here*). But can anyone describe in code using any framework how does the framework affect the application architecture?

A: There are some interesting notes about the topic in [Wikipedia](#):

Software frameworks consist of frozen spots and hot spots. Frozen spots define the overall architecture of a software system (...). These remain unchanged (frozen) in any instantiation of the application framework. Hot spots represent those parts where the programmers using the framework add their own code (...).

According to that, your application can be defined by the Frameworks you're using. For example, in the Java World using Struts frameworks implies that you're using an [MVC architecture](#), or using Spring Framework forces you to apply the [Dependency Injection Pattern](#). If Software Architecture is defined by software patterns, then some frameworks are pre-built patterns for you to utilize.

On the other side, no Software Application is made only by Patterns/Frameworks, as there's were the Hot Spots are useful: they're ways that Software Frameworks offer to extend/use the frameworks capabilities and build an application according to your requirements and domain.

For example, let's say you're building a Web Application using [Spring MVC Framework](#). After you configure the Framework in your project, every request for your application will be delegated to a class called DispatcherServlet. This class is built-in in the Framework and you shouldn't modify it, so it's a perfect

example of a **Frozen Spot**. The DispatcherServlet will look-up your project configuration and delegate request processing to a Controller. The Controller is typically a class made by the programmer and has the responsibility to process the request. So your hand-made controller it's a **Hot Spot** for you to extend the Framework.

And the DispatcherServlet is an Implementation of the [Front-Controller Pattern](#), and the Controller usage is typical of an MVC application; so your application is highly defined by the framework you're using.

A2: I must say that a clean Architecture(also Design Patterns) does not depend on which frameworks, toolkits or library are being used. An architecture describes the high level structure of a software system(layers and tiers), not in details how it is implemented. it's a set of principles that help us to achieve some specific goals such as security, usability, extensibility, reliability, maintainability, availability... Let's see a simple example:

Model-view-controller (MVC) is a software architecture(or design pattern) that separates the modeling of the domain, the presentation, and the actions based on user input into three separate classes. The central idea behind MVC is code reusability and separation of concerns. You can apply MVC using many programming languages or frameworks like ASP.Net MVC, Java Strut, PHP DRY, CAKEPHP....

A3: There are different approaches in ways of passing, storing or evaluating data in different frameworks. IF you're working with a Windows Form application, you can reach your view elements from anywhere of the project, since they are all in the computer's local memory and nowhere else.

However, if you're working with an ASP.NET application, there are different sides consuming the project, client and server and things get more complex. The design you're making has almost nothing common with Forms.

If you're working with an ASP.NET MVC application, there are three tiers: ModelViewController, and operations are divided into these and from now on, you need to do your design in a way that fits with these tiers. You have database table-object relations provided by MVC which could change the design totally.

Also programming language lying beneath the program changes the design, as it can be functional, object-oriented etc.

In short, this is not a constructive question. You'll figure out this questions answer after working with different programming languages and technologies.

407. <https://stackoverflow.com/questions/3706158/pros-cons-of-using-biztalk-instead-of-nservicebus-or-masstransit/3884610#3884610>

T: Pros/Cons of using BizTalk instead of NServiceBus or MassTransit

Q: I am curious if it even makes consider BizTalk for the implementation of a pub/sub messaging architecture (basically what you can do with NServiceBus or MassTransit is all I really need). My manager tends to want to stick with frameworks provided directly from Microsoft and so as part of my due diligence as to which one to use I need to give a good set of pro/cons for both sides. Any guidance would be greatly appreciated!

A1: One of the major cons of a Broker is that it is very difficult to version and upgrade. You would have to stop the flow of messages to upgrade a particular endpoint(s). A Service Bus allows endpoints to be autonomous and be upgraded independently.

Then there is a difference in terms of scale. With a Broker the tendency is to scale those up(vertical) versus a Service Bus which is built for scaling out(horizontal). You would also have to make the Broker highly available through some sort of HA setup(clustering usually). This combined with the cost of software to do so can become pretty cost prohibitive.

NSB in particular will be offering a paid support model so if your manager is nervous about not having someone on the other end of the line when something goes wrong, you can buy into support.

A2: Biztalk is a broker and is more suited for EAI within the boundaries of different business services. A servicebus is fundamentally different. A comparison can be found here.

A3: The Broker architectural pattern can be used to structure distributed software systems with decoupled components that interact by remote service invocations. A broker component is responsible for coordinating communication, such as forwarding requests, as well as for transmitting results and exceptions

408. <http://docs.particular.net/nservicebus/architecture/nservicebus-and-biztalk>

If you can share some of your requirements I might be able to give some more guidance.

A3: It's important to note that BizTalk is a server product for Enterprise Application Integration (EAI -- as Andreas mentioned). It's more involved and complicated than a framework.

Microsoft does have the Enterprise Service Bus Toolkit available to use within BizTalk, so that you can call your BizTalk environment your ESB. What they consider "ESB" may not be what you consider ESB. You can take a look at their ESB Toolkit page (<http://msdn.microsoft.com/en-us/biztalk/dd876606.aspx>), but it includes things like:

Dynamic (i.e., at run-time) message transformation and translation.

Message routing can be content-based, itinerary-based, or context-based, and determined at run-time.

Of course, the publish-subscribe pattern is not the same thing as using a service bus.

BizTalk does do pub-sub well, whether or not you use the ESB Toolkit. It's extremely simple to publish a single message to the BizTalk "Message Box", and have the message routed to any and all subscribers. The pub-sub solution means that BizTalk acts as a broker, but this helps guarantee that messages do not get missed, and all messages are tracked. A BizTalk pub-sub solution has built-in extensibility points that allow us to add, change, or remove endpoints without impacting the rest of the solution.

All that being said, your requirements may not dictate extensive message reliability, monitoring, and tracking, so it could be that BizTalk is not the best fit for you. It is a large investment, and since the product can do so many different things all at once, it can be daunting at a first glance.

A new book was just published call Applied Architecture Patterns on the Microsoft Platform, which covers much of this. One of that book's authors, Richard Seroter, also published SOA Patterns with BIzTalk Server 2009, which would be essential reading if you do decide to go with BizTalk for your company.

A4: I'm with Andreas on this - BizTalk is generally more suited to 'value add' integration and business process management, rather than ESB type activity. BizTalk is good at:

- BPEL
- Long Running / Compensated Transactions
- EAI
- Brokering / Mapping
- Protocol changes (MQ to WCF, Flat File to SAP etc)
- EDI, RFID

However, efforts have been made to use BizTalk as a service bus, notably the [ESB Toolkit](#)

409. <https://stackoverflow.com/questions/34098658/integration-architecture-best-practices-for-enterprise-applications/34099079#34099079>

T: Integration architecture best practices for Enterprise applications

Q: Our application is going to integrate like a consumer to a bunch of external systems.

Most of this integrations are not just message processing and routing. There are a plenty of complex logic, like storing a current state, scheduled executions and other stuff.

Besides, each integration doesn't share much common logic.

What is the best practice to build this kind of systems?

Should I build all-in-one integration layer? It can be a monolithic application with different apache camel routes and processors for each integration: What benefits and drawbacks can i get with each solution?

A: There are quite a few criteria to have in mind:

- **Economy:** project cost, operational cost
- **Throughput:** data volume per time
- **Latency:** travel time of messages
- **Security:** data protection
- **Reliability:** likelihood of failures
- **Flexibility:** ease to react on changing requirements
- **Process Support:** control of data flow, event/error handling

The choice of a good solution architecture depends on the importance of such criteria for the given IT environment. For enterprise applications, it is quite common to use an integration platform rather than building the integration logic into the applications. Such a platform typically includes components for connectivity, message mapping, routing, monitoring/alerting, logging, accounting, change management, etc.

Ask your favorite search engine for [**Integration Patterns**](#) or [**Enterprise Application Integration**](#).

A2: Let me share my opinion. In general as Axel Kemper has stated there are a lot of factors that can influence your decision and there is no a silver bullet solution here.

I'll try to keep it technical, so:

A Monolithic application:

- Easier to deploy. In general you'll need only one/a couple of servers. From the point of view of developer the difference may be not that obvious, but talk to your dev-ops team and they'll immediately say that deploying one application is much easier for them
- Its easier to monitor. Basically for the same reason as above. Ask devOps about this as well:)
- It can be faster. If different Integration Apps should interconnect somehow (its not stated in your scheme, though), then potentially they can suffer from slow "over-network" protocol. In a monolithic application everything is inside the same JVM.
- Potentially requires less servers. If you're running in a private cloud/some outdated environment it can be quite a hassle to plug a new server. You can get 2-3 servers for your application and that's it :)

"Multiple integration applications" architecture (in my understanding it really resembles micro-services architecture in the integration domain) has the following advantages:

- Easier to upgrade different parts of it. If you have a monolithic application, there is no normal way to upgrade only part of the API, there should be one big upgrade for the whole application. If different "integration point" are developed by different Teams, its not obvious to coordinate between releases.
- As a result of previous bullet it will potentially take less time to fix a bug in an integration point (from the time when the bug has been detected to the time that the fix gets deployed in production). Just fix in one particular integration point and redeploy it. Its much more lightweight.
- Scales "out" better. If you experience an intensive usage of some particular integration point, you can easily add another one (or more) on different server. In a monolithic approach you'll have to install the whole application to achieve a similar effect. Another use case is that if you are deployed in a cloud and you have a client willing to pay for an exclusive access to a particular integration point.
- Easier to test (arguably). If you're running integration/system tests to check your integration point, then you can organize the CI flow so that the system will just run in parallel. Add to this a much more lightweight startup and you'll get a much more flexible flow.

I might have missed some aspects of comparison (for sure) but that's the direction IMO.

Hope this helps

410. <https://stackoverflow.com/questions/75258/how-to-make-a-side-by-side-compiler-for-.net/75583#75583>

T: How to make a Side-by-Side Compiler for .NET

Q: Nikhil Kothari's [Script#](#) is quite possibly one of the most amazing concepts I've seen in the JavaScript arena for quite some time. This question isn't about JavaScript, but rather about language compilation in the .NET runtime.

I've been rather interested in how, using the .NET platform, one can write a compiler for a language that already has a compiler (like C#) that will generate separate output from the original compiler while allowing the original compiler to generate output for the same source during the same build operation, all the while referencing/using the output of the other compiler as well.

I'm not entirely sure I even understand the process well enough to ask the question with the right details, but this is the way I currently see the process, as per diagrams in the Script# docs. I've thought about many things involving complex language design and compilation that may be able to take advantage of concepts like this and I'm interested in what other people think about the concepts.

--

Edit: Thanks for commenting, so far; your information is, in its own right, very intriguing and I should like to research it more, but my question is actually about how I would be able to write my own compiler/s that can be run on the same source at the same time producing multiple different types of (potentially) interdependent output using the CLR. Script# serves as an example since it generates JavaScript and an Assembly using the same C# source, all the while making the compiled Assembly cooperate with the JavaScript. I'm curious what the various approaches and theoretical concepts are in designing something of this nature.

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A: It's important to realize that all a compiler does is take a source language (C# in this case), parse it so the compiler has a representation that makes sense to it and not humans (this is the abstract syntax tree), and then does a naive code generation to the target language (msil is the target for languages that run on the .NET runtime).

Now if the script# code is turned into an assembly and interacts with other .NET code, that means this compiler must be generating msil. script# is using csc.exe for this, which is just the standard c# compiler. Now to generate the javascript, it must take either c# or msil, parse it, and generate javascript to send to the browser. The docs says it has a custom c# -> js compiler called ssc.exe.

To make things interact consistently on both the client side and the server side it has a set of reference assemblies that are written in .NET but are also compiled to javascript. This is not a compiler specific issue though, those reference assemblies are the script# runtime. The runtime is probably responsible for a lot of the script# magic you're perceiving though.

A2: So let's say you want to compile C# into Javascript. You are asking whether you can take advantage of the existing C# compilers, so instead of compiling C# into Javascript directly you actually convert the MSIL generated by the C# compiler into Javascript?

Sure, you can do that. Once you have the MSIL binary you can do whatever you want to it.

A3: Microsoft has a research project called [Volta](#) which, amongst other things, compiles msil to JavaScript. a developer toolset for building multi-tier web applications using existing and familiar tools, techniques and patterns. Volta's declarative tier-splitting enables developers to postpone architectural decisions about distribution until the last possible responsible moment. Also, thanks to a shared programming model across multiple-tiers, Volta enables new end-to-end profiling and testing for higher levels of application performance, robustness, and reliability. Using the declarative tier-splitting, developers can refine architectural decisions based on this profiling data. This saves time and costs associated with manual refactoring. In effect, Volta extends the .NET platform to further enable the development of software+services applications, using existing and familiar tools and techniques.

You architect and build your application as a .NET client application, assigning the portions of the application that run on the server tier and client tier late in the development process. You can target either web browsers or the CLR as clients and Volta handles the complexities of tier-splitting. The compiler creates cross-browser JavaScript for the client tier, web services for the server tier, and all communication, serialization, synchronization, security, and other boilerplate code to tie the tiers together. In effect, Volta offers a best-effort experience in multiple environments without requiring tailoring of the application.

412.<https://stackoverflow.com/questions/2767295/for-reliable-code-nmodel-spec-explorer-f-or-other/2768725#2768725>

T: For reliable code, NModel, Spec Explorer, F# or other?

Q: I've got a business app in C#, with unit tests. Can I increase the reliability and cut down on my testing time and expense by using NModel or Spec Explorer? Alternately, if I were to rewrite it in F# (or even Haskell), what kinds (if any) of reliability increase might I see?

Code Contracts? ASML?

I realize this is subjective, and possibly argumentative, so please back up your answers with data, if possible. :) Or maybe an worked example, such as Eric Evans Cargo Shipping System?

If we consider

Unit tests to be specific and strong theorems, checked quasi-statically on particular “interesting instances” and Types to be general but weak theorems (usually checked statically), and contracts to be general and strong theorems, checked dynamically for particular instances that occur during regular program operation. (from B. Pierce's [Types Considered Harmful](#)),

where do these other tools fit?

We could pose the analogous question for Java, using Java PathFinder, Scala, etc.

A: Reliability is a function of several variables, including the general architecture of the software, the capability of the programmers, the quality of the requirements and the maturity of your configuration management and general QA processes. All these will affect the reliability of a rewrite.

Having said that, language certainly has a significant impact. All other things being equal:

- Defects are roughly proportional to SLOC count. Languages that are terser see fewer coding errors. Haskell seems to require about 10% of the SLOC required by C++, Erlang about 14%, Java around 50%. I guess C# probably fits alongside Java on this scale.
- Type systems are not borne equal. Languages with type inference (e.g. Haskell and to a lesser extent O'Caml) will have fewer defects. Haskell in particular will allow you to encode invariants in the type system so that a program will only compile if they can be proven true. Doing so requires extra work, so consider the trade-off on a case-by-case basis.
- Managing state is a source of many defects. Functional languages, and especially pure functional languages, avoid this problem.
- QuickCheck and its relatives allow you to write unit and system tests that verify general properties rather than individual test cases. This can greatly reduce the work required to test the code, especially if you are aiming for high test coverage metrics. A set of QuickCheck properties resembles a formal specification, and this concept fits nicely with Test Driven Development (write your tests first, and when the code passes them you are done).

Put all of these things together and you should have a powerful toolkit for driving quality through the development lifecycle. Unfortunately I'm not aware of any robust studies that actually prove this. All the factors I listed at the start would confound any real study, and you would need a lot of data before an unambiguous pattern showed itself.

A2: Some comments on the quote, in the context of C# which is my "first" language:

Unit tests to be specific and strong theorems,

Yes, but they might not give you first order logic checks, like "for all x there exists a y where f(y)", more like "there exists a y, here it is (!), f(y)", aka setup, act, assert. ;)*

checked quasi-statically on particular "interesting instances" and Types to be general but weak theorems (usually checked statically),

Types are not necessarily that weak**.

and contracts to be general and strong theorems, checked dynamically for particular instances that occur during regular program operation. (from B. Pierce's Types Considered Harmful),

Unit Testing

Pex + Moles I think is getting closer to the first-order logic type of checking, as it generates the edge-cases and uses the C9 solver to work with integer constraint solving. I would really like to see more Moles tutorials (moles is for replacing implementations), specifically together with some sort of inversion of control container that can leverage what stub- and real- implementations of abstract classes and interfaces already exist.

Weak Types

In C# they are fairly weak, sure: generic typing/types allows you to add protocol semantics for **one operation** -- i.e. constraining types to be on interfaces, which are in some sense protocols which implementing classes agree to. However, the static typing of the protocol is just for **one operation**.

Example: Reactive Extensions API

Let's take Reactive Extensions as a discussion topic.

The contract required by the consumer, implemented by the observable.

```
interface IObserver<in T> : IDisposable {
```

```
void OnNext(T);  
void OnCompleted();  
void OnError(System.Exception);  
}
```

There are more to the protocol than this interface shows: methods called on an `IObserver< T >` instance must follow this protocol:

Ordering:

`OnNext{0,n} (OnCompleted | OnError){0, 1}`

Furthermore, on another axis; time-dimension:

Time:

```
for all t|-> t:(method -> time). t(OnNext) < t(OnCompleted)  
for all t|-> t:(method -> time). t(OnNext) < t(OnError)  
i.e. no invocation to OnNext may be done after one to OnCompleted xor OnError.
```

Furthermore, the axis of parallelism:

Parallelism:

```
no invocation to OnNext may be done in parallel  
i.e. there's a scheduling constraint that needs to be followed from implementers of IObservable. No IObservable  
may push from multiple threads at the same time, without first synchronizing the invocation around a context.
```

How do you test this contract holds in an easy way? With c#, I don't know.

Consumer of API

From the consuming side of the application, there might be **interactions between different contexts**, such as Dispatcher, Background/other threads, and preferably we'd like to give guarantees that we don't end up in a deadlock.

Further, there is the requirement to handle deterministic disposing of the observables. It might not be clear all the time when an extension method's returned `IObservable` instance takes care of the method's arguments' `IObservable` instances and dispose those, so there's a requirement to know about the inner workings of the black box (alternatively you can let the references go in a "reasonable way" and the GC will take them at some point)

<<< Without Reactive Extensions, it's not necessarily easier:

There is the task pool on top of TPL is implemented. In the task pool we have a work-stealing queue of delegates to invoke on the worker threads.

Using the APM/begin/end or the async pattern (which queues to the task pool) could leave us open to callback-ordering bugs if we mutating state. Also, the protocol of begin-invocations and their callbacks might be too convoluted and hence impossible to follow. I read a post-mortem the other day about a silverlight project having problems seeing the business logic-forest for all the callback-trees. Then there's the possibility of implementing the poor-man's async monad, the `IEnumerable` with an `async 'manager'` iterating through it and calling `MoveNext()` every time a yielded `IAsyncResult` completes.

...and don't get me started on the nuuuumerous hidden protocols in `IAsyncResult`.

Another problem, without using Reactive extensions is *the turtles problem* - once you decide that you want an IO-blocking operation to be `async`, there need to be turtles all the way down to the p/invoke call that places the associated Win32-thread on an IO-completion port! If you have three layers and then some logic as well inside of your topmost layer, you need to make all three layers implement the APM pattern; and fulfil the numerous contract obligations of `IAsyncResult` (or leave it partially broken) -- and there's no default public `AsyncResult` implementation in the base class library.

>>>

Working with exceptions from the interface

Even with the above memory-management + parallelism + contract + protocol items covered, there are still exceptions to be *handled* (not just received and forgotten about), in a good, reliable application. I want to make an example;

Context

Let's say that we find ourselves catching an exception from the contract/interface (not necessarily from reactive extensions' IObservable implementations here which have monadic exception handling rather than stack-frame based).

Hopefully the programmer was diligent and documented the possible exceptions, but there might be exception possibilities all the way down. If everything is correctly defined with code contracts at least we can be sure we are capable of catching a few of the exceptions, but many different causes may be lumped together inside of one exception type, and once an exception is thrown, how do we ensure that the **work of the least possible size is rectified?**

Aim

Say that we are pushing some data-record from a message-bus-consumer in our application, and receiving them on the background thread which decides what to do with them.

Example

A real-life example here could be Spotify, which I'm using every day.

My \$100 router/access point throws in the towel at random times. I guess it has a cache-bug or some sort of stack overflow bug, as it happens every time I push more than 2 MB/s LAN/WAN data through it.

I have to NICs up; the wifi and the ethernet card. Ethernet's connection goes down. The sockets of Spotify's event-handler loop return an invalid code (I think it's C or C++) or throw exceptions. Spotify has to handle it, but it doesn't know what my network topology looks like (and there is no code to try all routes/update the routing table and hence the interface to be used); I still have a route to the internet, but just not on the same interface. Spotify crashes.

A thesis

Exceptions are simply not semantic enough. I believe one can look at exceptions from the perspective of the Error monad in Haskell. We either continue or break: unwinding the stack, executing the catches, executing the finally's an praying we don't end up with race conditions on either other exception handlers or the GC, or async exceptions for outstanding IO-completion ports.

But when one of my interfaces' connection/route goes down, Spotify crashes freezes.

Now we have SEH/Structured Exception Handling, but I think we will have SEH2 in the future, where each source of exception gives, with the actual exception, a discriminated union (i.e. it should be statically typed to the linked library/assembly), of possible compensating actions -- in this example, I could imagine Windows' network API telling the application to execute a compensating action to open the same socket on another interface, or to handle it on its own (like now), or to retry the socket, with some kernel-managed retry policy. Each of these options are parts of a discriminated union type, so the implementer must use one of them.

I think that, when we have SEH2, it won't be called exceptions anymore.

^^

Anyway, I have digressed too much already.

Instead of reading my thoughts, listen to some of Erik Meijer's -- this is a very good [round-table discussion between him and Joe Duffy](#). They discuss handling side-effects of calls. Or have a look at [this search listing](#).

I'm finding myself in a position, today, as a consultant, of maintaining a system where stronger static semantics could be good, and I'm looking at tools which can give me the speed of programming + the correctness verification on a level which is accurate and precise. I haven't found it yet.

I simply think we are another 20 years if not more away from developer oriented reliable computing. There are just too many languages, frameworks, marketing BS and concepts in the air right now, for the ordinary developer to stay on top of things.

Why is this under the heading of "weak types"?

Because I find that the type system will be part of the solution; types need not be weak! Terse code and strong type systems (think Haskell) help programmers build reliable software.

413.<https://stackoverflow.com/questions/6803008/can-i-convert-a-non-mvc-asp-net-application-to-be-azure-compatible/6806251#6806251>

T: Can I convert a non-MVC asp.net application to be Azure compatible?

Q: Can I convert a non-MVC asp.net application to be Azure compatible ? Or If i want to create an Azure web application, should it be MVC one ?

A: The other answers answered your question about converting your app to MVC for deployment to Azure (you don't need to).

If you're creating a new web application and go with ASP.NET MVC (which I'd recommend), just remember if you go with MVC3, you may have to make some of the MVC3 DLL's CopyLocal for your deployment, as it won't be part of your web role instance. At least that's how I still understand it. The 1.4 SDK of the Azure SDK doesn't have a MVC3 Web Role template yet.

See this [post](#) on steps to get your MVC3 app Azure-ready.

A2: You may take a look at the [following blog post](#) for migrating an existing ASP.NET application to Azure. It should not necessarily be an ASP.NET MVC application. Any ASP.NET application will work.

A3: Yes, you can. But you need to be aware of certain limitations too, none of which were mentioned in the answers already given:

1. **Your application should be stateless**, unless you are running a single instance (for most apps 99,9% reliability is OK, but there are some where you want 99,95%, so you need at least two instances + it gives you additional benefits of a load balancer, etc.). The reason for this is that if you have more than one instance, the load balancer will deliver the request to a different instance. You can use [AppFabric Cache](#) to solve this.
2. **You don't have a file system** - this is not entirely true, but in reality you should never rely on having local files. All your image uploads (e.g. user profile pictures) should be uploaded to a blob storage and linked to there. How you do this is another matter, and one that can be approached differently depending on the architecture of your existing application. You can get away with files, by using Azure Drive, but it's slow as hell.
3. **No Event Log / RDP** - this is also only partially true, but you should rely on other ways of getting diagnostics information from your role. While you can RDP to your role instance, there are better ways (e.g. Azure Diagnostics storage).
4. **Database** should be chosen carefully. Sure, you have SQL Azure available, but it's *expensive* (1 GB = 10 USD/ month). If you can get away with stuff like Table Storage, you may save on some costs. Again, this depends a lot on the architecture.

As for the second part of your answer. MVC as a pattern is nice. It saves you a lot of time, it's much more adaptable for the Web as WebForms ever will be. The event based system was designed for Desktop applications, and it was forced onto the web. However, going to Azure does not imply a requirement to go to MVC. What I suggest you do however, is treat it as a nice jump-start opportunity to look into MVC and see how it could help you write your apps better & faster.

As with any other case involving architecture of apps, **it depends**. If you used common patterns (e.g. IOC, Repository), you will have a really easy time moving any app to Azure.

414. <https://stackoverflow.com/questions/40272126/publishing-to-message-queue-from-web-api/45224692#45224692>

T: Publishing to message queue from Web API

Q: I have a ASP.Net Web Api application that updates some entities in a database using Entity Framework. When certain ones are updated I plan to publish the updated to an Azure Service Bus queue which is then picked up and handled by other systems.

I'm not too sure how to kick off the process of adding the message to the queue from the Web Api. I know I can't do too much after I have returned a response in the api so wasn't sure whether to run the code then, or possibly raise an event. But then I don't want to have a message queue to add messages to the main queue.

I don't want this to impact the response time to the user so do want to do it asynchronously. Any ideas?

415. <https://stackoverflow.com/questions/232681/what-does-it-take-to-be-a-better-oo-programmer/874157#874157>

T: What does it take to be a better OO programmer?

Q: I've almost 6 years of experience in application development using .net technologies. Over the years I have improved as a better OO programmer but when I see code written by other guys (especially the likes of Jeffrey Richter, Peter Golde, Ayende Rahien, Jeremy Miller etc), I feel there is a generation gap between mine and their designs. I usually design my classes on the fly with some help from tools like ReSharper for refactoring and code organization.

So, my question is “what does it takes to be a better OO programmer”. Is it

- a) Experience
- b) Books (reference please)
- c) Process (tdd or uml)
- d) patterns
- e) anything else?

And how should one validate that the design is good, easy to understand and maintainable. As there are so many buzzwords in industry like dependency injection, IoC, MVC, MVP, etc where should one concentrate more in design. I feel abstraction is the key. What else?

A1: you'll probably find that the elegant OO designs that you admire *are not the first iteration*, but result from several adjustments, refactorings, and fine-tunings
try to qualify why you think their designs are 'better' than yours, and adjust accordingly

the difference between an amateur writer and a professional writer is that the professional *rewrites*; the same holds for programming

A2: Object oriented skills can be learned from books and other resources. But if you are lucky, you inherit the skills from your parent. Most of the time it is a matter to provide and use the correct method. Be careful about the amount of arguments. Less is better.

Use the right names for anything. Use verbs as a method of activity. Use nouns for anything that needs to be remembered. Don't be too creative and keep your solution as simple as possible, else your users will be confusers.

It is also important to encapsulate the nasty details. And be sure to hide your private members for the general public else the unexpected behaviour will occur. Be also aware to catch your exceptional situation at the right level.

Rest me to press you to always test your units and to use the right interface to provide just enough handles for the happy user.

A3: A little bit of everything. As for any language (verbal ou programming), the more you'll get exposed to it, the more you'll learn.

So read books, read your coworkers code. And at least as much important, learn new programming languages: they will broaden your vision, make you more critical of your own code and allow you to rethink your programming habits.

About design patterns, they are a de-facto standard way to work around common problems in common languages. You must know them to avoid reinventing the wheel and better communicate with your coworkers, but you should also see them as working around missing features in the languages you are using. The state machine pattern exists only in languages that don't provide them as builtins (not that I know a language that provides them, but you get the picture).

I would also add:

- always refactor if needed and time permits (harmless since you have unit tests to avoid regressions, of course).
- learn when to avoid inheritance (which is more often than you think).
- learn when to avoid OO (when it doesn't add any value).
- don't confuse OO with encapsulation (which is the main benefit of OO but is also provided by other paradigms).

A3: Good OO design:

- it reads like poetry
- doesn't need any comment
- trust your objects (let the control go)
- favor composition over inheritance

416. <https://stackoverflow.com/questions/3846107/learning-the-basics-of-wcf/28579655#28579655>

T: Learning the basics of WCF

Q: For those just starting to learn WCF, what are the major/basic things I should look at and learn first?

What concepts would you recommend to learn first, to be productive in WCF?

What resources/articles/training/books would you recommend to someone learning WCF?

In C#, for example, one can learn LINQ at a later stage. Along similar lines, in WCF also there should be basics to learn first, and then later invest time in advanced features to enhance productivity.

A1: The book I always recommend to get up and running in WCF quickly is Learning WCF by Michele Leroux Bustamante. She covers all the necessary topics, and in a very understandable and approachable way. This will teach you everything - basics, intermediate topics, security, transaction control and so forth - that you need to know to write high quality, useful WCF services.

A2: I like this one: <http://wcfguidanceforwpf.codeplex.com/>

It's aimed at WPF developers who want to learn WCF, but I would recommend it even if you aren't that familiar with WPF either.

Also, I always suggest to people to use a tutorial that shows WCF working without using Visual Studio's "Add Service Reference," which is a tool in VS that you can point at a WCF or other web service and have it generate a bunch of foundational classes that help you connect to that service easily. Most tutorials will have you create a service and then create a client for that service using Add Service Reference, at least to start with.

I highly recommend a tutorial like the above, or this one if you want to start typing sooner (bugmenot.com has devx.com logins you can use if you don't want to register) that goes beyond that and shows you how to do it "by hand", because it really reinforces the core idea of WCF, which is that if an app wants to consume a service, all it needs to know is the ABC's: the address of the service, the type of binding to use, and the contracts (the methods on the service and the classes it uses as parameters and return types).

Also note that a lot of tutorials still out there are for VS2008. Not much has changed, but one thing that can confuse newcomers is that the XML configuration for bindings has been reworked in .NET 4 / VS2010 to make better use of defaults. The config files that VS 2010 will generate for you to start with are shorter than they used to be and look like they are missing required information, but in fact they are just using defaults.

A3: If you want to learn the basics fast (the ABC's), look at [Dime Casts, WCF](#).
Videos (around 10 minutes each)

- Introduction to WCF: Creating your first service
- Migrating from .asmx web services to WCF web services
- Learn how to consume a WCF service
- Taking a look at how to separate out your WCF service project into multiple parts
- Adding [IoC](#) support to your WCF Services

That means you can have a good idea within an hour :) Epic win

A4: Learn the ABC of WCF: "Address, Bindings, Contracts".

Best is to look for tutorials on the Internet as they have mentioned above, and to then create your own Service, host that service in a console app and then use VS2008/10 Add Service Reference to create the client interface to your wcf service.

When you get the hang of things, you must definitely invest in either Michelle's book or Juval's book, they are the best in the industry.

There are a lot of information which can really make it difficult to learn WCF but focus on the ABC and start with a specific binding and address type and work your way from there.

A5:

417. <https://stackoverflow.com/questions/42410226/why-does-process-creation-using-clone-result-in-an-out-of-memory-failure/42755694#42755694>

T: Why does process creation using 'clone' result in an out-of-memory failure?

Q: I have a process that allocates about 20GB of RAM on a 32GB machine. After some events, I'm streaming the data from the parent process to stdin of the child process. It's mandatory to keep the 20GB of data in the parent process at the point when the child is spawned.

The app is written in Rust and I'm calling `Command::new('path/to/command')` to create the child process. When I spawn the child process the operating system is trapping an out-of-memory error.

strace output:

```
[pid 747] 16:04:41.128377 clone(child_stack=0,  
flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD, child_tidptr=0x7ff4c7f87b10) = -1  
ENOMEM (Cannot allocate memory)
```

Why does the trap occur? The child process should not consume more than 1GB and exec() is called immediately after clone().

A: The Problem

When a child process is created by the Rust call, several things happen at a C/C++ level. This is a simplification, but it will help explain the dilemma.

The streams are duplicated (with dup2 or a similar call)

The parent process is forked (with the fork or clone system call)

The forked process executes the child (with call from the execvp family)

The parent and child are now concurrent processes. The Rust call you are currently using appears to be a clone call that is behaving much like a pure fork, so you're 20G x 2 - 32G = 8G short, without considering the space needed by the operating system and anything else that might be running. The clone call is returning with a negative return value and errno is set by the call to ENOMEM errno.

If the architectural solutions of adding physical memory, compressing the data, or streaming it through a process that does not require the entirety of it to be in memory at any one time are not options, then the classic solution is reasonably simple.

Recommendation

Design the parent process to be lean. Then spawn two worker children, one that handles your 20GB need and the other that handles your 1 GB need1. These children can be connected to one another via pipe, file, shared memory, socket, semaphore, signalling, and/or other communication mechanism(s), just as a parent and child can be.

Many mature software packages from Apache httpd to embedded cell tower routing daemons use this design pattern. It is reliable, maintainable, extensible, and portable.

The 32G would then likely suffice for the 20G and 1G processing needs, along with OS and lean parent process.

Although this solution will surely solve your problem, if the code is to be reused or extended later, there may be value in looking into potential process design changes involving data frames or multidimensional slices to support streaming of data and memory requirement reductions.

Memory Overcommit Always

Setting overcommit_memory to 1 eliminates the clone error condition referenced in the question because the Rust call calls the LINUX clone call that reads that setting. But there are several caveats with this solution that point back to the above recommendation as superior, primarily that the value of 1 is dangerous, especially for production environments.

Background

Kernel discussions about OpenBSD rfork and the clone call ensued in the late 1990s and early 2000s. The features stemming from those discussions permit less extreme forking than processes, which is symmetrically like the provision of more extensive independence between pthreads. Some of these discussions have produced extensions to the traditional process spawning that have entered POSIX standardization.

In the early 2000s, Linux Torvalds suggested a flag structure to determine what components of the execution model are shared and what are copied when execution forks, blurring the distinction between processes and threads. From this, the clone call emerged.

Over-committing memory is not discussed much if any in those threads. The design goal was MORE control of the results of a fork rather than the delegation of memory usage optimization to an operating system heuristic, which is what the default setting of `overcommit_memory = 0` does.

Caveats

Memory overcommit goes beyond these extensions, adding the complexity of trade-offs of its modes², design trend caveats³, practical run time limitations⁴, and performance impacts⁵.

Portability and Longevity

Additionally, without standardization, the code using memory overcommit may not be portable, and the question of longevity is pertinent, especially when a setting controls the behavior of a function. There is no guarantee of backward compatibility or even some warning of deprecation if the setting system changes.

Danger

The linuxdevcenter documentation² says, "I always overcommits. Perhaps you now realize the danger of this mode.", and there are other indications of danger with ALWAYS overcommitting ^{6, 7}.

The implementers of overcommit on LINUX, Windows, and VMWare may guarantee reliability, but it is a statistical game that, combined with the many other complexities of process control, may lead to certain unstable characteristics under certain conditions. Even the name overcommit tells us something about its true character as a practice.

A non-default `overcommit_memory` mode, for which several warnings are issued, but works for the immediate trial of the immediate case may later lead to intermittent reliability.

Predictability and Its Impact on System Reliability and Response Time Consistency

The idea of a process in a UNIX like operating system, from its Bell Labs beginnings, is that a process makes a concrete requests to its container, the operating system. The result both predictable and binary. Either the request is denied or granted. Once granted, the process is given complete control and direct access over the resources until the use of it is relinquished by the process.

The swap space aspect of virtual memory is a breach of this principle that appears as gross deceleration of activity on workstations, when RAM is heavily consumed. For instance, there are times during development when one presses a key and has to wait ten seconds to see the character on the display.

Conclusion

There are many ways to get the most out of physical memory, but doing so by hoping that use of memory allocated will be sparse will likely introduce negative impacts. Performance hits from swapping when overcommit is overused is the well documented example. If you are keeping 20G of data in RAM, this may particularly be the case.

Only allocating what is needed, forking in intelligent ways, using threads, and freeing memory that is surely no longer needed lead to memory thrift without impacting reliability, creating spikes in swap disk usage, and can operate without caveat up to the limits of system resources.

The position of the designer of the `Command::new` call may be based on this perspective. In this case, how soon after the fork the `exec` is called is not a determining factor in how much memory is requested during the spawn.

418. <https://stackoverflow.com/questions/18915812/simple-architecture-for-asp-net-mvc-using-database-first-ef>

Q: Background

I am coming from 3 tier architecture of ASP.NET background. I have used Unit Tests directly on layers and never tried mocking of layers. All application are developed with EF Database First and separate POCOs and Infrastructure project handles the plumbing work of the application. Applications developed are of small to medium size.

Progress so far

Since I started learning ASP.NET MVC, One of the first questions was to how to create layers for solution. For last 15 days I am learning and hunting for good architecture to learn and follow in this and future MVC projects. I have went through following architecture patterns/sites and found them too complex for my own good. Some of the main concerns

- Inherit complexity of the project which makes it difficult to work with for new programmers
- Sharp learning curve
- Too many unit tests for every layer to test redundant behaviors (minor)
- Relatively slow compilation during development

Sites / Project I tried

- Sharp Architecture
- Onion Architecture
- Neard Dinner
- Project SiLK (Microsoft)

Main Dilemmas

- I found that most common thing among these projects is Repository Patterns and Dependency Injection (IoC). Though I do not have anything against it, I found it hard to maintain and understand projects. I have executed fairly large projects with 3 tier architecture, with so-called "tight coupling" with adequate Unit tests to test the project. I feel architecture will be better off without these involved.
- Huge emphasis on TDD and DDD
- Concept of loosely coupled is far stretched
- Loosing focus on MVC as pattern and dominating architecture with other parts

Required Simple, easy to understand, **maintainable** architecture for MVC projects

Note: I came across this good implementation structure from jimmy bogard's [Organizing ASP.NET MVC solutions](#). I would still appreciate any suggestions on this topic.

A: Required Simple, easy to understand, maintainable architecture for MVC projects

Go for [NidoFramework](#). It is just what you are looking for. It is free, simple, well design code framework with a good architectural pattern.

I must say [Nido framework](#) will hit the head of the nail for you for your requirement..

Link: <https://nidoframework.codeplex.com>

Download from [NuGet](#)

A2: Background

After so much of looking backward and forward I have settled on using Onion Architecture for my ASP.NET MVC WebAPI project.

In this course I found my self struggling to keep up with new development methodologies and frameworks. Fact is whoever is looking for creating new application based on three tier structure or similar existing structure, need to "let go" and embrace new foundations. Advances in the new development philosophies like TDD and BDD are immense and are nothing but helpful.

Web and supported technologies are different beasts than that I know of. Truth is MVC and MVC WebAPI got developed cause existing Web Forms framework could not keep up with new developments.

Technology Stack

It took time and patience to unlearn and learn. But finally I find myself at new level and with the flow of mainstream developments. Following is final technology stack adopted by me (in no particular order).

Backend

- ASP.net MVC WebPI
- Onion Architecture
- EF database first (cause it was suited for my project)
- Generic Repositories

Frontend

- Bootstrap UI (as UI design framework and skipped jQuery UI)
- Typescript (for strongly typed JavaScript, so no direct JS in project)
- AngularJS (as front-end MVC)
- LESS CSS (for robust and maintainable CSS, so no direct CSS in project)
- Breeze.js (for model binding and change tracking)

Testing - In process of finalizing

Along with above I have used and created bunch of T4 templates to take care of redundant tasks. I would suggest master yourself in it. It reduces development time considerably. I am still making my mind for some of the tools and project and testing. I will post the finalized stack of it once am done.

Above stack may look comprehensive but I found myself it as necessity to built highly maintainable and responsive web application. As I mentioned before, it takes time, but once you are familiar with it, it makes sense. Note: Of all, learning curve of AngularJS very steep and you will find yourself going back and forth on decision to use it. But stick to it, its worth it.

@Steven: Thanks a bunch for your link, it really was corner stone for me to unravel mysteries of new Web.

419. <https://stackoverflow.com/questions/45241581/microservices-vs-functions-as-service-faas>

T: Microservices vs functions as service (faas)

Q: Microservice architecture is/was next big thing. Easy to deploy, easy to develop, not as complicated to scale and develop as monolith systems.

Oriented mostly towards containers, it all looked new and promising, but i recently discovered there is a new hype about function as service or faas (aws lambda for example).

Wikipedia says the following about Faas "Building an application following this model is one way of achieving a "serverless" architecture, and is typically used when building microservices applications."

My conclusion was that in faas one should not worry about maintaining hardware and network resources. But is that the only advantage? Could microservice architecture pattern be fully achieved using functions as service?

A: Yes, as long as the other microservices would not know or care that the Faas microservice is using this kind of technology. That's the beauty of the microservices architecture: you could have anything inside a microservice as long as it communicates to the outside world using a technology agnostic protocol that hides the underlying technology stack (yes to JSON, no to Sql protocol - database/table sharing).

420. <https://stackoverflow.com/questions/2979323/reusability-testability-code-complexity-reduction-and-showing-off-ability-prog>

T: Reusability, testability, code complexity reduction and showing-off-ability programming importance

Q: There are lots of programming and architecture patterns. Patterns allow to make code cleaner, reusable, maintainable, more testable & at last (but not at least) to feel the follower a real cool developer.

How do you rank these considerations? What does appeal you most when you decide to apply pattern?

A1: Code complexity reduction ranks high, if I keep things simple, I can maintain the project better and work on it faster to add/change features.

Reusability is a tool, one that has its uses, but not in every place. I usually refactor for reusability those components that show a clear history of identical use in more than three places. Otherwise, I risk running into the need of specialized behavior in a place or two, and end up splitting a component in a couple of more specialized ones that share a similar structure, but would be hard to understand if kept together.

Testability is not something I personally put a lot of energy in. However it derives in many cases from the reduced code complexity: if there are not a lot of dependencies and intricate code paths, there will be less dangers to break tests or make them more difficult to perform.

As for showing-off-ability... well... the customer is interested in how well the app performs in terms of what he wants from it, not in terms of how "cool" my code is. 'nuff said

A2: I think you missed the single most important one from your list - more maintainable. Code that is well and consistently structured (as you get with easily reusable code) is much more easily maintained.

And as for reusability, then yes, on a number of occasions, usually something like : create a web page to save/update some record. Some months later - we need to expose this as a service for a third party to consume - if your code is structured well, this should be easy and low risk, as you're only adding a new front end.

A3: I hope most people use patterns to learn how to solve design problems in certain context. All those non-functional requirements you mention can be really important depending on stakeholder needs for a project. As for MVC etc. it is not meant only to be reused between projects, that is often not possible or a good idea. The benefits you get from MVC should be important in the project you use that architecture. You can change independently details in view and models, you can reuse views with controllers for different models, you should be able to change persistence details without affecting your controllers and views. All this is imho very important during development of a single project.

A4: "Code reusability" as defined in many books is more or less a myth. Try to focus more on easy to read - easy to maintain. Don't start with "reusability" in mind, will be better if you will start to think first on testability and then to reuse something. Is important to deliver, to test, to have clean code, to refactor, to not repeat yourself and less important to build from the start components that can be reused between projects. Whatever is to be reused must be a natural process, more like a discovery: you see a repetition so you build something that can be reused in that specific situation.

421. <https://stackoverflow.com/questions/13109263/what-was-mvc-invented-for/13109595#13109595>

T: Any open source application applying design patterns for multithreading?

Q: I have a multithreading MFC application. But I don't want to have hacky code for threading as it will cause headaches to maintain the system. So I am looking for right patterns for the threading code.

I have read [Pattern-Oriented Software Architecture: Patterns for Concurrent and Networked Objects \(POSA2\)](#) but after that reading, I can't help but feel lost somewhere. I think I'd better look at real application applying these design patterns. It does not have to be MFC application or windows application since I want to look at usage of the patterns. Can you give any hint or advice on this?

422. <https://stackoverflow.com/questions/8515535/any-testable-architecture-or-design-pattern-for-a-mfc-application>

T: Any testable architecture or design pattern for a MFC application?

Q: This question has been bugging me for a while.

I am looking for a testable architectural design pattern for a MFC application. Please don't tell me MFC is already MVC or something like that because it does not make any sense as long as we can't test the app.

I understand the rule of thumb is to make it View/Document as dumb as possible and make other classes testable. But I want more details on that. How can I make View/Document as dumb as possible and connect them to other testable classes?

First I thought about MVP since I had some success with it for Windows .NET and Android app. But in this MFC case, we need to make Document dumb too. That complicates things.

I need an effective architecture which is maintainable in long term. Any advice from experienced developer would be appreciated.

A: Testing GUI's is still a terrible task. There are tools to help you track and replay interactive input. I used some of this API (code stolen from Perl) to inject keypress events into another application (to open a new url in firefox without always open a new tab). But it's not really good enough for testing.

Advanced tools costs multi kilo dollar and come with external script languages and usability reports are divided.
http://en.wikipedia.org/wiki/List_of_GUI_testing_tools

There are two different areas in GUI testing. One is filling out dialogs with user options and the other is the model/view testing.

The first can easily solved with a few coding rules. For example dialogs do not modify anything but take and return classes with all the options. In this case you can simply replace the dialog code with your own code. This is the easy part. In my code dialogs modify the ini file settings and then just notify the model with a few hints what has changed.

Testing the view and model is much harder. If it is about drawing you can try to use the WM_PRINT message to capture the view and then run your test and compare its output with the previous captured data. If the bitmaps are the same the test passes. I've never really seen this technique applied in real world, except in one toolkit where it used it to test pixel exact drawing on multiple platforms.

Next is testing a model based on interactive code. As mentioned before key events are easier to emulate most translate directly to separated command handling code anyway, so you just test the commands not the key event handler. Mouse selection and manipulation, for example object selection on a canvas is much harder. Either use one of this test tools that promise to capture and replay mouse actions or pray.

There are many different ways depending on your own code base, if you abstract from MFC good enough to use mock GUI objects instead of real MFC windows. And if you already embedd a script language which can help you to test things etc. I'm sorry there are no simple pattern. It has to be decided case by case.

My own experience is that I don't like unit testing GUI's and unit testing at all. It's often not worth the time. I'm using Eiffel and Design by Contract (this means lots of assert statements) and do extensive beta tests with customers and let the customers find the remaining bugs. Most bugs are untestable usability bugs anyway.

A: You mean MVC? It's there in doc/view architecture but the controller part is somewhat missing. You can still accomplish good things separating GUI from data but the real advantage of separating model from view is that you can use it elsewhere but that doesn't come easy with doc/view to say the least.

Edit: Add on: As for as testing capabilities, MFC application comes with command line processing. You could build on that and send testing commands to the application from command prompt.

A2: I don't think you may need any special design pattern to separate logics from UI. MVP can help but may not be practically necessary. The separation would be enough for testing if you can make your logics into separate dlls or static libraries and make them accessible from other applications. That will be a good start to practically make your logics to be testable.

But even before that, I would find a good testing framework for your development environment. I had some success with Google Testing framework or Boost Testing in case of MFC.

As for design patterns, they are very good to make your program maintainable and maximize code reuse, but I am not sure it's a good practice to use them to make your program testable. Testability is a good property of your program but it may not be the goal of your design.

423. <https://stackoverflow.com/questions/6406804/grails-vs-asp-net-in-architecture-response-time-and>

T: Grails vs. ASP.net in Architecture, Response Time and

Q: I am looking for a good platform to rewrite a growing website with huge amount of daily and concurrent visitors! so the Required Parameters are:

- Render Time With minimum CPU and Memory Usage
- Response Time
- Extendability in Architecture (Best support for new features)
- Maintainability
- Security Capabilities
- Minimum Hardware usage

I know Spring, GORM, but they will slow it down! also I did not mentioned ASP.net MVC because of Tradeoff between Speed and MVC Pattern Benefits!

I know that all of these parameters should be considered as a tradeoff so then I can choose my best fitting platform! Can some body provide a good and reliable comparison between GRails and ASP.net in Items provided above ?

424. <https://stackoverflow.com/questions/10518507/php-mvc-framework-maximum-6-includes-per-action>

Q: I'm developing a small PHP-MVC framework which's main principle is simplicity of use and debug and also portability, performance (above all) and ultra-easy learning curve. In my framework, the router and the controller are in the same file, because I don't really use a router, I simply parse actions from the _GET and _POST So my idea is to try to, no matter what action is being called, never (or almost never) do more than 6 includes (include()). The idea of this is to sustain readability and performance at their best. What you guys think? Do you think it's a good idea or not?

In my framework, the router and the controller are in the same file, because I don't really use a router, I simply parse actions from the _GET and _POST So my idea is to try to, no matter what action is being called, never (or almost never) do more than 6 includes (include()). The idea of this is to sustain readability and performance at their best.

What you guys think? Do you think it's a good idea or not?

A1: many includes are no problem, at least not with opcode caching extensions like xcache or apc. they cache the classes in memory and hold them for later usage (nearly instant).

you should plan the class interaction with something like uml and prefer single responsibility of classes and methods over using less of them.

if you like mvc you might want to look at h-mvc as it enables hierarchical controller calls using mvc. also you should try to decouple the view from the template engine.

A2: The point of using includes in the first place is to narrow down what you need so you don't wind up running code or defining functions you won't be using at all. Many lightweight frameworks out there build on this idea: "use only as needed". Of course if your framework only requires 6 files, sure it cleans up the code a bit but then you run into other problems such as loading time, functionality, usefulness, reusability, memory, readability, debugging, maintainable... It's just not practical in my opinion to force yourself down to 6 files only.

425. <https://stackoverflow.com/questions/38460281/n-tier-architecture-using-asp-net-5-mvc-6>

T: N-Tier Architecture using ASP.NET 5 (MVC 6)

Q: CemaManager (representative layer) has reference to Helpers, Resource, ViewModel and BLL. BLL has reference to ViewModel, Database and DLL. DLL has reference to Database.

Typical N-tier architecture using DI and Repository pattern.

When I investigate MVC6 there is startup.cs where DI initialize. That means if I want to separate BLL and DAL they will have all reference to MVC6 and all logic will go thru that layer? By the time It's gonna be heavy and hard to maintain and scale or am I wrong?

Is there any way to export startup.cs or DI method to another layer? Maybe somebody know any articles to read or examples?

A: Personally I have a few things I would change about the overall structure, but I'm guessing a full design review isn't really what you're asking for. ON your actual question, no - your other layers do not need to reference MVC.

For most any application, IoC needs to be configured and initialized in the presentation layer. Ultimately your presentation layer needs a reference chain (direct or indirect references) to everything you want to register, but this has always been true.

You are already referencing Helpers, Resource, ViewModel, and BLL so you can easily register implementations for the interfaces in those layers. You could also add a reference to DLL to register implementations from that layer.

You can also go the indirect route and add a class in each layer which takes a reference to your IoC container and handles its own registration. In Autofac this is done using [modules](#) but there are equivalent ways of accomplishing the same thing using other IoC containers.

426. <https://stackoverflow.com/questions/24392181/entity-framework-6-database-first-and-onion-architecture>

T: Entity Framework 6 Database-First and Onion Architecture

Q: I am using Entity Framework 6 database-first. I am converting the project to implement the onion architecture to move towards better separation of concerns. I have read many articles and watched many videos but having some issues deciding on my solution structure.

I have 4 projects: Core, Infrastructure, Web & Tests.

From what I've learned, the .edmx file should be placed under my "Infrastructure" folder. However, I have also read about using the Repository and Unit of Work patterns to assist with EF decoupling and using Dependency Injection.

With this being said:

- Will I have to create Repository Interfaces under CORE for ALL entities in my model? If so, how would one maintain this on a huge database? I have looked into automapper but found issues with it presenting IEnumerables vs. IQueryable but there is an extension available it has to help with this. I can try this route deeper but want to hear back first.
- As an alternative, should I leave my edmx in Infrastructure and move the .tt T4 files for my entities to CORE? Does this present any tight coupling or a good solution?
- Would a generic Repository interface work well with the suggestion you provide? Or maybe EF6 already resolves the Repository and UoW patterns issue?

Thank you for looking at my question and please present any alternative responses as well.

I found a similar post here that was not answered: [EF6 and Onion architecture - database first and without Repository pattern](#)

A: Database first doesn't completely rule out Onion architecture (aka Ports and Adapters or Hexagonal Architecture, so you if you see references to those they're the same thing), but it's certainly more difficult. Onion Architecture and the separation of concerns it allows fit very nicely with a domain-driven design (I think you mentioned on twitter you'd already seen [some of my videos on this subject on Pluralsight](#)).

You should definitely avoid putting the EDMX in the Core or Web projects - Infrastructure is the right location for that. At that point, with database-first, you're going to have EF entities in Infrastructure. You want your business objects/domain entities to live in Core, though. At that point you basically have two options if you want to continue down this path:

- 1) Switch from database first to code first (perhaps using a tool) so that you can have POCO entities in Core.
- 2) Map back and forth between your Infrastructure entities and your Core objects, perhaps using something like AutoMapper. Before EF supported POCO entities this was the approach I followed when using it, and I would write repositories that only dealt with Core objects but internally would map to EF-specific entities.

As to your questions about Repositories and Units of Work, there's been a lot written about this already, on SO and elsewhere. You can certainly use a generic repository implementation to allow for easy CRUD access to a large set of entities, and it sounds like that may be a quick way for you to move forward in your scenario. However, my general recommendation is to avoid generic repositories as your go-to means of accessing your business objects, and instead use Aggregates (see DDD or my DDD course w/Julie Lerman on Pluralsight) with one concrete repository per Aggregate Root. You can separate out complex business entities from CRUD operations, too, and only follow the Aggregate approach where it is warranted. The benefit you get from this approach is that you're constraining how the objects are accessed, and getting similar benefits to a Facade over your (large) set of database entities.

Don't feel like you can only have one dbcontext per application. It sounds like you are evolving this design over time, not starting with a green field application. To that end, you could keep your .edmx file and perhaps a generic repository for CRUD purposes, but then create a new code first dbcontext for a specific set of operations that warrant POCO entities, separation of concerns, increased testability, etc. Over time, you can shift the bulk of the essential code to use this, while still keeping the existing dbcontext so you don't lose any current functionality.

A2: I am using entity framework 6.1 in my DDD project. Code first works out very well if you want to do Onion Architecture.

In my project we have completely isolated Repository from the Domain Model. Application Service is what uses repository to load aggregates from and persist aggregates to the database. Hence, there is no repository interfaces in the domain (core).

Second option of using T4 to generate POCO in a separate assembly is a good idea. Please remember that your domain model (core) should be persistence-ignorant.

While generic repository are good for enforcing aggregate-level operations, I prefer using specific repository more, simply because not every Aggregate is going to need all of those [generic repository operations](#).
<http://codingcraft.wordpress.com/>

427. <https://stackoverflow.com/questions/4546440/is-it-okay-to-consume-repositories-and-services-from-a-same-controller/4546548#4546548>

T: Is it Okay to consume repositories and services from a same controller?

Q: I use repositories to perform basic CRUD operations and I use services to implement business logic with these repositories.

I tend to use repositories and services at the same time within controllers. My question is -is this Okay in terms of a standard architecture? Should I move my basic repositories to basic services, so my controllers only consume services, not repositories? Hope this make sense, thank you.

A1: I'd recommend you to put your Repositories behind the Services, so the Controllers would only consume Services. That way you:

- Maintain nice layered architecture (Onion Architecture pattern);
- Keep your Controllers Actions clean and clear.

Actually, nothing stops you from injecting Repos along with Services into your Controllers but it just feels wrong - what is the point of Services existence then?

A2: It's OK as long as you don't put any biz logic in the controller. There's no point in creating a new service class that wraps the repository if it doesn't add any logic/behavior.

I tend to use repositories and services at the same time within controllers.

Think about the controller/action functionality and its dependencies, if you are using repositories and services then you should probably create a new service class that wraps the functionality, and make the controller/action depend on that single service. Actions should ideally depend on one service only.

I've had controllers call repositories directly when all I need is CRUD (e.g. admin app).

428.<https://stackoverflow.com/questions/3879440/need-an-advice-about-applications-architecture/3879552#3879552>

T: Need an advice about application's architecture

Q: I am trying to build an application's architecture these days and I will be glad to hear some advice. Here are some details about the application itself. It has a web UI where customers could register and pay (with credit card) for some sort of services. They have to provide some info because these services are based on it. For example dates to schedule the service work. Of course they always can check the status of their order via the site.

Also I have a database (classic relational database or NO-SQL database I am not sure what is better in my case) that located on other physical machine. So I have to take customers' info and store it into the db in order to make some work based on it. Besides there is a windows service or its Linux analogue that makes the main job. It should create processes based on the information in database to do the job. In other word the services I mentioned in the beginning provided not by business logic of the web site but of the windows service. Of course during its work this service stores an information back to my database or update it in some way.

Recently I have read the book about applications architecture from Microsoft and they introduce there many approaches to build an application. For example DDD or Client / Server or Components based architecture and so on. I am really confused what is the most suitable in my case. Could someone please advise me something. Thanks in advance.

A1: Take 10 steps back and learn programming. Seriously.

Recently I have read the book about applications architecture from Microsoft and they introduce there many approaches to build an application. For example DDD or Client / Server or Components based architecture and so on

This is part of your problem. MS did none of that. These concepts were around 20 years ago. They were around 10 years ago. The Book from MS basically just presents them to you. You think a book makes you someone understanding them?

Things are a little more complicated.

Take your question, replace "application" with "car" etc. and you may realize how really funny the question is. "Need advice about car architecture" etc. - you seem to have a VERY shallow understanding of even what you are talking about.

Also I have a database (classic relational database or NO-SQL database I am not sure what is better in my case)

You know what a relational database is about? Ever heard of ACID conditions? If not - learn them.

I suggest you get professional help. Why? Because otherwise the moment your credit card data gets stolen (and no, you won't even know how to write secure code with the understanding of SQL you showed) you are in legal pain hell. Everyone will sue you - customers, credit card companies (you know how to treat credit card data, right - I mean, legally).

A2: Absolute resource for App Architecture:

[Microsoft Patterns & Practices Application Architecture Guide 2.0.](#)

I've learnt a lot from it, and still learning!

A3: I've recently read agile principles, patterns and practice by Robert Martin. I think it's a good book to start understanding design patterns and architecture principles

429. <https://stackoverflow.com/questions/589488/mvp-mvc-vs-traditional-n-tier-approach-for-winform-apps>

T: MVP/MVC vs traditional n-tier approach for winform apps

Q: We have a large suite of apps, most are C# 1.1, but at least 10 major ones are in VB6. We are undertaking a project to bring up the VB6 apps to .NET 3.5.

All the C# 1.1 apps are written using a traditional n-Tier approach. There isn't really any architecture/separation to the UI layer. Most of the code just responds to events and goes from there. I would say that from the point of maintainability, it's been pretty good and it's easy to follow code and come up to speed on new apps.

As we are porting VB6 apps, the initial thinking was that we should stick to the existing pattern (e.g. n-Tier).

I am wondering, whether it's worth it breaking the pattern and doing VB6 apps using the MVP/MVC pattern? Are MVC/MVP winform apps really easier to maintain? I worked on a MVC-based project and did not feel that it was easier to maintain at all, but that's just one project.

What are some of the experiences and advice out there?

A1: Dude, if something works for you, you guys are comfortable with it, and your team is up to specs with it. Why do you need to change?

MVC/MVP sounds good... Then why am I still working on n-Tier myself?

I think before you commit resources to actual development on this new way of programming... You should consider if it works for YOUR team.

A2: If you are porting the VB6 apps vs. a full rewrite, I'd suggest to focus on your Priority 1 goal - to get asap to the .Net world. Just doing this would have quite a lot of benefits for your org.

Once you are there, you can evaluate whether it's beneficial to you to invest into rearchitecting these apps.

If you are doing full rewrite, I'd say take the plunge and go for MVP/MVVM patterned WPF apps. WPF will give you nicer visuals. The MVP/MVVM pattern will give you unit testability for all layers, including the visual. I also assume that these apps are related, so chances are you might be able to actually reuse your models and views. (though, I might be wrong here)

A3: It moves a thin layer of code you still probably have on the UI. I say thin, because from your description you probably have plenty of code elsewhere. What this gives you is the ability to unit test that thin layer of code.

Update 1: I don't recommend rearchitecting while doing the upgrade, the extra effort is best expended on getting automated tests (unit/integration/system) - since you will have to be testing the upgrade anyway. Once you have the tests in place, you can make gradual changes to the application with the comfort of having tests to back the changes.

A4: MVC in particular does not exclude n-Tier architecture.

We also have ASP.NET 1.1 business application, and I find it a real nightmare to maintain. When event handlers do whatever they like, maybe tweak other controls, maybe call something in business logic, maybe talk directly to the database, it is only by chance that software works at all.

With MVC if used correctly you can see the way the data flows from the database to your UI and backwards. It makes it easier to track the errors if you got the unexpected behaviour.

At least, it is so with my own little project.

I'll make the point once again: whatever pattern you use, stick to the clear n-Tier architecture. 2-Tier or 3-Tier, just don't mess everything into a big interconnected ball.

A5: "Change - that activity we engage in to give the allusion of progress." - Dilbert

Seriously though, just getting your development environment and deployment platforms up to .NET 3.51 is a big step in and of itself. I would recommend that things like security reviews and code walkthroughs should probably come before re-architecting the application.

MVC and MVVM are excellent paradigms, particularly in terms of testability. Don't forget about them, but perhaps you should consider a pilot project before full scale adoption?

430. <https://stackoverflow.com/questions/1832638/what-pattern-fits-between-a-fa%C3%A7ade-and-a-dao>

T: What pattern fits between a façade and a DAO?

Q: I'm in the process of designing part of my company's architecture for its Java EE web applications. I'm pretty clear on the reasons to use a façade and one or more DAOs. The problem I have is this:

There will be some logic that definitely belongs in the integration tier because it's all about keeping the data model consistent. Except the logic goes beyond simply maintaining referential integrity and other 'raw' persistence tasks which will be handled by JPA and Hibernate. I don't class this as business logic because it's separate to any business function. However, my understanding is that a DAO should only implement the logic required to access and persist objects to the data source.

My conclusion is that I need a 'business object'-like pattern which is appropriate for the integration tier. I've looked around and the closest thing I have found (yet still not quite right to my mind) is the [Sun Transfer Object Assembler pattern](#).

Either there's a gap in my understanding of Java EE or there is a pattern out there that will fit.

A1: maybe a [mediator](#) is what you want:

Define an object that encapsulates how a set of objects interact. Mediator promotes loose coupling by keeping objects from referring to each other explicitly, and it lets you vary their interaction independently.
then you can use a DaoMediator in order to coordinate two or more DAOs

A2: It sounds to me like you may be missing a controller, and consequently may need the [MVC](#) pattern. The controller will look after the DAOs and present a consistent view (don't think in terms of GUIs, but rather some client-facing interface). When modifications are made via this view, then the controller coordinates the changes to the model via the DAO. I suspect that your facade objects may be the view in this scenario.

Having said this, I wouldn't worry *too* much about identifying particular patterns. You often find that taking into account all your requirements and separating concerns where applicable, that you end up implementing a particular pattern and only identify it as such after the fact.

A3: Have you considered using aggregates from Domain Driven Design? I'm a student of DDD myself and it seems the business logic you're trying to design could be accomplished by richer POJO-like domain models. You'd have each domain object to be responsible for its aggregate objects, and also including any logic concerning that business concept; that said, your integration layer would coordinate those rich objects but would refrain from having real logic per se (i.e several conditional logic).

Perhaps the pattern you're trying to find is actually a step into richer domain objects?

A4: What is driving the requirement for consistency between the DAOs? If there is some business assumption that is dictating the relationship. For example, you might have an invoice type that when it is 'Capital' then we have to make sure several other objects are in the right state or have the right set of values. This is definitely outside the realm of the data-layer.

I wouldn't try to hard to find the perfect pattern for this case. You need some sort of coordinating class though, a mediator or controller of some sort.

431. <https://stackoverflow.com/questions/14131063/how-to-update-an-existing-data-structure-when-we-need-to-maintain-legacy-support>

T: How to Update an Existing Data Structure When We need to Maintain Legacy Support?

Q: So long story short, we have an aging application that's acquired some cruft over the years we've been developing it. There's a few bolted-on things that have been starting to cause problems though, and it got me thinking about how we could structure the data a bit better. The problem with this, though, is that we *NEED* to maintain support for older serialised data files that our clients might have, which makes it very difficult to migrate to a new build if we make any sweeping changes to our classes.

My question is, is there a good, tested process/architecture pattern that could potentially help us in the future should we decide to invest some effort in refactoring the code?

EDIT It's all binary serialization

A: Actually, now that I'm looking at this laid out in front of me, I can't say it's anything close to an ideal solution. It'd quickly lead to a proliferation of "version number hell", which is much like what COM is these days (check out the various DirectX interface names sometime)

That said, it *is* a potential answer, so I'll leave it.

432. <https://stackoverflow.com/questions/3879440/need-an-advice-about-applications-architecture/3879552#3879552>

T: Need an advice about application's architecture

Q: I am trying to build an application's architecture these days and I will be glad to hear some advice. Here are some details about the application itself. It has a web UI where customers could register and pay (with credit card) for some sort of services. They have to provide some info because these services are based on it. For example dates to schedule the service work. Of course they always can check the status of their order via the site.

Also I have a database (classic relational database or NO-SQL database I am not sure what is better in my case) that located on other physical machine. So I have to take customers' info and store it into the db in order to make some work based on it. Besides there is a windows service or it's Linux analogue that makes the main job. It should create processes based on the information in database to do the job. In other word the services I mentioned in the beginning provided not by business logic of the web site but of the windows service. Of course during its work this service stores an information back to my database or update it in some way.

Recently I have read the book about applications architecture from Microsoft and they introduce there many approaches to build an application. For example DDD or Client / Server or Components based architecture an so on. I am really confused what is the most suitable in my case. Could someone please advise me something

A:

Take 10 steps back and learn programming. Seriously.

Recently I have read the book about applications architecture from Microsoft and they introduce there many approaches to build an application. For example DDD or Client / Server or Components based architecture an so on

This is part of your problem. MS did none of that. These concepts were around 20 years ago. They were around 10 years ago. The Book from MS basically just presents them to you. You think a book makes you someone understanding them?

Things are a little more complicated.

Take your question, replace "application" with "car" etc. and you may realize how really funny the question is. "Need advice about car architecture" etc. - you seem to have a VERY shallow understanding of even what you are talking about.

Also I have a database (classic relational database or NO-SQL database I am not sure what is better in my case)

You know what a relational database is about? Ever heard of ACID conditions? If not - learn them.

I suggest you get professional help. Why? Because otherwise the moment your credit card data gets stolen (and no, you won't even know how to write secure code with the understanding of SQL you showed) you are in legal pain hell. Everyone will sue you - customers, credit card companies (you know how to treat credit card data, right - I mean, legally).

A2: i've recently read agile principles, patterns and practice by Robert Martin. I think it's a good book to start understanding design patterns and architecture principles

433. <https://stackoverflow.com/questions/3077866/large-scale-design-in-haskell>

T: Large-scale design in Haskell? [closed]

Q: What is a good way to design/structure large functional programs, especially in Haskell?

I've been through a bunch of the tutorials (Write Yourself a Scheme being my favorite, with Real World Haskell a close second) - but most of the programs are relatively small, and single-purpose. Additionally, I don't consider some of them to be particularly elegant (for example, the vast lookup tables in WYAS).

I'm now wanting to write larger programs, with more moving parts - acquiring data from a variety of different sources, cleaning it, processing it in various ways, displaying it in user interfaces, persisting it, communicating over networks, etc. How could one best structure such code to be legible, maintainable, and adaptable to changing requirements?

There is quite a large literature addressing these questions for large object-oriented imperative programs. Ideas like MVC, design patterns, etc. are decent prescriptions for realizing broad goals like separation of concerns and reusability in an OO style. Additionally, newer imperative languages lend themselves to a 'design as you grow' style of refactoring to which, in my novice opinion, Haskell appears less well-suited.

Is there an equivalent literature for Haskell? How is the zoo of exotic control structures available in functional programming (monads, arrows, applicative, etc.) best employed for this purpose? What best practices could you recommend?

Thanks!

EDIT (this is a follow-up to Don Stewart's answer):

@dons mentioned: "Monads capture key architectural designs in types."

I guess my question is: how should one think about key architectural designs in a pure functional language?

Consider the example of several data streams, and several processing steps. I can write modular parsers for the data streams to a set of data structures, and I can implement each processing step as a pure function. The processing steps required for one piece of data will depend on its value and others'. Some of the steps should be followed by side-effects like GUI updates or database queries.

What's the 'Right' way to tie the data and the parsing steps in a nice way? One could write a big function which does the right thing for the various data types. Or one could use a monad to keep track of what's been processed so far and have each processing step get whatever it needs next from the monad state. Or one could write largely separate programs and send messages around (I don't much like this option).

The slides he linked have a Things we Need bullet: "Idioms for mapping design onto types/functions/classes/monads". What are the idioms? :)

A: I talk a bit about this in [Engineering Large Projects in Haskell](#) and in the [Design and Implementation of XMonad](#). Engineering in the large is about managing complexity. The primary code structuring mechanisms in Haskell for managing complexity are :

The type system

- Use the type system to enforce abstractions, simplifying interactions.
- Enforce key invariants via types
 - (e.g. that certain values cannot escape some scope)
 - That certain code does no IO, does not touch the disk
- Enforce safety: checked exceptions (Maybe/Either), avoid mixing concepts (Word,Int,Address)
- Good data structures (like zippers) can make some classes of testing needless, as they rule out e.g. out of bounds errors statically.

The profiler

- Provide objective evidence of your programs heap and time profiles.
- Heap profiling, in particular, is the best way to ensure no unnecessary memory use.

Purity

- Reduce complexity dramatically by removing state. Purely functional code scales, because it is compositional. All you need is the type to determine how to use some code -- it won't mysteriously break when you change some other part of the program.
- Use lots of "model/view/controller" style programming: parse external data as soon as possible into purely functional data structures, operate on those structures, then once all work is done, render/flush/serialize out. Keeps most of your code pure

Testing

- QuickCheck + Haskell Code Coverage, to ensure you are testing the things you can't check with types.
- GHC +RTS is great for seeing if you're spending too much time doing GC.
- QuickCheck can also help you identify clean, orthogonal APIs for your modules. If the properties of your code are difficult to state, they're probably too complex. Keep refactoring until you have a clean set of properties that can test your code, that compose well. Then the code is probably well designed too.

Monads for Structuring

- Monads capture key architectural designs in types (this code accesses hardware, this code is a single-user session, etc.)
- E.g. the X monad in xmonad, captures precisely the design for what state is visible to what components of the system.

Type classes and existential types

- Use type classes to provide abstraction: hide implementations behind polymorphic interfaces.

Concurrency and parallelism

- Sneak par into your program to beat the competition with easy, composable parallelism.

Refactor

- You can refactor in Haskell **a lot**. The types ensure your large scale changes will be safe, if you're using types wisely. This will help your codebase scale. Make sure that your refactorings will cause type errors until complete.

Use the FFI wisely

- The FFI makes it easier to play with foreign code, but that foreign code can be dangerous.
- Be very careful in assumptions about the shape of data returned.

Meta programming

- A bit of Template Haskell or generics can remove boilerplate.

Packaging and distribution

- Use Cabal. Don't roll your own build system. (**EDIT: Actually you probably want to use [Stack](#) now for getting started.**).
- Use Haddock for good API docs
- Tools like [graphmod](#) can show your module structures.
- Rely on the Haskell Platform versions of libraries and tools, if at all possible. It is a stable base. (**EDIT: Again, these days you likely want to use [Stack](#) for getting a stable base up and running.**)

Warnings

- Use -Wall to keep your code clean of smells. You might also look at Agda, Isabelle or Catch for more assurance. For lint-like checking, see the great [hlint](#), which will suggest improvements.

With all these tools you can keep a handle on complexity, removing as many interactions between components as possible. Ideally, you have a very large base of pure code, which is really easy to maintain, since it is compositional. That's not always possible, but it is worth aiming for.

In general: **decompose** the logical units of your system into the smallest referentially transparent components possible, then implement them in modules. Global or local environments for sets of components (or inside components) might be mapped to monads. Use algebraic data types to describe core data structures. Share those definitions widely.

434. <https://stackoverflow.com/questions/24646706/wpf-mvvm-architecture-visual-studio-solution-and-projects>

T: WPF - MVVM Architecture (Visual Studio Solution and Projects)

Q: I'm working on a Window-App WPF project in MVVM pattern. At the moment, the app is a bit simple (can't really explain the nature of the product), but eventually it is expected to grow into a more complex app.

- The wpf winapp has a local database and also connects to a REST service.
- Development Time is not really the top concern; but maintainability, and testability.
- Will use an IOC container and DI
- Planning to do 1 ViewModel is to 1 View
- I don't want to use any WPF/MVVM frameworks, as this is my first time in WPF-MVVM app (just like first time coding in bare DOM javascript even if there's jquery).

I decided to use multiple projects, and here's what I came up so far:

1. **Product.Windows.Common** (Utils, Logging, Helpers, etc.)
2. **Product.Windows.Entities** (Database and REST entities)
3. **Product.Windows.Contracts** (All Interfaces will reside in this namespace/project)
4. **Product.Windows.Data** (for local Database)
5. **Product.Windows.ServiceClients** (for REST client)
6. **Product.Windows.App** (the main WPF project, contains the Views/XAML)
7. **Product.Windows.Models** (INPCChanged)
8. **Product.Windows.ViewModels** (INPCChanged and ICommand)
9. **Product.Windows.Tests** (Unit Tests)

I just want to ask:

1. Is this architecture a bit over-kill?
2. Do I need to create a **Product.Windows.Business** for the business logic? Or should I just put business logic in the ViewModels?

A: i'm currently working on an app with a similar structure. the project structure looks ok. in my project i did things a little differently though.

the Data and ServiceClients assemblies might represent your DAL. it's good these are separated in different assemblies. in the Data assembly you'll have the repositories and in the ServiceClients you'll have the service agents. The Entities and Contracts assemblies might represent your BL. Here, i think you could have used a single assembly. this assembly should be referenced by both DAL assemblies.

it's good that logging is implemented separately and if you have security this should also be implemented in Common. From what i've read recently, in a great book, Dependency Injection in .NET, utils & helpers are a result of poor/incomplete design. these classes usually contain static methods. but i don't think this is relevant to the discussion.

on my projects i usually implement the VMs in the same assembly as the views. this includes the RelayCommand (the ICommand implementation) and the ViewModelBase that implements INPC.

i've recently viewed a presentation by Robert Martin. from what i can remember he said that an application's architecture should scream what the application does. classes should not be grouped in projects or folders called (MVC or MVVM). this tells us nothing about what the app does. classes should be grouped by what they do, by the features they implement. i'm not at this phase yet. i'm still grouping things like you :).

i see that you only have a single test project. this might also be fine if you add directories in this project for all the assemblies you are planning to test. if you're not doing that it will be a little hard to find the tests for a particular assembly. you might want to add test projects for every assembly you plan to test.

A2: You can organize your components as you want but i prefer the following structure: - create 2 class libraries (dll) for each screen in your project (one of them has views + View Models for this screen and the other dll has the business logic for it) so you can use your view and.viewmodel with another business logic and also you can change, update in every screen business/view separately and the update will work when you replace a dll.

- Use all of your components except: Product.Windows.ViewModels Product.Windows.Models
- 1. A3: It's a bit of overkill, but I think only you can vouch for your own program. I think I would put **Contracts** inside **Common** and **Entities** (Depending on functionality). Also, I don't think you need to completely separate between the View and the ViewModel. It'll also ease the changing / debugging process if they are on the same project.
- 2. If your program is client side only you can have the BL in the ViewModel (At least if it's not TOO complicated to follow). If you have a main server and multiple client then you should not implement *ANY* logic (except cosmetics) in your ViewModel, and yes create a new project

435.<https://stackoverflow.com/questions/5409324/is-domain-driven-design-right-for-my-project>

T: Is Domain Driven Design right for my project?

Q: have been reading [this ebook about DDD](#) and it says that only highly complex systems are suited for DDD architecture. This leads me to second guess my decision to move more towards DDD as my architecture. I am converting a classic ASP application over to .NET section by section. It includes a robust product categorization scheme and shopping cart which gets ~100-200 orders per day, and a video section similar to YouTube (videos and social features like rating, commenting, etc). Since I have converting it in chunks, I want to treat each area of the site as separate project.

The site continuously gets new features and needs to be easy to maintain and update.

Right now I am just using a basic homemade ADO.NET DAL with BLL and DTOs that act as a common layer.

Would it be better to go with a different architecture than DDD for this project? I am new to architecture and want to use some sort of pattern as a guide that I can follow throughout the conversion process to avoid the dreaded spaghetti anti-pattern.

If not DDD, then what? Still trying to find a good direction. It needs to be fast and easy for me to get started on without being a complete expert as I am still learning.

A: **DDD is not an architecture.**

It's a philosophy of design, you cannot just rename all your FooDAO's to FooRepositories, throw in an Anti-Corruption Layer and call it DDD.

It stands for Domain Driven Design. It puts a focus on the models that you use to solve problems in your specific domain. What Eric Evans is suggesting is that if your site is simply a form to join a mailing list there's no reason to spend days in front of whiteboard playing with models. It's my opinion if there's only a single context in your domain you don't need DDD. More on that in a bit.

There's a famous quote:

“There are only two hard problems in Computer Science: cache invalidation and naming things.” — Phil Karlton

And DDD does have patterns to address these. It offers ubiquitous language as pattern to tackle naming, and it offers the oft misunderstood collection of patterns: Repository, Aggregate, Entity, and Value Object to tackle model consistency (which I will lump cache invalidation into and won't cover further here).

But I would say most importantly it adds a critical 3rd item (not off by 1 problems):

Where to put stuff

Where to put code and logic. For me, **the most fundamental concept in DDD is that of context**. Not all problems are best served by the same model, and knowing where one context ends and another begins is a critical first step in DDD.

For instance, at my company we work with Jobs, Jobseekers and Recruiters. The world of a jobseeker is very different from the world of a recruiter and they both look at a Job differently. As an example, In the world (context) of Recruiters they can post a job and say

I want to make this job available in New York, Austin, and San Fran.

In OO speak: One Job has one or many Locations.

In the world of the jobseeker a job in LA is not the same job as a job in Boston. Nevermind if they are the same position at the same company. **The difference in physical location is meaningful to the jobseeker**. While the recruiter wants to manage all Widget Manager jobs from a single place even if they are spread out around the country, a Jobseeker in New York does not care if the same position is also available in Seattle.

So the question is? How many Locations should a Job have? One or Many?

The DDD answer is both. If you're in the context of **jobseeker** then a job has only one location, and if you're a **recruiter** in that context a job can have many locations.

The Jobseeker context is wholly separate from the Recruiter Context and they should **not** necessarily share the same model. Even if in the end of the day all the jobs end up in the same DB (another context itself perhaps), sharing models between contexts can make a model a jack of all trades and master of none.

Now this example is very specific to the Domain of recruitment and jobseeking. It has nothing to do with Entity Framework of ADO or MVC or ASP. DDD is framework agnostic.

And it is DDD heresy to claim that framework A or B makes your architecture DDD. The whole point of DDD is that a model should serve the needs of a specific Context within a particular Domain. Frameworks can only support that and make it possible, they cannot do:

```
$ dddonrails new MyDDApplication
$ dddonrails generate context ContextA
$ dddonrails generate context ContextB
$ dddonrails generate model Widget ContextA
$ dddonrails generate model Widget ContextB
$ dddonrails start
```

To specifically address the question, "To DDD? Or not to DDD?" **The good news is you don't have to decide at the onset**, "This is going to be a DDD project!" DDD requires no toolset other than the willingness to think hard about the problems you're trying to solve and ask is my code helping or hurting me?

The bad news is DDD requires a serious commitment to look at and challenge your design, asking every day "Is this model making the problems in this context as easy as possible?"

But separate the somewhat tactical and practical concerns of what presentation framework (MVC or no MVC) and persistence framework (Entity Framework?) from the task of modeling your business domain. If you want to start now, think about what contexts are in your app. Some questions to ask:

- Are multiple areas of the application solving different problems with the same basic data?

- How many teams work on the app?
- How do they integrate with each other?

Mapping these out is called **Drawing a Context Map** and it's an important first step to starting to do DDD. I encourage you to checkout [the ddd website](#) for more. There's some good eric evans videos on qcon too. You may also want to read the Eric Evans' book Domain Driven Design, he has many more examples.

436.<https://stackoverflow.com/questions/2267041/what-are-the-performance-implications-of-using-design-patterns-in-php/2267053#2267053>

T: What are the performance implications of using design patterns in PHP?

Q: I know that design-patterns are very useful in creating of big projects. Does anyone have experience in both creating project with normal (OO, procedural) and using design patterns in respect to performance(speed of execution)? I want to create some big project and I am afraid that using design patterns my scripts would run slower. So What is pefrmance of code with desing paterns compare to normal OO programming?

A1: Personally,

I'd program it, and then figure out if there are speed problems/bottlenecks.

Only worry about performance when it becomes a problem.

A2: Some of the reasons design patterns are used is to eliminate code duplication and placing the code in the right spot. Both of these factors adds up to a fast application. Individual techniques such as caching and loading-code-only-when-needed could be easier/faster to apply with design patterns.

That said, maintainability will be much more prominent with some kind of thinking behind the coding applied, which will let you as a programmer focus on the real performance issues.

A3: An old adage about database design can be applied here: "Design for normalization first, denormalize for performance later". In this case, design it right the first time, if you find performance bottlenecks, optimize and break elements of your design on a one off basis then. Another issue, get someone using your application before you start optimizing, otherwise, who really cares?

A4: This depends entirely on what your application is doing and on the details of how you implement the patterns. Design patterns themselves are not really related to performance, but are intended to help you structure your system to aid maintainability.

Besides, performance should not be a concern at this stage; focus on getting the design pinned down first, and if it turns out to be running too slowly, only then should you worry about optimization.

A4: Well I don't have experience with programming using design patterns (only MVC). It is useful for maintainability, but amount of classes/code is greater compare to OO programming. (that is conclusion from my research ,but not from experience). By desing patterns I mean Factory,Decorator, Singleton etc.

I don't want to be in a situation that my code is well maintained but run slowly. Ex. Many ORM solutions are well maintained but much slower than simple query request coding.

437.<https://stackoverflow.com/questions/5021190/architectural-concerns-fluent-nhibernate-the-repository-pattern-and-asp-net-mvc>

T: Architectural concerns: Fluent NHibernate, The Repository pattern and ASP.NET MVC

Q: I've just started a new project and have naturally opted to use a lot of new tech.

I'm using (Fluent) NHibernate, ASP.NET MVC 3 and am trying to apply the Repository pattern.

I've decided to separate my Business Logic into a separate project and define services which wrap my repositories so that I can return POCOs instead of the NHibernate proxies and maintain more separation between my Front end and DA logic. This will also give me the power to easily provide the same logic as an API later (a requirement).

I have chosen to use a generic `IRepository<T>` interface where `T` is one of my NHibernate mapped Entities which all implement `IEntity` (my interface only a marker really).
The problem is this goes against the aggregate root pattern and I'm starting to feel the pain of the anemic domain model.

If I change an object that is hanging off another

- Root <- changed
 - Child <- changed

In my service I have to do the following:

```
public void AddNewChild(ChildDto child, rootId)
{
    var childEntity = Mapper.Map<ChildDto, ChildEntity>(child);
    var rootEntity = _rootrepository.FindById(rootId);
    rootEntity.Children.Add(childEntity);
    _childRepository.SaveOrUpdate(child);
    _rootRepository.SaveOrUpdate(root);
}
```

If I don't save the child first I get an exception from NHibernate. I feel like my generic repository (I currently require 5 of them in one service) is not the right way to go.

```
public Service(IRepository<ThingEntity> thingRepo, IRepository<RootEntity> rootRepo,
    IRepository<ChildEntity> childRepo, IRepository<CategoryEntity> catRepo, IRepository<ProductEntity>
    productRepo)
```

I feel like instead of making my code more flexible, it's making it more brittle. If I add a new table I need to go and change the constructor in all my tests (I'm using DI for the implementation so that's not too bad) but it seems a bit smelly.

Does anyone have any advice on how to restructure this sort of architecture?

Should I be making my repositories more specific? Is the service abstraction layer a step too far?

EDIT: There's some great related questions which are helping:

- [Repository Pattern Best Practice](#)
- [repository pattern help](#)
- [Architectural conundrum](#)

A1: When you have an Aggregate, the Repository is the same for the aggregate parent (root) and its children because the life cycle of the children is controlled by the root object.

Your "Save" method for the root object type should be also directly responsible for persisting the changes to the children records instead of delegating it into yet another repository(ies).

Additionally, in a "proper" Aggregate pattern, the child records have no identity of their own (at least one that is visible outside the Aggregate). This has several direct consequences:

1. There can be no foreign keys from outside records/aggregates to those children records.
2. Resulting from point 1., every time you save the root object state, you can delete and recreate the child records on the database. This usually will make your persistence logic easier if you bump into precedence problems.

Note: the reverse case of 1. is not true. Child records in an aggregate **can** have foreign keys to other root records.

A2: I feel like instead of making my code more flexible, it's making it more brittle. If I add a new table I need to go and change the constructor in all my tests (I'm using DI for the implementation so that's not too bad) but it seems a bit smelly.

Implement the Unit Of Work pattern in your repository. That means practically you have a unit of work class which holds your services inject via ctor or property injection. Furthermore it holds a commit and/or transaction method. Only inject the IUnitOfWork instance in your services. When you add a repository you just have to change the unit of work not touch the business logic (services).

438.<https://stackoverflow.com/questions/14131063/how-to-update-an-existing-data-structure-when-we-need-to-maintain-legacy-support>

T: How to Update an Existing Data Structure When We need to Maintain Legacy Support?

Q: So long story short, we have an aging application that's acquired some cruft over the years we've been developing it. There's a few bolted-on things that have been starting to cause problems though, and it got me thinking about how we could structure the data a bit better. The problem with this, though, is that we *NEED* to maintain support for older serialised data files that our clients might have, which makes it very difficult to migrate to a new build if we make any sweeping changes to our classes.

My question is, is there a good, tested process/architecture pattern that could potentially help us in the future should we decide to invest some effort in refactoring the code?

EDIT It's all binary serialization

439.<https://stackoverflow.com/questions/44500109/have-i-understood-architectural-design-with-asp-net-mvc-and-entity-framework>

T: Have I understood architectural design with ASP.NET MVC and Entity Framework?

Q: EF DAL is EntityFramework Data Access Layer.

And from what I understood, Service layer would contain methods that call the DAL which in turn is used to access data.

Do you see something wrong in my approach?

Am I right in saying the **Service Layer**, is the one containing all operations? (eg: Searching a user in DB -> Service Layer launches search by calling EF DAL which returns the value, and in turn Service Layer returns a ViewModel to the controller) (also see: [Creating a Service Layer for my MVC application?](#))

Finally, Should my Service layer classes implement Interfaces for persistence purposes?

As a student we only used MVC pattern for our projects, and never had to expand the solution with new projects because we worked on small projects. Here I feel like misconceiving the architecture will end up in disastrous maintainability. Thanks for your help!

A: You're almost in the right direction. However, the ViewModel in this case should reside in the application layer, i.e. your MVC layer. The service layer should in turn return a data transfer object, more commonly known as the DTO.

Think of the ViewModel as a simple POCO class that is built for the View, it can be a collection of various DTO returned by various services from your service layer.

Benefits of DTO

1. You are not directly exposing your domain entities, i.e. your EntityFramework POCO classes. However, a case can be made for a project small enough to avoid DTO all together.
2. In case in the future you decided to add an WebAPI function along your MVC project, say, for an iPhone application. The new application uses the WebAPI that also consumes the service layer, most of the service layer codes can be re-used since they return DTO classes and not ViewModel that is constructed for the View itself.

For your Data Access layer, no one explains better than this guy. [Entity FrameWork With Repository Pattern](#)

As for project structure, I would suggest an onion architecture. [Onion Architecture](#). If you can understand this article well enough, you should be all set.

440.<https://stackoverflow.com/questions/36418745/solution-architecture-in-c-sharp-where-winforms-and-asp-mvc-share-business-logic>

T: solution architecture in c# where winforms and asp.mvc share business logic and Data access

Q: I have a c# winforms solution which includes the below projects:-

1. UI Layer
2. BLL
3. DataModel
4. DAL

Now, i want to create a asp.mvc UI within the same above solution, for the same application using MVC pattern. When i searched about mvc solution architecture, mostly i found, the model, view and controllers are created in the same project. But, since i already have the model as DAL, and BLL which developed for my winforms application, how can i design the solution architecure so that i can make use of my present BLL, DataModel and DAL layers.

Or, is it better to do the mvc projects as a separate solution? In that case, i have to maintain my BLL and DAL separately na.

A: You do not. What you have is the data model. The model you talk about in MVC is the VIEWmodel and is PAGE SPECIFIC. I.e. it contains the data that the Razor code needs to render the view without any further interaction with the business layer. This is not identical to your data model that lives behind the BLL.

The WHOLE MVC PROJECT replaces the UI layer. The controllers call your BLL to interact with the business logic, then put the data into ViewModels that then get rendered by the page code.

441.<https://stackoverflow.com/questions/20041525/why-some-open-source-project-like-nginx-and-pcap-use-their-own-nginx-uint-t-an/20041569#20041569>

T: What is a good balance in an MVC model to have efficient data access?

442.<https://stackoverflow.com/questions/21656849/consecutive-daily-user-visits>

T: why some open source project like nginx and pcap use their own 'nginx_uint_t' and 'bpf_u_int32' instead of built-in type 'unsigned int'

Q: I am dealing with libpcap and nginx source codes these days. I wonder something like:

1. In libpcap, they use their own unsigned int type bpf_u_int32
 2. In nginx, they use their own unsinged int type ngx_int_t as well
- what's the advantage of these usages compared with built-in types?

A: Generally it's about controlling complexity. Some code bases need to be run across multiple platforms. Sometimes the reason is that the code evolves to encompass more platforms, while in other cases the code starts from the premise that it needs to run on multiple platforms.

Anyway, a good architectural pattern is to lower dependencies to other systems/libraries/platforms/compilers etc. This allows the platform dependant code to kept in small place and not permeated across the whole code base.

Thus when you move the code to a new platform the amount of code that needs rework is kept smaller.

All in all it's about the cost of maintainability, and it isn't a magic bullet, rather it's a proven architectural pattern.

443.<https://stackoverflow.com/questions/12883759/maintaining-clean-architecture-in-spring-mvc-with-a-data-centric-approach>

T: Maintaining Clean Architecture in Spring MVC with a data-centric approach

Q: Maintaining Clean Architecture in Spring MVC with a data-centric approach

I'm trying to map out the architecture for the front-end of a new Java-based web app (portal type application) we are making at work. I want to get this right from day one, and I would like to kick off a discussion here to help me implement Uncle Bob's [Clean Architecture](#) in my architectural design.

Here's a quick run-down of our tech stack, top to bottom (the technology isn't importance, the structure is):

- Oracle Database
- Oracle Service Bus exposing services using WSDLs
- JAX-WS generated Java-classes from the WSDLs (let's call this the "generated service layer")
- A Domain module consisting of POJOs mapped to the generated data objects
- A Consumer-module exposing the "generated service layer" to the front-end application
- A Spring MVC based front-end module using FreeMarker to render the views

A key point:

In particular, the name of something declared in an outer circle must not be mentioned by the code in the an inner circle. That includes, functions, classes, variables, or any other named software entity.

Attempting to adhere to Bob's Clean Architecture, I've gone back and forth a bit with myself regarding where to place the *application logic*, namely the "Use Case"-layer in his architecture.

Here is the approach I've come up with:

Layer 1 - Entities

Entities encapsulate Enterprise wide business rules.

This is where our Domain module containing the *domain-objects* lives, these are self-containing objects with minimal dependencies on each other. Only logic pertaining to the objects themselves may live on these domain objects, and no use-case specific logic.

Access to our database is exposed via WSDLs using a service bus that transforms the data, as opposed to an ORM like JPA or Hibernate. Because of this, we do not have "entities" in the traditional sense (with Ids), but a *data-centric approach* making this layer a data access layer, presented to the rest of the application by the Consumer-module.

Layer 2 - Use Cases

The software in this layer contains application specific business rules.

This is where logic specific to our application's use cases lives. Changes to this layer should not affect the data access layer (layer 1). Changes to the GUI or framework implementation (Spring MVC) should not affect this layer.

This is where it gets a little tricky: Since our data access layer (in layer 1) must be kept clean of application logic, we need a layer that facilitates use of that layer in a fashion that suits the use cases. One solution I've found to this problem is the use a variant of the "*MVVM-pattern*" that I choose to call *MVC-VM*. See below for an explanation. The "VM"-part of this lives in this Use Case-layer, represented by *ViewModel-classes that encapsulate this Use Case-specific logic.

Layer 3 - Interface Adapters

The software in this layer is a set of adapters that convert data from the format most convenient for the use cases and entities, to the format most convenient for some external agency such as the Database or the Web.

This is where the MVC-architecture of our GUI lives (the "MVC" in our "MVC-VM"). Essentially this is when the Controller-classes get data from the *ViewModel-classes and puts it in Spring MVC's ModelMap objects that are used directly by the FreeMarker-templates in the View.

The way I see it, the servicebus would in our case also fall in under this layer.

Layer 4 - Frameworks and Drivers

Generally you don't write much code in this layer other than glue code that communicates to the next circle inwards.

This layer is really just a configuration-layer in our application, namely the Spring configuration. This would for example be where we specify that FreeMarker is used to render the view.

Model View ViewModel Pattern

MVVM facilitates a clear separation of the development of the graphical user interface (either as markup language or GUI code) from the development of the business logic or back end logic known as the model (also known as the data model to distinguish it from the view model). The view model of MVVM is a value converter meaning that the view model is responsible for exposing the data objects from the model in such a way that those objects are easily managed and consumed.

More on the MVVM-pattern at [Wikipedia](#).

The MVC-VM roles would be fulfilled in our application like so:

- **Model** - represented simply by the `ModelMap` datastructure in Spring MVC that is used by the view templates.
- **View** - FreeMarker templates
- **Controller** Spring's Controller-classes that directs *HTTP URL requests* to specific *handlers* (and as such functions as a `FrontController`). The handlers in these classes are responsible for fetching data from the use case-layer and pushing it out to the view templates when showing data(HTTP GET), as well as sending data down for storing (HTTP POST). This way it essentially functions as a *binder* between the ViewModel and View, using the Model.
- **ViewModel** - These classes are responsible for 1) structuring data from the data access layer in a fashion that is usable by the View and 2) treat data-input from the View. "Treat" means to validate and to break down the data so that it can be sent down the stack for storing. This layer would take form as `<UseCase>VM`-classes in a viewmodel package in our Spring MVC front-end module.

A key component here is the implicit binding that happens in Spring MVC between `ModelMap` and the FreeMarker-templates. The templates only use the model (`ModelMaps`), where the controller has put the data in a format it can use. That way we can make templates like so:

```
<body>
<h1>Welcome ${user}!</h1>
<p>Our latest product:
<a href="${latestProduct.url}">${latestProduct.name}</a>!
</body>
```

I apologize for the verbose explanation, but I could not explain this (relatively simple) architecture in fewer words.

I would greatly appreciate some input on my approach here - am I on the right track? Does the MVC-VM thing make sense? Am I violating any Clean Architecture Principles?

There are of course many solutions to this, but I am trying to find a solution that is 1) not over-engineered and 2) adheres to the principles of Bob's Clean Architecture.

Update:

I think the key issue that puts me off here is what form the "Use case" layer takes in this application. Remember we have an MVC front-end that gets data from a data access layer. If the MVC part fits in Bob's "Interfaces adapters", and the domain models of the data layer fit in Bob's "Entities" layer, then what do I call the use case classes that implement application logic? I am tempted to just call them `<UseCase>Models` and put them in the MVC project, but according to Bob

The models are likely just data structures that are passed from the controllers to the use cases, and then back from the use cases to the presenters and views.

so that means my model objects should be "dumb" (like a simple Map, ModelMap in Spring) and it is then the responsibility of the controller to put data from the Use Case class into this Map-structure.

So again, what form does my Use Case-classes take? How about <UseCase>Interactor?

But in conclusion I realize that the MVC-MV-thing is over-engineering (or simply incorrect) - as "mikalai" indicates below this essentially just a two-layer application in its current form; a data access layer and a front-end MVC layer. Simple as that.

A: Whoa that was a lot. And I think you have mostly translated Uncle Bob's jargon over to your Spring Java app.

Since architecture is mostly opinion and since your question is sort of asking for one...

There are many different styles of architecture and ... most are overrated. Because most are the same thing: **higher cohesion** and **looser coupling** through indirection and abstraction.

What matters MOST (IMHO) are the **dependencies**. Making lots of small projects as opposed to one giant monolithic project is the best way to get "clean" architecture.

Your most important technology for clean architecture will not be "Spring MVC" technology or "Freemarker" templating language, or another Dr. Dobb's article with diagrams of boxes, hexagons and various other abstract polygons.

Focus on your build and dependency management technology. It is because this technology will enforce your architecture rules.

Also if your code is hard to test.. you probably have bad architecture.

Focus on making your code easy to test and write lots of tests.

If you do that it will be easy to change your code with out worry ... so much you could even change your architecture :)

Beware of focusing too much an bull#%\$@# architecture rules. **Seriously:** if your code is easy to test, easy to change, easy to understand and performs wells then you have a good architecture. There is no 6 weeks to 6 pack abs article to do this (sorry Uncle Bob). It takes experience and time... there is no magic bullet plan.

So here my own "clean" architecture... I mean guidelines:

- Make many small projects
- Use dependency management (ie Maven, Gradle)
- Refactor constantly
- Understand and use some sort of dependency injection (Spring)
- Write unit tests
- Understand cross cutting concerns (ie when you need AspectJ, metaprogramming, etc..)

A2: Something seems odd to me in that part. Why couldn't your entities have ID's even if you get them from web services ?

In the Clean Architecture approach, the Entities layer is precisely not a data access layer. Data access should be a **detail** in your architecture, not a central concern. As you said yourself, Entities contain domain-specific *business rules*. Business rules, or behavior, is very different from the way you fetch your data. *Entities is where all the domain logic happens, not where you get your data from.* According to Clean Architecture, you get your persisted or external data from Gateways.

One solution I've found to this problem is the use a variant of the "MVVM-pattern" that I choose to call MVC-VM. See below for an explanation. The "VM"-part of this lives in this Use Case-layer, represented by *ViewModel-classes that encapsulate this Use Case-specific logic.

ViewModel clearly refers to a View, which is a presentation artifact -another detail. Use cases/Interactors should be devoid of such details. Instead, Interactors should send and receive delivery mechanism-agnostic data structures (RequestModels and ResponseModels) through Boundaries.

I understand that this is a custom pattern of yours and doesn't involve a reference to a presentation framework, but the word "View" is just misleading.

444.<https://stackoverflow.com/questions/5298303/is-it-worth-setting-up-ioc-for-non-mvc-projects-in-.net/5299121#5299121>

T: Is it worth setting up IoC for non-MVC projects in .Net?

Q: Everywhere I look for information on Windsor or Spring.net its always in reference to MVC. Is there any point trying to implement it for web forms projects or wcf?

A1: It just so happens that the nature of an ASP.NET MVC web application lends itself extremely well to IoC because of the way it handles requests. You can say that the startup-request-response lifecycle of a web application, and the way ASP.NET MVC handles those things, correspond directly to what Krzysztof Koźmic calls [The Three Calls Pattern](#) and what Mark Seemann calls [Register Resolve Release pattern](#). There are ways, however, to follow this pattern even in application that *do not* directly lend themselves to it - e.g. in WinForms apps, Windows services etc.

<shameless_plug>

I wrote [a blog post](#) about Castle Windsor's [TypedFactoryFacility](#) that is a feature of Windsor that allows the container to be called, truly IoC style, without your code knowing it.

The typed factory facility makes Windsor capable of dynamically implementing interfaces, like e.g. ISomeFactory, delegating calls to the container's Resolve method underneath, thus allowing your code to depend only on the ISomeFactory interface.

</shameless_plug>

A2: IoC is just as useful whatever kind of project it's in. The problems it solves (testability etc... etc...) aren't specific to any particular kind of project.

A3: Inversion of Control (a.k.a. Dependency Injection or Third-party Connect) is just a way to enable **loose coupling**.

As far as I have been able to identify, there are only two ways to enable loose coupling: IoC or Service Location ([which is an anti-pattern](#)). **If you want to enable loose coupling in any application, IoC is the way to do it.** Loose coupling gives you a lot of benefits:

- Testability
- Late binding
- Reduced complexity (SOLID)/better maintainability
- Extensibility
- Parallel development

It isn't tied to any specific architecture, pattern or type of application.

A4: IoC has absolutely nothing to do with MVC. They are two completely different design patterns.

Whether or not you use IoC in an application depends on your design. YAGNI? Then forget about it. Lots of dependencies between classes that makes testing hard? Sign up immediately.

IoC frameworks don't care what kind of design pattern you use to implement your application. So MVC or 10k lines of code inside your aspx file, it doesn't matter.

A5: Yes, if the architecture calls/allows for it. It depends on the design of the whole application, not just the UI framework used.

For example, if the WebForms project throws everything into code-behind and is directly accessing the database from Page_Load and such, then using IoC (or any kind of re-factoring) is going to be difficult.

However, if the WebForms are, say, accessing services or are interacting with models which access services or use repositories, etc. then those back-end objects can be injected with a service locator of some kind, such as an IoC framework. Hooking into the constructor of the WebForms classes may not be easy (or even possible, I don't think I've ever tried it), but you can still resolve dependencies within the classes as needed (late-bound class properties, for example).

445. <https://stackoverflow.com/questions/11259679/3-layer-architecture-passing-data-between-layers>

T: 3-layer architecture - passing data between layers

Q: Trying to implement 3-layer (not: tier, I just want to separate my project logically, on one machine) architecture I've found so many different approaches that I'm confused, what's the best way (if there's any) to make that in WinForms app.

Now I have no doubts only about 3 layers that should be present in the project:

- UI (Presentation Layer)
- BLL (Business Logic Layer)
- DAL (Data Access Layer)

The pros:

- it's a nicely encapsulated object, following OOP rules (I suppose ;)).
- both logic and properties are in one place, easier to maintain and debug.

The cons:

- to use the object, DAL has to reference BLL (that's not how the 3-tier layer should do, isn't it?).
- class may contain some fields that are not used in Database, as well as some fields from Database (like Id) do not represent "real life" object.

So, **it looks like whatever I choose, I'll violate some rules**. What's better way then, which should I choose? Maybe there is other approach I haven't found?

A: I don't like DTOs, because they mean creating a dual hierarchy with little or no value.

I also don't like the idea of making model objects responsible for their own persistence. I prefer a separate persistence layer. Why? Model objects don't always need to be persisted to be useful. Business logic and functionality are orthogonal to persistence.

If you have two layers it's possible to keep a one way dependency graph: persistence knows about model, but model does not know about persistence. You end up with a cyclic dependency if model objects are responsible for persistence. You can never test or use model objects *without* persistence.

My advice? Don't do DTOs. Break out a separate persistence layer.

446. <https://stackoverflow.com/questions/11344326/should-i-pick-n-tier-architecture-over-mvc>

T: Should I pick N-Tier architecture over MVC?

Q: I have to develop a application (Winforms-application) which is connected to a database within a enterprise-intranet.

As I want to keep the application scalable, maintainable & flexible I am thinking on which architecture I should use. In this connection I stumbled over the N-Tier and MVC Patterns.

As far as I got it the main difference between the two patterns is that MVC has a more triangular structure (Components can communicate with each other), while 3-Tier applications have a straight structure where each component (n) can only forward requests to the component (n+1).

So my idea would be to take the 3-Tier approach. Where the "**Presentation Layer, Tier-1**" holds the Forms, the "**Business Layer, Tier-2**" handles the information and logic between Tier-1 and Tier-3 and the "**Data Layer, Tier-3**" is connected to the database and works with stored procedures.

My question is:

Does this sound like a reasonable desicion to you? Because I read that N-Tier makes sence if you plan on running the single Tiers on different machines, which I do not plan to do. If you think I chose the wrong approach, what would be a better idea?

A: MVC and n-tier are two architecture patterns at different levels covering different aspects. They can be used at the same time. It's not one or the other.

MVC is more a software architecture that can be applied in the presentation tier, one component being Windows Forms. (Whether Windows Forms is fully MVC compatible is a separate discussion.)

N-tier architecture is a system architecture (at a higher level than the MVC architecture). The decision is basically whether you have two tiers (the Windows Forms client as the first tier and the database with the stored procedures as the second tier) or three tiers (the Windows Forms client as the first tier, an application server with the business logic as the second tier, and the database with the third tier as the third tier). Or even shorter: Will the client directly connect to the database or is there an application server in between?

It seems that the use of stored procedures is given. If this is the case, then they probably provide more than just data querying and storage but some business logic as well. In such a case, I tend to go with two tiers.

Other factors that could be relevant are:

- Authentication: Is it possible to setup up all users in the database? Or would it be easier to do it on an application server and use a single user to acess the database? Is some sort of single sign on required?
- Authorization: Is is possible to check all rights and permissions in the database? If not, then three tiers are required to create a secure application?
- Are there any restrictions regarding the network architecture that prohibit to directly access the database?
- Do you expect several thousand concurrent users and would like to scale up by setting up several servers?

In general, I tend to go for fewer tiers since it's easier to implement and costs less (initially and during maintenance). The cost of additional tiers needs to be justified by requirements that depend on the extra tier.

447. <https://stackoverflow.com/questions/94148/appropriate-design-pattern-for-an-event-log-parser>

T: Appropriate design pattern for an event log parser?

Q: Working on a project that parses a log of events, and then updates a model based on properties of those events. I've been pretty lazy about "getting it done" and more concerned about upfront optimization, lean code, and proper design patterns. Mostly a self-teaching experiment. I am interested in what patterns more experienced designers think are relevant, or what type of pseudocoded object architecture would be the best, easiest to maintain and so on.

There can be 500,000 events in a single log, and there are about 60 types of events, all of which share about 7 base properties and then have 0 to 15 additional properties depending on the event type. The type of event is the 2nd property in the log file in each line.

So for I've tried a really ugly imperative parser that walks through the log line by line and then processes events line by line. Then I tried a lexical specification that uses a "nextEvent" pattern, which is called in a loop and processed. Then I tried a plain old "parse" method that never returns and just fires events to registered listener callbacks. I've tried both a single callback regardless of event type, and a callback method specific to each event type.

I've tried a base "event" class with a union of all possible properties. I've tried to avoid the "new Event" call (since there can be a huge number of events and the event objects are generally short lived) and having the callback methods per type with primitive property arguments. I've tried having a subclass for each of the 60 event types with an abstract Event parent with the 7 common base properties.

I recently tried taking that further and using a Command pattern to put event handling code per event type. I am not sure I like this and its really similar to the callbacks per type approach, just code is inside an execute function in the type subclasses versus the callback methods per type.

The problem is that alot of the model updating logic is shared, and alot of it is specific to the subclass, and I am just starting to get confused about the whole thing. I am hoping someone can at least point me in a direction to consider!

A1: Well... for one thing rather than a single event class with a union of all the properties, or 61 event classes (1 base, 60 subs), in a scenario with that much variation, I'd be tempted to have a single event class that uses a property bag (dictionary, hashtable, w/e floats your boat) to store event information. The type of the event is just one more property value that gets put into the bag. The main reason I'd lean that way is just because I'd be loathe to maintain 60 derived classes of anything.

The big question is... what do you have to *do* with the events as you process them. Do you format them into a report, organize them into a database table, wake people up if certain events occur... what?

Is this meant to be an after-the-fact parser, or a real-time event handler? I mean, are you monitoring the log as events come in, or just parsing log files the next day?

448. <https://stackoverflow.com/questions/2529195/whats-the-best-way-to-store-logon-user-information-for-web-application>

T: What's the best way to store Logon User information for Web Application?

Q: I was once in a project of web application developed on ASP.NET. For each logon user, there is an object (let's call it UserSessionObject here) created and stored in RAM. For each HTTP request of given user, matching UserSessionObject instance is used to visit user state information and connection to database. So, this UserSessionObject is pretty important.

This design brings several problems found later:

- 1) Since this UserSessionObject is cached in ASP.NET memory space, we have to config load balancer to be sticky connection. That is, HTTP request in single session would always be sent to one web server behind. This limit scalability and maintainability.
- 2) This UserSessionObject is accessed in every HTTP request. To keep the consistency, there is a exclusive lock for the UserSessionObject. Only one HTTP request can be processed at any given time because it must to obtain the lock first. The performance and response time is affected.

Now, I'm wondering whether there is better design to handle such logon user case. It seems Sharing-Nothing-Architecture helps. That means long user info is retrieved from database each time. I'm afraid that would hurt performance.

Is there any design pattern for long user web app? Thanks.

A: One method discussed on StackOverflow and elsewhere is the signed cookie. A cookie that has information you would otherwise not be able to trust, along with a hash created in such a way that only your server could have created it, so you know the information is valid. This is a scalable way to save non-high-security information, such as username. You don't have to access any shared resource to confirm that the user is logged in as long as the signed cookie meets all criteria (you should have a date stamp involved, to keep cookie theft from being a long term issue, and you should also keep track that the user has not authenticated, so they should have no access to more secure information without going through the usual login process).

449. <https://stackoverflow.com/questions/44334652/can-you-implement-cascading-dynamic-sql-queries-in-power-bi>

T: Can you implement cascading dynamic SQL queries in Power BI?

Q: I have several data sources (MS SQL Server) that I'd like to optimize the queries for. I have a single source query that retrieves a list of keys that I'd like to pass to other queries in the same power bi solution as filter criteria.

I don't want to replicate the same key logic in all of my data sources for maintainability, and source system metadata improvements aren't an option. What is the best way to implement this in Power BI?

To put this in perspective, I'm able to do this work (cascading dynamic SQL) in Python without much effort. My current solution architecture has Power BI ingesting flat files that I'm generating from python scripts (for this reason). I'm seeking to migrate that work into PowerBI... but the path seems very convoluted.

To follow a similar design pattern, I'd like to source a list of parameter values from one data source and use that list to generate WHERE clause criteria for other data sources. How can you implement something like this in Power BI? If it isn't possible, any suggestions on how this problem could be solved in Power BI?

450. <https://stackoverflow.com/questions/438261/logical-versus-physical-design>

T: Logical versus physical design

Q: I have a very general design question, but I'll frame it in concrete terms with an example.

Suppose you're working on embedded software for a digital printer. The machine has 4 print heads (for each of the C, M, Y, K colors). Each print head performs the same task: fetching toner and putting it on the page.

At runtime, we could organize our API in two distinct ways. Either we follow a logical (aka "functional" or "process") design, so that client software can control the printing process across all print heads (e.g. change the brightness of all colors at once). Or we follow a physical design, so that client software can control each print head individually (e.g. change the brightness of only the magenta color).

This is a classic dilemma in software design: We either organize by activity or by architecture. By function or by form. My question is: are there any solid criteria for choosing one over the other? Different projects will choose differently and can both be right depending on their own situation; so I'm not asking which is best, only how to choose. E.g. I would be interested in your ideas about loose coupling, maintainability, layering, role-oriented design, architectural design patterns, etc.

A: Write an interface that follows the physical design. On top of that you can layer a logical interface that will use the physical one. So don't choose when you can have both.

451. <https://stackoverflow.com/questions/2531155/what-exactly-is-a-framework-like-zend-framework-for-php/2531188#2531188>

T: What exactly is a framework? Like Zend Framework for PHP

Q: I am new to coding and would just like to know a bit more about frameworks. How does a framework help you code and what exactly is it? Such as Zend for php.

A: A framework is essentially a foundation for applications. Which means the following:

- If you build your application on a framework, it can't be separated from it: there is a dependency to that framework.
- The framework provides all that is necessary for your application to run. It handles about everything a typical application needs. (Think of: (internal) data storage, output and input)

Zend for PHP is a framework for creating internet applications. It has a lot of modules, which will help you build your application more productive.

The difference between a framework and a plain library is that a framework often consists of multiple libraries which need each other to function properly. An example of a framework you probably have used: Windows. The Windows platform provides a set of libraries for you to use, but those libraries need each other too to function properly, e.g. the library for letting applications play video-files needs the library for outputting pixels on your screen.

A2: A framework is basically a way to program "inside out". In traditional programming, you write the "main" code and call functions from the library when and where you need them. A framework, on the contrary, handles

the "main" code on its own, and calls *your* functions when appropriate. In other words, a framework is a pre-written, ready-to-run application, which you can extend or adjust to your needs.

A3: A framework is an organized group of code that takes care of some "lower-level" details for you, so you can concentrate on building your application (or whatever it is you are working on).

For PHP, most frameworks implement the MVC architecture pattern. These frameworks organize your code for you into models, controllers, views, and other directories of "stuff" (depending on the framework) - this keeps your code cleaner and more maintainable. Instead of trying to maintain this organization on your own, just use the framework and you do not need to worry about many details. Many MVC frameworks also have many other nice features built-in, such as unit testing, classes to simplify database access, etc.

So in short, using a (good) framework simplifies development because it solves many problems that you would otherwise have to deal with yourself.

A4: A framework is basically a group of libraries that make you follow a certain way of coding your app. Like in most php frameworks you are required to follow the mvc design pattern. Zend is not exactly a framework because it let's you just use whatever you want and you use just the parts you want.

452.<https://stackoverflow.com/questions/11649347/what-happens-if-a-proper-design-has-been-not-followed-for-an-enterprise-application#11649492>

T: What happens if a proper design has been not followed for an enterprise application

Q: I've been outsourced for an ASP.Net project of another organization to build a large enterprise application. Currently almost 80% of the work has been completed. I found that the developers did not implemented any architecture in this application. All the work is done in the code behind file (*.aspx.cs). Even the database calls, sql scripts, etc. are on the code behind file. The entire solution has only one project, which is a Website. All the coding, .aspx file etc. comes under it. I know that the maintainability , catering to change requests, etc. of this project will be a nightmare.

But I would like know about the impact for the functionality of this project once the no of users increased from hundreds to thousands and more.

Will it be an issue, for not having a Data access layer and maintaining db connections in a once single place?

What will be the overall impact of the project from the functionality wise due to not implementing proper system architecture?

I need some hard point to convince them to go for a proper system architecture, which may be a whole system rewrite. So would be grateful if you are able to share your expertise of this matter. Thanks.

A1: Even though, this is very broad question...

I think there are well known reason behind using a kind of an architecture to application developments.

Basically using architecture will reduce the complexity of an application. This can be done by using following best practices, design patterns and which brings us the flexibility and high usability.

Since you mention that code been done in code behind files we can guarantee that it's violating one of the key design principles like **Separation of concerns** and **DRY**(Don't repeat yourself). That is only a single factor. There can be many.

I think you might gain a good idea if you could read this article about [Software Architecture and Design](#) Also another good one about [Motivating Software Architecture](#)

A2: There is only two kinds of software, software that works and software that does not. The customers/users do not care what goes on behind the scenes.

Maintaining software is a real reason for concern, however you can have maintainable spaghetti code, but it's highly un-likeley in the enterprise.

Proper architecture is specific to your software solution regarding goals for maintainability, scalability and extensibility. There are trad-offs in architectural goals that often conflict.

There's no single answer, just patterns that solve common problems.

453.<https://stackoverflow.com/questions/6112063/design-pattern-for-winform-net-to-asp-net-project/6112172#6112172>

T: Design Pattern for Winform .NET to ASP.NET project

Q: What is currently the most **widely used** and accepted **design pattern** for developing .NET applications with a **Windows and Web User Interface**?

An example of this could be an application that retrieves data from a 3rd party source (such as an RSS feed) with the following user interfaces:

- WinForms UI that caches some data locally (xml)
- ASP.NET Web UI that caches data on a server (SQL)

My thoughts are **MVC**, **MVP** or **MVVM**. I am looking for a modern pattern that utilizes or applies to specific .NET features (such as Data Binding, LINQ and IProviders).

A: MVC is a great pattern. It helps create separation of concerns within your architecture. Above all - make sure your code is modular, easy to read, testable and maintainable. These are all elements of a good MVC design.

A2: MVC or MVP would work well, not too sure that MVVM works on the web (can anyone clarify)?

You will need to have a service layer so you can share business logic and data layers.

More about the service layer:

<http://martinfowler.com/eaaCatalog/serviceLayer.html>

454.<https://stackoverflow.com/questions/23167435/why-dont-automake-and-autotools-lose-power-of-gnu-make>

T: why don't automake and autotools lose power of GNU Make?

Q: I am very experienced with GNU Make but a complete stranger to autotools. From looking at some tutorials, I understand that autotools are a way to standardize makefile targets and builds across multiple architectures. Which is a good thing, so the user of open-source distributions, can always build and install them in the same way.

GNU Make is very powerful and flexible: any shell command can be used to build targets and dependencies of targets on prerequisites can be expressed in many efficient and flexible ways.

Can all the power of a Makefile be transferred to automake-based system by turning the Makefile into Makefile.am ? I found statements in tutorials such as:
rules like

%foo: %.bar

are not portable and cannot be used in Makefile.am . As such, the programmer would have to write explicit rules where pattern rules suffice, which is definitely more time consuming and less maintainable.

Also, I never see any complex variable computations or functions, in the example Makefile.amfiles I have seen.

Then how can automake build the same software with the same efficiency, speed of programming and maintainability as GNU Make, if it restricts the GNU Make constructs?

I assume it can, I just don't see something obvious.

A: I'm not very proficient in, nor a big fan of the autotools, but my understanding is this:

The purpose of the autotools was to improve portability, for example to systems that didn't have GNU Make available. Examples included HP-UX, Solaris, IRIX and the BSD family. The autotools users could build programs with an always-constant sequence of instructions:

```
./configure  
make
```

Here, ./configure is a /bin/sh script that is generated on the developer's system and is portable so it can run on a wide range of systems. The generated Makefile was platform-specific and included handling for platform-specific requirements/issues. Also, ./configure generates a config.h file which allows C code to react to the availability/absence of certain libraries to build options passed to ./configure.

The Wikipedia page on [GNU build system](#) includes a nice diagram of the files involved in the whole process:

455. <https://stackoverflow.com/questions/10462000/does-the-decorator-pattern-improve-performance/10465863#10465863>

T: Does the Decorator pattern improve performance?

Q: I firmly believe that the Decorator pattern really helps when maintaining your code, but does that help to improve performance overall in the web application? Because you have to create an instance of a class and then use it, but without it you just create links in the normal way. Just to refresh you mind, here is a code example:

A: The *intent* of the decorator pattern is *not* to improve performance; it is to add behavior to an existing object. Design patterns, when used judiciously, are useful to better control the design and evolution of a code base. Performance is just *one* concern of good software design and architecture; other concerns are e.g. maintainability, security and extensibility.

Design patterns are useful in large scale software development; but also take a look at *design principles*, like the [SOLID principles](#).

456. <https://stackoverflow.com/questions/7083815/sharp-architecture-alternative/7089784#7089784>

T: Sharp Architecture alternative

Q: I am looking Sharp Architecture alternative which use Entity Framework code first as ORM. Is there any mature project like Sharp Architecture with EF code first ?

A: Architecture is a blueprint. Once you see Sharp Architecture you should be able to simply think about it and change it to work with EF. If you are not able to do that you probably don't have enough skills with required APIs - that is the first thing you have to change before start dealing with architecture. No architecture will save you from understanding APIs and without understanding them you cannot do a good architecture correctly using features of your APIs.

Architecture should be driven by needs of your application. The approach where you want to bend needs of your application to fulfill some architecture blueprint is terrible wrong. First you have to define what should your architecture solve for you and after that you can ask if there is any blueprint already doing it (and nothing more).

Most of articles and sample architectures are just pushing a lot of patterns without actual need for them. Number of patterns and layers don't make a good architecture. In most cases it just makes the system overarchitected and hard to maintain. These samples are mostly for explaining how to implement some patterns.

A2: Bad news there is no exact replacement, Good news its easy to create something your own like I did.

I have been using S#arp for a long time and it is a good Architecture, I developed lots of applications with it but it looks like there is no more movement with that open source project so late last year I decided to move on and recreate something similar using the same principles but with Entity Framework.

Key components such as NHibernate, NHibernate.Validator and Castle Windsor was replaced to use Entity Framework, LINQ to Entities, System.ComponentModel.DataAnnotations and Autofac respectively. The layers remained the same like the Domain, Presentation, Task, Framework and Infrastructure.

On how I created it please have a look at this post on its detailed explanation.<http://www.macaalay.com/2015/10/20/creating-a-solid-architectural-foundation-from-scratch-is-not-really-that-hard/>

I also created a code generator which I called [Effinator](#), which generated CRUD operations and basic UI from your database design

457. <https://stackoverflow.com/questions/43345365/entity-access-based-on-acl-filter-sql-data-based-on-acl>

T: Entity access based on acl (filter sql data based on acl)

Q: The question is - how is more flexible and right to implement next: For restfull service i should provide collection of entities based on user acl For example: I have a rest /company/all GET db contains companies with ids(1,2,3,4,5)

Authorized user with role **ADMIN** can get all of this entities

User1 has access to companies 1,3,4 and get according companies with request

So, what is the better and right way of implementing such a logic? The only way I came to is filtering result with hibernate criteria because my acl and permission have difficult structure(for example, **User1** can get not only companies, but some clients correspond to another companies - and based on this - that user can get additional companies as a result for view), plus - i have a pagination so I should make hibernate criteria with pagination for better performance and minimal data passing between layers - and for that reason can't get all db data filter it based on user's restriction.

Should i do all logic for filtering based on user restriction in service layer, or is there any similar situation with not so simple logic of access domain object for different users I can read - because i want to create a right and flexible solution the key points of is maintainability, performance, flexibility.

I think a lot about something like chainOfResponsibility pattern when i can create a chain of criteria builder or filters before i execute final sql to select data for user and m.b. things like Advice and pointcut for service invoking to add some filtering logic - and came to that it's not a good decision for my case - m.b. manual checking for user domain access within service logic and generating criteria before sql execution will be the better way + addition `@PreAuthorize('isAuthenticated()')`things also will be good...

Is there any good examples of such a logic and good architecture?

Any help and high quality answers will be appreciated. Thanks for anybody help and discussion!

458. <https://stackoverflow.com/questions/32014250/events-methods-using-these-events-and-inheritance>

T: Events, methods using these events and inheritance

Q: I am creating the program-side architecture of a software developed in WPF, I designed the architecture as being compliant with the MVVM pattern.

For many sakes (design, coherence, reusability, maintainability, scalability, etc) I created the class `BaseViewModel` implementing the interface `INotifyPropertyChanged` and some other methods:

Q: Our architecture is a FAAS approach, where our entire backend is on Lambdas. The persistence layer is a managed Cloud Mongo Cluster, so called Atlas. Lambdas in the VPC talk to mongo cluster using a peered VPC connection.

I need a VPC enabled Lambda, because Lambda talks to mongo cluster using the VPC Peering connection. I need a NAT gateway because resources inside Lambda has to talk with external internet resources. Here is my VPC-Lambda-Mongo architecture:

Security and Safety is very important, Do you suggest any better architecture than this? I would be happy to hear it.

To sum up, the data relative to SampleUserControl are contained at three locations : the instance of SampleViewModel, within TextProperty and within the property Text of a TextBox in the xaml part of SampleUserControl(this property Text is twoway-bound through Binding with the field Name of ViewModel).

To synchronize the three values, I added the methods TextPropertyChangedCallback and ViewModel_PropertyChanged which update the fields which need to be updated.

The above code works and the three above-mentioned locations are kept up-to-date, events fire and so on, things are fine when SampleUsercontrol is consumed with data-binding.

But SampleViewModel fires the event BaseViewModel.PropertyChanged, and since BaseViewModel is meant to be extensively used, I would like each ViewModel to have its own event PropertyChanged, at least in order to avoid overlapping events.

So I uncomment the code of SampleViewModel thus redefining the event PropertyChanged but it breaks down the synchronization between the field Name of the instance of SampleViewModel and the property TextProperty of SampleUserControl.

Am I making some mistakes on the conception side? Do you have any guidance for me? What is the best economic way of defining a different event PropertyChanged for each ViewModel inheriting from BaseViewModel while still using the general-purpose methods defined within that base class (such methods use PropertyChanged)? (I would like to avoid having heavy pieces of code to copy-paste.)

I know that it is more about optimization, but such optimizations can make a difference between a slow software and a fast one. I am at the stage of code-factoring, so I fancy nicely-shaped, elegant and factorized code.

End of the day happening, I may miss some obvious solutions.

A1: TL;DR: Basically, I would double-check that you are doing your DC/DP on that user control correctly, and toss out any concept of multiple definitions of PropertyChanged

In detail:

1. You defined PropertyChanged in the base class, which is great. **There is no reason to ever redefine it anywhere else.** Really, you are just asking for trouble by doing this.
2. Related to that, you should *really* just make a method to do the event invocation rather than doing the whole handler bit in the setter. Insta-reduction of copy paste.
3. The fact that you are having to use TextPropertyChanged is a *huge* red flag here. Which relates to the real problem, that you are probably abusing your dependency property. DPs are used to allow *parent* controls to bind to a property of your user control. You typically won't use them in conjunction with a data context internal to the control because, as you have seen, keeping them in sync is a nightmare.
4. In general, user controls should only have their own data context if they are set up to stand apart from any other control (ie, a sub-view). If they are just a fancy control, then giving them a view model rarely gets you anything.

459. <https://stackoverflow.com/questions/558657/whats-the-difference-between-an-algorithm-and-a-design-pattern/558679#558679>

T: What's the difference between an Algorithm and a Design Pattern

Q: I was searching for "Undo/Redo algorithms" and found something marked as a duplicate, but the duplicate was a request for a "Undo Design Pattern". I'd really like an algorithm for this. I don't think I necessarily need a design pattern.

Is there a fundamental difference between "Design Pattern" and "Algorithm" or is it OK that someone uses the two interchangeably?

I'll hang up and take my answer off the air.

Ok, forgive me for thinking design patterns were just abstractions of algorithms. Here's a little table of my findings from the answers which were all very good.

A1: An algorithm is like a recipe: a step-by-step process for performing some activity.

A design pattern is like a blueprint: an structured collection of objects and associations and actions to accomplish some goal.

A2: Yes, there is a difference.

An **algorithm** is a recipe for performing some task - an unambiguous finite set of instructions that achieves some goal by operating on an input and producing an output. Typically an algorithm is expressed in a language-agnostic pseudo-code, which can then be implemented in the language of your choice.

A **design pattern** is a way of structuring your code in order to elegantly express a relationship between functional components. You might use design patterns within the implementation of an algorithm. For example, you might use an algorithm for an in-order walk of a tree to ensure that you visit all the nodes of a tree data structure in a certain order. You might also implement a *visitor* design pattern to express how your implementation returns control to the calling context to indicate that a node has been visited. This is not part of the algorithm, but part of the software design, and how you structure the interfaces that each component of your software can use.

Algorithms and design patterns are orthogonal, although they may well both be used at the same time.

Q: Can anyone point to any websites or web applications that are using the Presentation-Abstraction-Control design pattern rather than MVC? Desktop applications are easy to find like this (e.g.; GIMP) but I'm looking for something on the web.

Please check the answer and comments of my previous question in order to get a better understanding of my situation. If I use Google DataStore on AppEngine, my application will be tightly coupled and hence loose portability.

A3: A design pattern is a relatively vague description of how to solve a problem at an architectural level, with emphasis on flexibility and maintainability. An algorithm is a precise description of how to compute something specific, with an emphasis on correctness and efficiency.

A4: An algorithm is a set of steps/actions/commands/instructions that work in a specified order/manner across all circumstances or state changes. In the case of undo/redo, it would involve storing previous state at each juncture and then reproducing it (through whatever means the app has) on command. But since this definition is so fuzzy and each particular case is different, we like to create a more generalized design pattern into which a specific app's functionality can be plugged-in.

A design pattern is a more abstract concept that exists within object-oriented programming as a result of objects' encapsulation of their inner values and workings and polymorphism allowing for potentially different behaviors from the "same" function calls. All this makes it possible to build control structure into the objects' interaction rather than into an algorithmic structure like a conditional or a loop, and can be much simpler since you don't need to know an object's details to make it work - you only need to know *that* the object works. In the case of undo/redo, there could be objects for remembering state, for reproducing state, and for managing control. They would communicate with each other by calling methods/functions, which would each handle their own part of the functionality.

The terms are not interchangeable because they refer to different levels of design, and DP's in particular are only a part of object-oriented programming.

460. <https://stackoverflow.com/questions/25297433/need-help-deciding-how-to-structure-a-c-sharp-application-that-creates-products/25297522#25297522>

T: Need help deciding how to structure a C# application that creates products that share similarities but have their differences

Q: I'm having a bit of a mental block trying to figure out the best architecture for this program and need some help.

I'm writing a C# application that creates what we'll call "Views". A view is basically an object which accepts some data as input and spits out another object as output.

A: You should never need *help* deciding on a Design Pattern.

The reason, a Design Pattern isn't meant to be a cookie cutter or a one pattern fits all. A pattern should be implemented to solve a particular problem. It shouldn't be used as raw architecture, but to help solve a particular issue.

Once you introduce a pattern, it will introduce complexity and limitations of its own. Which may actually hinder your goal.

The real question should be, **how can I refactor this application to optimize performance, capture the application goal, and maintain readability / maintainability?**

Based on the information provided, we can't even recommend a pattern because we aren't aware of your applications goals, issues, and limitations. This is why it is often up to the creator to find the optimal solution as you understand your application in a business, user, and developer manner.

461.<https://stackoverflow.com/questions/19616903/what-to-apply-security-to-in-mvc-ddd-repository-pattern-project>

T: What to apply security to in MVC + DDD + Repository Pattern project?

Q: I have the broad requirement for a flexible, reasonably granular security system, allowing us to customize what a given role or user is allowed to do within the system.

Facing this requirement, I must choose what objects, classes, or items within the architecture the security should use as its building block - eg. if a role is granted access to X, then what is X? An entity, a controller action, an item in a custom list of objects etc.

Options I am considering:

- 1) Grant by CRUD action on Entities (eg. a user could be granted Create/Read/Update access to the Account entity, and Read access to the Invoice entity, etc)
- 2) Grant by CRUD action on Entities , with RU actions to individual Entity Properties (eg. access to update specific fields) - could be simplified with "property groups" identified by attributes on the entities
- 3) Grant by Repository & Repository Function (eg. permitted to call to AccountsRepository.Get(...) or AccountsRepository.GetList(...) etc)
- 4) Grant by MVC Controller + Action (eg. permitted to access /Accounts/Index or /Accounts/Update/X etc)
- 5) Grant by a custom list of "Security Objects" which can be tied to arbitrary things within the architecture

Option (5) gives the most flexibility but least generic implementation. Option (4) is attractive as the security items will closely reflect the user interface, but means that the Domain is not securing access and security would not be applied in non-web interfaces.

What is your opinion & experience designing a security pattern in MVC + DDD + Repository pattern?

A: Designing authorization is the same regardless of DDD, REpository, MVC, CQRS ,[insert whatever trend of the day].

You want the security check to be done when an action (not related to controller action) happens. You check if the user has the right to do a certain action within a specific context. In your case it's really a controller action and the easiest way is via an ActionFilter (which i think can be reused with the WebApi as well).

The Domain model business concepts, behavior and use cases, the repository deals with persistence, let the security be its own layer which will care about users, rights and contexts.

Even in the use case mentioned by Hippoom, it's still a security layer concerns which will have its very own security rules, similary to a validation layer which validates input data according to some predefined rules.

A2: The most common security mechanism only requires role and resource. In this case, Option (4) seems to be the most common solution I've seen, therefore there should be a few mature secutiry frameworks on your platform.

The security things are inevitably mixed into the domain model if the security granularity is on the domain objects. I think it is usually unnecessary.

On the other hand, some security requirement need business context, for example, an operator cannot manipulate a trade more than \$1000 while his supervisor can. Honestly, I have no expierence on how to implement this, but I personally prefer building the security implementation in another bounded context from the core domain.

A3: I think this is one of the kind of questions a security framework designer ask himself when is thinking about what facilities he can offer in the filed of the Authorization problem.

I'd suggest you to look at the design or implementation of actual security frameworks available for your platform.

I know only the Java-based Spring Security and Apache Shiro.

They usually come with facilities for every authorization requirements and, as for your question, they can offer you a solution at all levels of granularity:

- Resource level (when you are not interested on which object instance apply the security check);
- Instance level (you control access to a specific instance of an object);
- Attribute level (you control access to a specific field of a specific instance of an object).

462.<https://stackoverflow.com/questions/5197846/security-architecture-settings-to-drive-ui-and-priveledges-rights-role-bas>

T: Security Architecture - Settings to drive UI and Priveledges (Rights) - Role-Based, per User-Account

Q: How do large companies implement their security requirements which are centralized and used to drive things people can do (allowed to call a certain web-service, submit an order, etc.) as well as to drive UI (disable buttons, menu options, individual form fields)?

I am considering RBAC architecture: Users -> Roles, Roles -> Privileges.

Complex applications with permissions based on many individual field-account-user-role-amountThreshhold would have many, many "Roles" and managing this gets complicated as number of roles grows.

Managing all these possible options seems daunting, and my prior experience is to hard-code such logic in the application.

I am tasked with designing / implementing a security service/architecture which will be used as common authentication/authorization point for any/all applications (all .NET, but some GUI and some process-oriented).

This is not possible out of the box because of the business organization around client accounts and permission tiers based on financial amounts.

Ex: John is a User and he can View and Submit requests for account "Microsoft" and "Google". Mike can View "Microsoft" and "Google" requests but can only Submit "Google" requests.

Number of accounts / users is large and variable.

If I follow RBAC, there will be hundreds of "Roles" to accommodate all required Rights (Privileges). This doesn't help because the end goal is to give easy to manage GUI tool so that managers can assign their direct reports to appropriate Roles.

I was thinking to implement this security piece with the following API (rough draft in pseudo-code):

```
UserContext securityContext = Security.GetContext(userID, userPwd);  
And usage in application would be like this: if (securityContext.RequestManager.CanSubmitRequest("Google"))  
{...}  
This way there would be thousands of these 'Can(params)' methods to check permissions which doesn't make it  
easy to either manage or use this pattern.
```

Any links / ideas / pointers are appreciated.

It's a .NET shop, but nothing I've seen from .NET (Membership / AzMan) will give us the granularity and delegation requirements required. ActiveDirectory / Oracle LDAP integration would be nice, but not necessary.

Old (current) system uses LDAP to authenticate users, but all authorization is done in-house and stored in classic "Users, Roles, Rights" tables.

A1: We were having almost same requirement, where we had multiple apps inside big organization, and we had to

- Secure multiple applications for authentication and authorizations and manage all these applications from same central location, no matter these applications are .net or non .net, GUI based or process oriented,
- running applications might be internet based or intranet based
- Applications should support AD users or federated users for authentication and authroziation
- Apply lots of 'role based' or 'permission based' security or customizations.

ex. Enable/Disable features -like Enable buttons, Disable buttons, Hide some menus, Change background color of controls, or change any .net supported properties of .net components etc.

- Secure webservice or wcf service for authentication and authorization
- apply role based security for multi-tenant applications via groups and users management
- Manage organization's users for multiple applications from central location
- Tracing user's actions or auditing.

463. <https://stackoverflow.com/questions/5010570/optional-route-parameters-and-action-selection/5013249#5013249>

T: Optional route parameters and action selection

Q: I use the default route definition:

```
{controller}/{action}/{id}
```

where id = UrlParameter.Optional. As much as I understand it this means when id is not being part of the URL this route value will not exists in the RouteValues dictionary.

So this also seems perfectly possible (both GET):

```
public ActionResult Index() { ... } // handle URLs: controller/action  
public ActionResult Index(int id) { ... } // handle URLs: controller/action/id
```

When id is missing the first action would be executed, but when id is present, the second one would execute. Fine, but it doesn't work. It can't resolve actions.

How can I accomplish this?

I'm thinking of writing a custom action method selector attribute like:

```
[RequiresRouteValue(string valueName)]
```

This would make it possible to use this kind of action methods. But is this the only way of doing it? Is there something built-in I can hang on to?

A1: Well from the exception that action can't be determined is pretty clear that actions are resolved first then data binder comes into play and examines action's parameters and tries to data bind values to them. Makes perfect sense.

This makes perfect sense. There would be no point in first trying to data bind values to all possible types and see what we get and then look for an appropriate action. That would be next to impossible.

So. Since action selection is the problem here I guess the best (and only) way to solve this (if I don't want to use a multifaceted single action method) is to write a custom action method selector attribute.

You can read all the details and get the code on my blog:

Improving Asp.net MVC maintainability and RESTful conformance.

464. <https://stackoverflow.com/questions/19693119/bank-style-navigation-restrictions>

T: Bank-style Navigation Restrictions

Q: Some web applications, banking websites in particular, prevent you from using the browser's navigation buttons, opening links in new tabs or even refreshing the page. Often they'll warn you not to do so and even kill the session forcing you to login again.

Is there a particular architectural pattern they are following to achieve this? What are their goals? How does this increase security?

A: Rather than having a different URL handler for different pages, they are probably passing the page state using POST variables passed by hidden form fields and the same URL handler will handle each request.

e.g. the link to "recent transactions" could be coded as follows

```
<form method="post" action="https://www.example.com/securebankpage">

<input type="hidden" name="action" value="recentTransactions" />
<input type="hidden" name="token" value="3423432432535235325098525125242" />

<input type="submit" value="View Recent Transactions" />

</form>
```

Where token is a secure random generated value that is recorded server side against each user session and action combination and the server side records are validated against the submitted form values when the user navigates. As each page is loaded via the POST method, it is not possible for the user to repeat the action by accidentally clicking back and then accepting the browser prompt to resubmit the data. This is because the token will have been marked as already used server side and will not allow the token to be used again. Useful if the back button navigated to the money transfer page as the money transfer will not be accidentally repeated. This also can protect against certain types of replay attacks.

This architecture also guards against [CSRF](#) as the token value would be unknown to any attacker that tries to initiate a POST to https://www.example.com/securebankpage from their site and passing the action as doMoneyTransfer.

The tokens should be time limited so if not used in a set amount of time (e.g. 15 minutes) they should be marked as expired and if the user's session is still active they should be regenerated for each possible action when rendered.

Links opening in new tabs isn't a security risk in itself, but if the server continually refreshes the token for each possible action, the links in the original window would now contain expired tokens as they have not been refreshed which is why the system is probably discouraging you from doing this and having a single path throughout the system instead which can be tracked.

In my examples above I mention everything being passed via POST, but it is also possible to implement similar using GET and separate page handler URLs. The POST route is slightly more secure as pages will be

automatically expired in the browser via the mechanism that stops re-submission of forms, although it is also possible to implement this by via other means. The use unique tokens is the important point.

A2: From javascript you can detect a new window by checking the length of the history.

You can capture a backbutton event by injecting an iframe in your page, pointing to (e.g.) http://www.example.com/cacheable_blank_page.html then changing its location to http://www.example.com/cacheable_blank_page.html#offset. When the user clicks on the back button, the iframe reverts to its original location. If you attach an event handler to this then you can detect the back button and handle the situation appropriately.

There's some code to do that [here](#).

Ultimately the problem that people usually use this for is that their server-side code is poorly written and is inappropriately storing transaction related data in the session and/or overusing PRG patterns - ultimately this is a nasty hack intended to pre-empt problems rather than a solution to the root cause of the problem.

SilverlightFox's token based solution is great for CSRF but does not solve the problem of poor state management on the server.

465. <https://stackoverflow.com/questions/43991787/asp-net-mvc-reuse-code-between-different-website>

T: ASP.NET MVC reuse code between different website

Q: I have two asp.net mvc website, they have the same page to update account data.

How to separate the repeated code(controller, *.cshtml, *.js, *.css... etc) for better maintainability? I don't want to modify code from one website and copy it to the other.

I have tried creating new website project only contains account pages, but the static files(*.js, *.css) can't be reused in this way.

466. <https://stackoverflow.com/questions/6406804/grails-vs-asp-net-in-architecture-response-time-and>

T: Grails vs. ASP.net in Architecture, Response Time and

Q: I am looking for a good platform to rewrite a growing website with huge amount of daily and concurrent visitors! so the Required Parameters are:

- Render Time With minimum CPU and Memory Usage
- Response Time
- Extendability in Architecture (Best support for new features)
- Maintainability
- Security Capabilities
- Minimum Hardware usage

I know Spring, GORM, but they will slow it down! also I did not mention ASP.net MVC because of Tradeoff between Speed and MVC Pattern Benefits!

I know that all of these parameters should be considered as a tradeoff so then I can choose my best fitting platform! Can some body provide a good and reliable comparison between GRails and ASP.net in Items provided above ?

467. <https://stackoverflow.com/questions/746377/brokered-kerberos-web-service-security-over-the-internet>

T: Brokered Kerberos web service security over the Internet

Q: Is it possible to use Brokered Kerberos Authentication for web services over the Internet? I'm looking at web services security for an environment which already has Active Directory. Due to the existing architecture the web services will be quite chatty and I have no control over this architecture. It may take up to 6 web service calls to perform one business process .

There is concern over authenticating multiple times and the overhead this will incur. From my initial reading of brokered kerberos authentication, once the user credentials are provided then a Kerberos security token will be returned and authentication is not required for each web service call.

I'm envisaging a system where the user credentials are passed to Active Directory via a web service call and the Kerberos token is returned. This token is then used for all subsequent web service calls.

Is this possible or am I heading off on a tangent? If I am heading off on a tangent is there a preferred approach for this? I've finished reading the Microsoft Web Service Security: Scenarios, Patterns and Implementation Guidance for WSE 3.0 and still a little unclear.

A: Consider leveraging the SAML protocol as a way to exchange assertions via WS-Security.

468.<https://stackoverflow.com/questions/19155353/separating-business-og-presentation-logic-on-different-servers-tiers>

T: Separating business og presentation logic on different servers / tiers

Q: I am forced to use a hosting company, which are forcing me to separate my (web) presentation logic and my business logic on two different servers/tiers, separated by a firewall. Only the server with presentation logic will be exposed to the internet. The justification is security. I have a third server/tier with the DB, but that's trivial. I am looking for an architectural model / design patterns that is useful in this scenario.

I found a description from Microsoft on a 3 tier web architecture: [Improving Web Application Security: Threats and Countermeasures](#), but it's about what to do, not *how* to do it. Microsoft's own hosting uses a two tier architecture: [Windows Azure Security Guidance](#).

Eg. if I use the MVC pattern, I can put the Controller and the View on the presentation logic server and the Model on the business logic server. Then I can put a servicelayer on each server for the communication, but the I have to share sessions, user authentications etc. between the servers.

What is the smart way to do it? Can anyone give me a link to an article etc.?

A1Session state should be orthogonal to domain state. You most likely want to keep your session state in your view layer, and keep your service/domain layer stateless if at all possible. This means you will need to pass any user information into your service layer from your controller.

If this becomes an issue, and you need long-running session state, externalize it to a separate store, and link it to the passed in session information. This keeps the "session" for the domain layer separate from the "session" in the view layer. Thus preserving the abstraction between model and view.

You *will* start incurring business logic bleed into the view/controller layers, as the session state is much more conveniently located there. Be aware of it, and work to control it.

The [MVVM](#) pattern might fit this a lot closer than MVC will, and it does a better job of encapsulating the view state on the business server side. Sessions are still at issue though. You will need/want separate sessions on the view / business layer, but the one on the view layer ends up being very light. It basically just needs to handle authentication, and then have a key (sessionid) which it can pass to the service layer to allow the.viewmodel to link up with.

469.<https://stackoverflow.com/questions/1317726/best-architecture-for-reporting-application-in-asp-net-with-dynamic-sources>

T: Best Architecture for Reporting Application in ASP.net (with dynamic Sources)

Q: the Requirement in simple words goes like this.

- Its a charting Application (kinda Dashboard) with multiple views (Charts , PDF and Excel)
- DataSources could be primarily from Oracle but there are other data sources like Excel,flat Files....etc.
- Charting library would be Component art (I would like to try the new asp.net charting but as its already being used in other apps they would like to continue)

As I told you, We have already have an application which is like basic 3 layered with some DTOs and mostly DataTables;where I feel any data model is tightly coupled with Views, they would like to continue with the same :)

I would like to propose a new architecture for this and I need your honest comments.

I think

1. It should be designed using traditional MVC pattern, as there is one model and different Views(chart,excel,pdf)
2. A Solid Service layer(Enterprise Lib) with 1) Security(Provider model) 2)Data source Abstraction (flat files , oracle , excel) 3) Caching (each report would have its own refresh time and the data/view can be cached accordingly 4)Error logging 5)Health monitoring
- 3) using WCF services to expose the views or DTOs
- 4) Complete AJAX and partial rendering
- 5) develop a solid wcfservice which would take the datamodel name and view(chart,excel,pdf then returns the view accordingly.

Please guide me, I want to build a loosely coupled and configurable architecture which can be reused.

A2: Honest answer: It sounds like you are either **over-engineering** this, or you are **irresponsibly re-inventing** the wheel.

I want to build a loosely coupled and configurable architecture which can be reused.

That's a lovely goal, but is it a requirement of this project? I'm guessing it's not a fundamental requirement, at most a *nice-to-have*. It seems that the business needs a dashboard with some exportable charts and reports, and you're proposing to build a platform. That's classic over-engineering.

If you really need a reusable platform, it will take considerable effort and skills to build an intuitive, robust, secure, testable, configurable, maintainable reporting platform with sophisticated and trainable authoring tools.

And even if you build a perfect platform, *you'll have a custom system that nobody else knows*. If you use an established BI/reporting platform, you can hire people who already know the technology or point people at reams of already existent training materials.

In other words, it's going to be difficult and more expensive to build, which is bad, but also difficult and more expensive for the organization to use for years to come, which is worse. I routinely choose build over buy, but reporting is a known problem that has been solved well enough by commercial platforms.

So, sure, that architecture sounds reasonable. And without knowing more about the requirements, it's impossible to judge: maybe you really do need to build this from scratch, but from your description "charting Application (kinda Dashboard)", building a reporting platform sounds unnecessary, though perhaps quite fun.

A3: I recommend the following book: [Microsoft® .NET: Architecting Applications for the Enterprise](#) by Dino Esposito; Andrea Saltarello.

They are discussing architecture in a pragmatic way (Yes there are code examples). Many of the things you have mentioned will be described in the book. You will probably not get all the answers but it will inspire you. (They have made a book about Ajax/ASP.NET arch too but I have not read that one)

You want to use a lot of new cool technology, that's cool. But most important is why do you want to use it, what business value will it add? Ask yourself what do you want to with your product in the future? To be able to figure out today and tomorrow's requirement will be the best thing to help you build "loosely coupled and configurable architecture" it will help you more than any of the techs you have chosen.

A4: I think you can make a loosely coupled architecture that is flexible. It is actually pretty simple. Create a table that contains all of your reporting SQL and bind the results to a gridview. The individual SQL is pulled from the tables via a drop-down menu of categories and reports. You can add additional tables with sub-selects to drill down and rebind upon row selection. Use the parameters from the Oracle Data Access to include dates, filters, etc. from any controls that may be present on the front-end.

Once the data is dynamically bound and displayed, give the users the option to email the grid contents, export to PDF, Excel, etc.

I've implemented this @ 2 client sites and it saves them a ton of money of buying licenses from Crystal, MS, etc. and is much more flexible.

A5: My motto is always buy before reuse before build. From the requirements, you could be better off buying a COTS BI solution. They have very robust feature sets and provide the capability to do things like charting, pdf/excel export out-of-the-box. There are tons of vendors, Microsoft has their own BI suite. Oracle has theirs, etc...

470. <https://stackoverflow.com/questions/4671484/how-to-architect-an-asp-net-mvc-application>

T: How to architect an asp.net mvc application?

Q: I have read little bit about architecture and also patterns in order to follow the best practices. So this is the architecture we have and I wanted to know what you think of it and any proposed changes or improvements -

- **Presentation Layer** - Contains all the views, controllers and any helper classes that the view requires also it contains the reference to Model Layer and Business Layer.
- **Business Layer** - Contains all the business logic and validation and security helper classes that are being used by it. It contains a reference to DataAccess Layer and Model Layer.
- **Data Access Layer** - Contains the actual queries being made on the entity classes(CRUD) operations on the entity classes. It contains reference to Model Layer.
- **Model Layer** - Contains the entity framework model, DTOs, Enums. Does not really have a reference to any of the above layers.

What are your thoughts on the above architecture ? The problem is that I am getting confused by reading about like say the repository pattern, domain driven design and other design patterns. The architecture we have although not that strict still is relatively alright and it works well and I think and does not really muddle things but I maybe wrong. I would appreciate any help or suggestions here. I am really looking for some real big issues that I have missed ... Thanks!

A1: In order for architects and developers to make design decisions correctly and efficiently, they need information about how architecture patterns and other decisions (e.g., architecture tactics) interact, but it was not easy task. It slightly depends on the underlying reasons as to why you want a particular architecture, but assuming a standard MVC application with a small amount of separation of concerns to allow for interoperability and testability then the structure you have outlined is **exactly right**.

If you go for this then you should enforce it strongly with no exceptions. Saying the Model layer "Does not really have a reference to any of the above" is a bit vague - it should **not** reference any of the higher levels. Other aspects such as a repository pattern would be introduced as the way in which the data layer is implemented - it does not dictate the layers themselves.

471. <https://stackoverflow.com/questions/40469341/how-to-run-root-commands-from-tomcat-on-linux>

T: How to run root commands from Tomcat on Linux?

Q: I'm planning a project to run on Linux. I think it will be a java webapp using Tomcat. I'm not sure yet, because of the following problem and the solutions. This project will be able to configure some settings and run some system commands.

My problem is these commands need to be called from root or to use sudo. I would like to avoid this from a webapp or to avoid root to run Tomcat. How can I run these commands (directly/indirectly) from my webapp ?

Is there an architecture/design pattern/any solution for this kind of problem without to reduce the security of the system ?

472.<https://stackoverflow.com/questions/2986626/methods-for-ensuring-security-between-users-in-multi-user-applications>

T: Methods for ensuring security between users in multi-user applications

Q: I'm writing a multiuser application (.NET - C#) in which each user's data is separated from the others and there is no data that's common between users. It's critical to ensure that no user has access to another user's data.

What are some approaches for implementing security at the database level and/or in the application architecture to accomplish this? For example (and this is totally made up - I'm not suggesting it's a good or bad approach) including a userID column in all data tables might be an approach.

I'm developing the app in C# (asp.net) and SQL Server 2008. I'm looking for options that are either native in the tools I'm using or general patterns.

A1: I believe associating data with a user via a user id is the most common approach.

Another approach is encryption. Each user could have some secret key, an actual digital key or maybe just a password, and all their data could be encrypted with their secret key so that other users wouldn't be able to access it. You would still need to associate data with user ids for querying etc.

A2: why not using any kind of access methods (who can access which file, and has the rights of read, write and delete) that fits your problem if it works with your problem (i have no idea)? For example:

- Mandatory Access Control known as (MAC)
- Discretionary Access Control (DAC)
- Role Based Access Control (RBAC)
- Rule Based Access Control (RBAC)

you can read and select one of them if it fits your problem.

473.<https://stackoverflow.com/questions/32557125/spring-mvc-security-identification-of-protected-resource-during-authorization>

T: Spring MVC & Security - Identification of protected resource during authorization

Q: I'm building a Tomcat/Java MVC Servlet app using Spring MVC and Spring Security, and have come upon what looks to me like an architectural inconsistency between the functionality of the Controller and the Authorization step.

In standard MVC a display Controller examines the request, builds the model representation of the business resource(s) involved, and specifies the view that is to render the output to the client.

In my use case the "business resource" being served is a "photo album" consisting of a configuration file (containing album title, copyright, etc) cached metadata (dimensions, thumbnails, access requirements, etc) and the actual images. Some Albums are private, requiring that the user be logged in and have a specific group membership. This part is well encapsulated in an Album class and associated factory responsible for managing instances. Prior to adding security the Controller used the factory to find the requested Album instance, and placed it into the Model for use by the View.

Then I added Spring Security to the mix. Since Authorization happens in the servlet filter chain (before the Controller is invoked) and Authorization needs access to the Album object to make an access control decision, I am forced to locate/instantiate the Album during the Authorization phase instead. This doesn't feel quite right but I can't see any other way to accomplish my goals without duplicating functionality.

Question: Is it a normal pattern in web applications for some of the model-building to get pushed back into the Authorization step, or have I missed something important? BTW, in order not to lookup/instantiate the model object twice I plan to put it into the `HttpServletRequest` as an attribute for use by the Controller.

A1: Since I got no answers I'm going to share my own insights.

I simply didn't understand the scope of Spring's declarative security model. If you have a set of resources which have a binary accessibility state (yes/no) based on the logged-in user, then Spring Security's model is appropriate. If you need finer-grained control (i.e. display a page but tailor its contents based on logged-in user), then you have to do your own filtering at page generation time.

474. <https://stackoverflow.com/questions/10264189/best-practices-for-web-service-user-authentication-and-session-management>

T: Best practices for Web service user authentication and session management

Q: As per the title, I am wondering what are some best practices for Web service user authentication and session management, **mainly for backend implementation**, especially using Java (J2EE).

Has anyone published anything on the subject? What kind of security considerations should one keep in mind when working with user authentication? What kind of design patterns are related? How should sessions be managed? What does a well-designed architecture look like?

Are there existing systems that could be used as good examples, or even bad examples?

A: As the Java EE specifications for web services actually consist in exposing a stateless session bean as a web service, you won't be able to implement session management without a "home-made" solution such as including a user token in each of your request.

475. <https://stackoverflow.com/questions/45998405/oracle-soa-and-msa/46539990#46539990>

T: Oracle SOA and MSA

Q: Is it advisable to build the MSA based services on Oracle SOA or any other ESB suite for that matter? Is there any advantage or disadvantage?

If I am using Java, Spring and JPA over a message queue - say - RabbitMQ, I can achieve it in a more controlled environment with less recurring expenses. Of course will end up mixing tools like Drools or JBPM or similar to achieve things that may be OOTB (Out of the box) in the SOA Or ESB Suite. But scaling a specific service without paying licence fee for an additional environment should certainly be a good catch right?

A1: Microservices architecture pattern applies to development of backend systems/services, whereas ESB (e.g. Oracle SOA Suite) is intended as an intermediary layer between consumers and backend services. Backend services contain rich application logic, whereas ESB services provide only intermediary functions like routing, transformation, orchestration etc.

ESB is not intended for rich application logic, though it's possible to do that.

Using ESB (e.g. Oracle SOA Suite) to host microservices is achievable, but you will get a big overhead comparing to limited functions and scalability. If you are looking for centralized API management (tracing, security etc.), you can put an API gateway into your architecture instead of full scale ESB.

476. <https://stackoverflow.com/questions/15765429/multi-tier-architecture-responsibility-questions>

T: Multi-Tier Architecture - Responsibility questions

Q: I'm developing an application which implements multi-tier pattern where MySQL is used for persistence. There is a WCF service which provides access to data and provides DTOs.

Further, I plan to implement the following patterns: - DTOs - MVP (not yet sure if passive view or supervising controller) - Code against interfaces where applicable

Outer boxes are project folders in Visual Studio. Inner boxes are C# Projects

Before I continue coding and spend more time in actual implementation, I just like to get some feedback about the structure / architecture of my project.

I'm wrapping my head around following questions:

1. Is the above structure "best-practice"-conform? eg. location of Interfaces, DTOs
 2. Is it ok to have two business layers or rather split the business layer into client and server? Server BLL is meant to provide general functions like Session management and security while client BLL provides service access. It controls the views by its presenters as well.
 3. Server side does not know about the domain objects at present. Would it be better to use them here as well? This would result in mapping my entities to domain objects and then to DTOs
 4. Is it common to receive DTOs from WCF service or should I use domain objects (I know that has been discussed here a lot, but from what I understand, it would be applicable if the domain objects are not that complicated and could save mapping and coding effort when changing my domain objects and database) Wouldn't this result in a very hard to maintain communication chain like: Entities<->Domain Object<->DTO<->Domain Object
 5. Where do you put validation? I thought to put basic validation into the views or presenters (eg. formatting, null/not null values, ...) while main validation goes to the domain objects...?
 6. When creating a new record in the database, lets say a new user, should the client also pass a new DTO to the server or is it better to create a service method that accepts simple data types such as string and int?
- Sorry for this long post, but I thought it would be better to combine my questions into one post and provide the project structure within.

A: The structure that you propose is quite similar (*mutatis mutandis*) to one of our applications that was deployed in production 2 years ago. It works, but you have to carefully design the domain model, separating in different bounded context the various aspect of the application.

So these are my own answers:

1. No, there's no "best-practice" to conform here. After 5 years of DDD practice in financial applications, my own opinion is that DDD is still a research field. However, it proves very well if applied correctly to projects whose value resides in the experience of a **domain expert**. However you have to distinguish business needs (that are relevant to the domain) and technological requirements (that can help drawing the components and tiers that your application needs)
2. Business Layer (if you need to identify one) should handle the business rules only. It's the layer of the domain models, in a DDD application.
3. In my experience, if you can trust the client machine and you correctly design the domain model, you should not need any Application Server, at all. However, if you really need it (for example because clients cannot connect to the db), I would make it as simple and stateless as possible. An useful consideration here is that **most of times, the business rules already prevent concurrent access to mutable entities**. Don't try to handle concurrent access to such entities in that case, simply build a mutual exclusion mechanism.
4. For inter-process communications, use only DTOs. You can choose, however, to move the whole domain into the Application Server (that will become much more complex and stateful), and use a simpler MVC pattern in the client. This is simpler from the client's developer point of view, but more expensive overall (in particular, it can be hard to scale).
5. Simple type validation of input fields can be done in the view (integers, date times and so on), but **you should model each relevant type of value** with a custom value object before passing it to the domain. For example you should never pass strings or decimal to domain objects, but **Email** or **Money**. Moreover the

domain in the only responsible for business invariant: [it should throw expressive exceptions](#) when an operation can not be performed.

6. DTO are more expressive, thus easier to debug.

Before you start, I think you should ask yourself some questions:

1. Do I need a domain expert or I can learn enough of the business by reading Wikipedia or a set of well written specifications? Tip: no need for (at least) a domain expert == no need for DDD.
2. Can I trust the machines where the client will be deployed? If you can't, you should consider moving the domain into the Application Server (and adopt an MVC pattern client side to handle WCF requests and DTO bindings).

Finally, if you really need DDD, and you are new to it, you could find the [Epic's modeling patterns](#) useful (disclaimer, I'm one of the Epic devs and I designed all of them during the last 5 years of DDD trial and errors).

A2: Will answer one by one

- 1) It Depends on the complexity of the application. If your are working on complex domain its good to follow domain driven design
- 2) If you say BLL, it should only take care of the business logic not any technical details like session, security ..
- 3) Its good to have domain objects in the server side. It promotes reusability
- 4) You should not expose domain objects outside. DTOs are better option. You can use Automapper for all the mapping related work
- 5) Its good to have validations in each component depending on the scope
- 6) DTOs would be better

Additionally you can Service stack than WCF as it is built on industry best practices.

477. <https://stackoverflow.com/questions/21054031/is-it-safe-to-use-couchdb-with-ajax/21071766#21071766>

T: Is it safe to use CouchDB with AJAX?

Q: Since CouchDB has a built-in web-server and works with RESTful API, there is a temptation to access it's data with AJAX calls directly from the browser.

Is it a common practice, and what security features CouchDB has to prevent malicious actions?

A: I'm not sure if this is an academic question or not, but in terms of security, you want a tightly-defined boundary between back-end and front-end. Your app has no business exposing your back-end database platform to the front-end. Furthermore, good architecture patterns (e.g. N-tier, MVC, etc.) dictate that you have a service layer to marshal requests to the data layer.

To summarize, use direct ajax:

1. If you don't mind your database being hacked
2. If you never plan to switch database platforms or add other platforms
3. If you feel like throwing generally accepted architecture principles under the bus

478. <https://stackoverflow.com/questions/1478887/design-guidelines-for-secure-java-ee-web-applications-and-seam>

T: Design guidelines for secure Java EE web applications and Seam

Q: I attend in process of designing Java EE web application. It consist of:

- backend module (EJB 3.0)
- 3 web modules (JSF)

Our application must be secure, so some colleagues claim that it must be splitted into two or more separate servers - backend in one server, webapps in other(s). In our case performance isn't a problem but this architecure demands using remote interfaces in EJB layer.

We are planning also to incorporate Seam to simplify development, but there is one drawback. So we miss out some really cool features of Seam e.g. - extended persistence context in SFSB

Does the use of an architecture with two or more separate servers/machines for each layer of Java EE web application is really a must in aspects of high security? I didn't find resources explaining pros and cons of this configuration. What are other project configuration options/security patterns that I should consider that facilitate using Seam? In others words should we stick with this architecture and add Seam as it is or apply another solution?

If it helps we can use Spring instead of EJB, but EJB is more preferable.

A: Here's a simple answer to you're question.... Is it more secure to have your data hop across 3 network connections (Web->Web server is 1, Web server ->remote EJB is 2, and remote EJB->DB is 3), or 2 network connections? The 2 network connection is inherently safer, since there is less exposure to hostile listening on the wire. If you're attacker is able to read the memory Java uses to scrape the data from your web server, you have far far bigger problems than a separate server just won't help with.

479. <https://stackoverflow.com/questions/2848630/architecture-of-net-desktop-application-client-server-c-sql/2848717#2848717>

T: Architecture of .NET Desktop Application - Client Server C#, SQL

Q: Recently I've being given a chance to develop a PMS (Practice Management System) software for a small physiotherapy clinic.

I'm a computer science student and my course is predominately told on Linux. However, my client runs all their computers on vista or Windows 7.

My ideas are to develop the client front end in Visual C# and access a central postgresql server.

I'm a beginner in Windows Programming so I'm after advice on best practice on implement user rights and access levels in C# (WPF or Windows FORM). I've had a look into Credential class in Visual C# and access control list but please share your thoughts.

Just to Elaborate:

My thoughts are to write the front end using window forms and disable or hide controls/tables/forms according to the access level the user is granted.

E.g. Only the owner of the clinic will be shown the finance reporting form while the secretary will only be shown the appointment diary form.

So I probably need a dialog asking the user to login to the system, should I store or map those login details in the database? What libraries or classes are best used to handle those tasks?

I'm probably way over my head on this but this is my first commercial project so I'm keen to test the waters.

A1: Use these tools and technologies for your project.

- Visual Studio 2010

- .Net framework 4.0
- WPF using MVVM
- SQL Server 2008 Compact or Express
- Linq to Sql

Some notes:

Screw Postgresql. You're developing on MS, baby. Would you LAMP with Sql Server (LASSP)? Hell no. Don't give yourself the heartache and bother of trying to get all the tools and code samples working with PGRE.

You can develop awesome software using VS 2010 Express and Sql Server 2008 Express. Commercial software. Without having to buy either. Yes, you lose out on some of the cooler tools in VS, and you're limited to 4gb of database in Sql Server (10gb in R2), but I don't think you'll miss it too much.

I'd definitely start in 4.0. No sense developing in 3.5 and 2008 at this point. You don't GAIN anything by developing in 3.5, so why do it? All 3.5 code samples and information still applies for 4.0, but the reverse isn't true.

Sql Server compact makes for a simple deployment on a single machine or machines that don't require a central database. Express is good for the rest of it. You'll need to buy for an enterprise type application. Don't think you'll have to worry about that.

I'd suggest Linq to Sql over EF4 at this point. I'm not happy with EF4. Seems like the pit of success is pretty goddamn small. More like a pothole of success. L2S is easier for the starting developer, methinks.

A2: I'd suggest a completely different approach: Write it as a web app, give them a single-site version of Firefox to provide the UI.

You could give them a Linux or OS X server running Apache, Django, and Postgres, which would work IF and ONLY if that server can be properly supported by whoever does their routine IT work (which should not be you). If they can't get maintenance, go with Windows on the server.

If you do require a Windows server, I'd be using VS2010 Express, C# 4.0, ASP.NET MVC with Fluent NHibernate, Gallio/MBUnit and your choice of database... but in that context, MS SQL is probably a better choice than Postgres on Windows because you can actually back it up properly.

You're probably capable of doing some nice jQuery or SmartGWT UI for them.

Whichever way you go, your business model code at least, and preferably everything, MUST be unit tested for this kind of application. Also you really should look up what your legal privacy and data retention requirements are for this application... medical records are often heavily regulated.

A3: Use these tools and technologies for your project.

- Visual Studio 2008
- .Net framework 3.5
- Windows Forms [No WPF for timebeing]
- SQL Server 2005 or above
- Linq2Sql for Data-access

A4: I've never used Postgressql but in I assume it would be possible to just add users with passwords in there and give them access to different tables. And then the app asks for username/password at startup and use those details to login. Then you could have a username table and a permissions table and a username-permissions table to link them together.

Use previously entered username to lookup a record in this table and then retrieve it to your app and your app can use that record to decide what to show to the user.

Regarding technologies, I'd use VS2010, the express version should be fine I'd thought and whatever free database you know how to use (there's SQL Server express, but if you already know Progress I'd go with what you know.). There's plenty of questions here that discusses Winforms vs WPF.

480.<https://stackoverflow.com/questions/3429707/scalability-of-a-single-server-for-running-a-java-web-application>

T: Scalability of a single server for running a Java Web application

Q: I want to gain more insight regarding the scale of workload a single-server Java Web application deployed to a single Tomcat instance can handle. In particular, let's pretend that I am developing a Wiki application that has a similar usage pattern like Wikipedia. How many simultaneous requests can my server handle reliably before going out of memory or show signs of excess stress if I deploy it on a machine with the following configuration:

- 4-Core high-end Intel Xeon CPU
- 8GB RAM
- 2 HDDs in RAID-1 (No SSDs, no PCIe based Solid State storages)
- RedHat or Centos Linux (64-bit)
- Java 6 (64-bit)
- MySQL 5.1 / InnoDB

Also let's assume that the MySQL DB is installed on the same machine as Tomcat and that all the Wiki data are stored inside the DB. Furthermore, let's pretend that the Java application is built on top of the following stack:

- SpringMVC for the front-end
- Hibernate/JPA for persistence
- Spring for DI and Security, etc.

If you haven't used the exact configuration but have experience in evaluating the scalability of a similar architecture, I would be very interested in hearing about that as well.

Thanks in advance.

EDIT: I think I have not articulated my question properly. I mark the answer with the most up votes as the best answer and I'll rewrite my question in the community wiki area. In short, I just wanted to learn about your experiences on the scale of workload your **Java** application has been able to handle on one physical server as well as some description regarding the type and architecture of the application itself.

A2: You will need to use group of tools :

1. Loadtesting Tool - JMeter can be used.
2. Monitoring Tool - This tool will be used to monitor various numbers of resources load. There are Lot paid as well as free ones. Jprofiler,[visualvm](#),etc
3. Collection and reporting tool. (Not used any tool)

With above tools you can find optimal value. I would approach it in following way.

1. will get to know what should be ratio of pages being accessed. What are background processes and their frequency.
2. Configure my JMeter accordingly (for ratios) , and monitor performance for load applied (time to serve page ...can be done in JMeter), monitor other resources using Monitor tool. Also check count of error ratio. (NOTE: you need to decide upon what error ratio is not acceptable.)

3. Keep increasing Load step by step and keep writing various numbers of interest till server fails completely. You can decide upon optimal value based on many criterias, Low error rate, Max serving time etc. JMeter supports lot of ways to apply load.

A3: To be honest, it's almost impossible to say. There's probably about 3 ways (of the top of my head to build such a system) and each would have fairly different performance characteristics. Your best bet is to build and test.

Firstly try to get some idea of what the estimated volumes you'll have and the latency constraints that you'll need to meet.

Come up with a basic architecture and implement a thin slice end to end through the system (ideally the most common use case). Use a load testing tool like ([Grinder](#) or [Apache JMeter](#)) to inject load and start measuring the performance. If the performance is acceptable - be conservative your simple implementation will likely include less functionality and be faster than the full system - continue building the system and testing to make sure you don't introduce a major performance bottleneck. If not come up with a different design.

If your code is reasonable the bottleneck will likely be the database and somewhere in the region 100s of db ops per second. If that is insufficient then you may need to think about caching.

481. <https://stackoverflow.com/questions/817673/architectural-considerations-in-designing-console-applications/817678#817678>

T: Architectural considerations in designing console applications?

Q: I have recently programmed a console application and I've experienced a lot of pain in designing it in many aspects, particularly in C#, given its pure OO paradigm. Questions I have faced include anything from how to pass the options to how to return problems to the entry point class, among many, many others.

My question is: would any of you know of good designs of console applications in an OO paradigm so I can learn from them? Code of good implementations is **particularly** welcome.

EDIT: I'm not after command-line APIs, but after good design principles, and, in particular, good implementations I could learn from.

EDIT 2: There is simple user interaction in the application, but it is not a full-fledged CLI/REPL sort. Think of it as the TeX command, more or less. Interestingly, even though there is good theory floating around (no different than X, use pattern Y, you should know OO principles...[your computer science professor would be so proud!]), there is no real code I can take a look at to see these concepts in action. Again, where should I look (code!) for a good command line application in a pure OO paradigm?

A: It sounds as if you're building an interface that performs one of several distinct operations with each invocation. I'm not sure if you're referring to a "command-line" application (which does one action, then exits) or a CLI application (which displays a prompt and responds repeatedly to user input). In general, the former will be much simpler to build than the latter; I think it only makes sense to use a CLI if your application requires some persistent state that evolves over multiple commands. If you are tackling something like this, then alphazero is correct -- you should probably learn about REPLs and copy a good one.

In any case, the operation performed will depend on the arguments passed on the command-line, so I'll brainstorm about that part...

It's sensible think of the application as a set of distinct "Command" objects, one for each type of operation. The entry-point to the application should thus be a some sort of CommandLineDispatcher object that dispatches requests to the appropriate Command object.

To be modular, the dispatcher should be configured with an abstracted mapping (eg, a Hashtable) to associate each command token (usually the first word of the command-line string) to the Command object that handles it. The dispatcher may also handle common options-parsing, probably using some off-the-shelf "getopts" library to do the heavy lifting.

To start simple, each Command object could implement a consistent interface for doing its work; maybe something like this:

```
public void execute(List<String> args)
```

This way, the entry-point dispatcher just finds the Command being requested, and executes it.

Regarding error-handling: the `execute()` method might just throw an exception to communicate errors...

Exception could be caught and processed by the dispatcher, or simply logged to the screen. Alternatively, failing Commands could invoke some shared usage function to combine an error message with general instructions. I don't think the "entry point" should necessarily be made aware of problems as you suggest; if you need robust error-handling (eg, for logging or alerting capabilities), this seems like it belongs in a separate component that could be provided to the Command object.

In general, a command-line application is no different than any other application that responds to user input -- you'll need a dispatcher to parse and route the input, and handlers (aka "controllers") to execute the supported operations. If you need other services (logging, alerting, database connectivity, etc), you'll do well to create separate components to isolate this logic and expose it with clean interfaces.

A2: A console application is no way different from a regular win forms or web application when it comes to key cross cutting concerns like logging, error and exception handling, security,etc.,

Having said that can you please detail our question as to where they key areas of concern are?

You can draw on many patterns from [App Architecture Guide](#) from Microsoft.

482. <https://stackoverflow.com/questions/459062/are-there-any-good-guidelines-references-design-patterns-or-just-good-advice-for-building-html-javascript-air-apps>

T: Are there any good guidelines, references, design patterns or just good advice for building HTML/JavaScript Air Apps

Q: I'm currently building a prototype AIR application for work. It allows our clients to download and work with their data and then synchronise with the server at some later time. Pretty standard stuff.

I'm an experienced web developer and so I have been fairly successful at getting this app into a reasonable state for demonstration, but in the near future I'll have to get it production ready. In preparation for this I'll need to do a bit of research on best practices for this kind of thing.

Any advice you can give would be most appreciated. I would like to hear about

Architecture

I've organised my app into a roughly MVC pattern with a rudimentary signal/slot system for inter object communication. This works quite well but I think it may begin to break if the project were very much larger. I have an object that communicates with the database server, another that handles the local, SQLite data. An object that handles the various views, both static and dynamic HTML. A controller that marshals the other objects and handles the flow and a small config object that loads, stores and handles configuration data.

Does this sound reasonable? What have other people done? Are there any good demos/tutorials or good references?

Security

I haven't really spent much time on security because we're at prototype stage but I'm all ears! I'm using CSV to move the data around at the moment but in the end it'll be AMF over HTTPS.

Distribution and updates

I'm developing in Linux. Is this going to be a problem when the app is packaged up? Is AIR on Linux as capable as on Windows or Mac? Will I be able to make a proper installer/badge? Will I be able to get the update framework working?

In general though, because I'm not this far down the line, is making the .air file as simple as it seems? Works like a charm on my machine.

I think that's enough for now unless anyone spots something I've left out.

A1: I have used AIR quite successfully for this sort of thing, and intend to converge with you at the MVC abstraction level. From one of my SO questions, my attention was directed to [this](#). Maybe you could look it over and let me know what you think. At a high level it seems to coincide with your description of your design. I'm using AMF - tried starting with JSON but AMF is more direct and for my purposes functionally equivalent.

My app is used by a couple dozen people across random platforms, Windows and Mac and Linux. Installation is painless. I post one installation package, and the Adobe installer figures out what runtime stuff is needed for the platform being served, and makes sure things are set up correctly with no attention on my part. It completely abstracts out platform dependencies, and there was no learning curve.

483.<https://stackoverflow.com/questions/4970112/is-it-possible-to-have-over-inheritance-to-be-lost-in-code/4970170#4970170>

T: Is it possible to have over inheritance to be lost in code?

Q: I'm currently working on an asp.net site, done by someone else, and it's rediculously over complicated for what it does.....Well I think so! Pretty much every class inherits from another class then another and another and so on and on..... You have to go about 8/10 levels on average to get the the base class, sometimes more! And these classes have other classes inside which follow the same pattern of Uber Inheritance. This leaves me lost in code many many times resulting in God knows how many tabs open on visual studio.

Is this good/normal practice or is it bad practice? I feel it's bad practice as something so simple is made over complicated with an over usage of inheritance resulting in un-extensible code.....but I could be wrong :)

A1: Inheritance as a means to reusing code is a pretty bad choice indeed. Consider that every class in .NET-based languages have a **single** slot of inheritance where code can go. Hence, for each class it should be chosen wisely whether it should inherit from something else or not.

Classically one says that inheritance describes a "*is-a*" relationship, where by going up the inheritance chain we reach higher levels of abstraction.

The first question should always be whether a "*can-act-as*" relationship isn't sufficient. In this case, describing the relationship via **interfaces** is often a better choice. Secondly, when adding abstractions, the question must be whether a non-negligible amount of code can work with those abstractions in order to satisfy the features you are seeking.

If there is hardly any code using those abstractions, then they are most likely worthless by themselves. Again, the cost of abstraction is usually lower with interfaces than with base classes.

So, in summary

- A "can-act-as" relationship is usually enough - You then don't need to go for a "is-a" relationship
- The inheritance slot is precious - It can be used only once.
- There are many more ways for code reuse than inheriting from a class
- Base classes and interfaces are abstractions: Make sure that your code can indeed make use of them. If your interface is implemented by only one class, your abstraction is possibly worthless and easily introduced when it becomes necessary.
- If there is a need for abstraction, the penalty is lower on interfaces than on base classes.

A2: Sounds like inheritance-overkill, very rarely should need to go beyond 2-3 levels, and that would be for a complex business model.

What sort of classes are these? Controls? Business Objects? Are they documented (UML) anywhere so that you can get a good overview of the model?

8-10 levels deep is a lot, I would hazard a guess that these classes were coded before (or never) designed.

484.<https://stackoverflow.com/questions/15350012/best-c-sharp-archeticture-pattern-for-communicating-between-separate-plugins-o/15350520#15350520>

T: Best c# archeticture / pattern for communicating between separate plugins of application

Q: I am currently involved in designing a system from the ground up, and we have come across an architectural design scenario that I'm not sure of the best way to solve - but I'm sure other people have solved and there's probably even a pattern for it.

The story so far:

We have a multi-tenant website in which we are implementing various features as Plugins, our clients will choose which plugins they wish to use in their application. And each plugin could have a variety of "widgets" that a user can add to a page. (eg. similar idea to how Android apps often come with widgets that you can add to the main screens).

A plugin can depend upon other plugins to be enabled (eg an eCommerce Plugin would need Payments Plugin). Also plugins can use other plugins to enhance their functionality (eg Blogs plugin has the option of using the Comments plugin, could also use Comments with eCommerce Products).

As much as possible, we want each plugin to be self contained, with a very skinny public interface. We believe this separation of concerns will give us the best long term flexibility and maintainability of the overall system.

The problem:

When we started to layout all the plugins we currently know about (let alone future requirements), and their dependencies and possible relationships with other plugins - it started to have a very strong resemblance to a spider web of madness. And we also started to see some Circular References happening.

eg Navigation Plugin needs to know about what Pages are on the site. But you can also add a Navigation widget to a Page.

The partial/potential solution:

We were thinking that each plugin should be completely separate from other plugins, but would get info from and communicate with other plugins via Messages. These messages can be broken down into 2 basic types

- request for info from another plugin (Request / Response Messages)
- event notifications (Event Messages)

Both of these message types will be very simple DTO type classes - they shouldn't contain any business logic - just the info required for some other service to process the request, and provide a response.

I have mocked up a very simplified version of a couple of plugins and what we see the solution to their interactions to other plugins would be: <http://screencast.com/t/Mdb9wUmMF>

In this diagram, the Navigation, Page, Search and Other plugins wouldn't know anything about each other. But they would know about the Messages that are available, and the ProcessMessages interface.

eg Request / Response Messages

The Navigation and Other Plugins would know that if it sends a GetPagesRequest to ProcessMessages, it will get back a PagesResponse with all the info they need. (The Nav/Other plugins would need a response to the GetPagesRequest immediately.)

The Navigation and Other Plugins wouldn't know anything about the Page plugin.

Request / Response Message Requirements

A plugin that raises a Request Message would always (usually?) expect a Response message immediately.

Only 1 service would know how to process a Request Message, and provide the Response Message that would get passed back to the calling Plugin.

eg Event Messages

When a user updates the url of a page in the Page Plugin, the plugin would send a PageUrlUpdated message to ProcessMessages. The Navigation and Other plugin would then consume the PageUrlUpdated message and do whatever it needs to.

Event Message Requirements

A plugin that raises an Event would *never* expect a response. 0-Many plugins might consume a given message.

(Tech Note: for Event messages we are going to send them to MassTransit and RabbitMQ - then have 1-n consumers for each message)

The questions

1. From a few sketches we've made, the above idea seems to work, and has a lot less inter-dependencies between different elements of the system. But I don't know the name of the design pattern or architectural structure - or if I'm on complete the wrong track. I was hoping that someone could point me to the proper solution - some good documentation and examples would be excellent. (Trying to avoid re-inventing the wheel - and an existing pattern is likely to be more robust and successful)
2. For the Request Messages, we were envisioning some kind of StructureMap-ish mapping from the Request Message to the concrete plugin / service that would process the message. Again - I'm sure that this has been solved before and there's a pattern for it, or we're completely on the wrong track and there's a better solution.

Any help and ideas are greatly appreciated Saan

PS - I would also have an IWidget in a common project with some basic properties - so the Pages Plugin could just request all classes that implement IWidget to add to a page

A1: Your question is subject to a lot of different approaches; but I might suggest Service Oriented Architecture. Mostly because it can bend to a business in a very quick and agile manner. This architecture provides many bonuses:

- Lightweight
- Agile
- Code Re-usability

However it does come with an array of hurdles that may need to overcome such as:

- Interoperability
- Security
- Performance
- Persistence

So implementing some of these resolutions may alleviate such an issue. However, that will require some knowledge of the matter on your part. As this Architecture is agile, but everything is exposed to a degree. Additionally what about multiple instances being instantiated?

Those are all potential items you'll have to identify.

What I would personally do, is find the true core of the business- Not the project; but the business. Then determine what approach would best accomplish that task. That will be a model that will last as the business core is at its heart.

Some things I'd highly recommend on this matter are:

- [Patterns Of Enterprise Application Architecture.](#)
- [Implementing Domain Driven Design.](#)
- [Domain-Driven Design: Tackling Complexity In The Heart Of Software.](#)
- [Service Design Patterns: Fundamental Design Solutions.](#)

There are a lot of other viable books, but those were some I found very helpful. As they culminate a vast array of design discussions that involve:

- Lazy Loading
- Unit Of Work
- Repository
- Dependency Injection

- Model Extensibility Framework
- and more...

This will fill in several gaps; but I can't emphasize enough. *No technology is better than one another, they all have pros and cons. But the technology that captures your business goals the best is the ideal choice.*
And I understand your need for a response to help you, but remember:

Ask not the Elves for counsel, as they both say yes and no.

Simply because we don't know your project or your business, those goals are going to heavily impact your decision. Those are things that only you will know. As I stated things we don't know that you'll want to account for:

- Company Objectives
- Maintainability
- Companies Growth Projections
- Possible Shifts in the Company paradigm.

There are more, but you'll have to account for some of those variables for the applications rate of decay to stay stagnant for awhile. So the life of the application will endure for quite awhile.

Hopefully that helps, but that is my two cents.

485. <https://stackoverflow.com/questions/14521397/forgerock-identity-management-solution-vs-wso2-identity-server/14534606#14534606>

T: forgerock Identity Management Solution Vs WSO2 Identity Server

Q: I'm trying to choose one of forgerock identity management solution (openAM, openIDM) and wso2 identity server for implementing Identity and Access Management solution.

I'm interested in using following features:

- Single Sign-On (SSO)
- Policy based access control
- Managing user identities
- Connecting to central repository like Active Directory, OpenLdap, Oracle Internet Directory etc.
- Etc..

Both open source products looks viable. I'm interested in having all of the above features along with good API to implement these features, along with active community support.

Which one would be the best amongst two ?

A: I am an architect from WSO2 - mostly leading WSO2 Identity Server. I am trying to be not bias as much as possible :-)

Both products bring you a comprehensive Identity Management platform - having support for SAML2, OpenID, XACML 3.0, OAuth 2.0, SCIM, WS-Security standards.

Few unique features that I would like to highlight on WSO2 Identity Server are...

1. Decentralized Federated SAML2 IdPs (<http://blog.facilelogin.com/2012/08/security-patterns-decentralized.html>)
2. Distributed XACML PDPs
3. User friendly XACML PAP wizard

4. High scalability (We have a middle-east customer using WSO2 IS over an user base of 4 million for OpenID support.)
5. Cassandra based User Store (To be used over 800 Million user base by one of our production customers)
6. Light-weight and Very low memory footprint. The stripped down version of WSO2 IS can be started with 64MB Heap Size and the standard versions runs with 96MB Heap.
7. Highly extensible. The architecture behind WSO2 IS is highly extensible. You can easily plugin your authenticators, user store, etc...
8. Support for multi-tenancy.
9. Suport for multiple user stores (AD, LDAP, JDBC)
10. Interoperability.

11. Part of a proven SOA product platform provided by WSO2.

Also we are planning to add support for OpenID Connect this year with a set of improved Identity Management capabilities.

You can also read more about WSO2 Identity Serevr from <http://blog.facilelogin.com/2012/08/wso2-identity-server-flexible.html>

You will not get an unbiased answer from me for your question :-) "Which one would be the best amongst two ?". You will also get answers from Forgerock and other folks here. Best would be to evaluate and decide.

A2: Abdul, please share your findings as I am looking at both as well. We implemented OpenSSO in production a couple years ago just prior to its transition to OpenAM. It was an excellent product with thought leadership and decent execution. Unfortunately the pending transition to OpenAM was too unnerving for some of us and we switched to another product at great, unnecessary cost and continue to look over our shoulder. Some downsides at the time were ability to migrate policy through lanes from dev-test-stage-prod, keeping configurations in sync, and issue resolution. Also, fine-grained policy was very new. So my info is a bit dated and I know they have matured since then.

Just starting with WSO2. It has strong thought leadership and good execution with several platforms per other reviews. Their base architecture looks solid and it's allowing them to create and consume/improve open source technology very quickly into integrated, commercially supported solutions.

486. <https://stackoverflow.com/questions/2066005/general-frameworks-for-preparing-training-data>

T: General frameworks for preparing training data?

Q: As a student of computational linguistics, I frequently do machine learning experiments where I have to prepare training data from all kinds of different resources like raw or annotated text corpora or syntactic tree banks. For every new task and every new experiment I write programs (normally in Python and sometimes Java) to extract the features and values I need and transform the data from one format to the other. This usually results in a very large number of very large files and a very large number of small programs which process them in order to get the input for some machine learning framework (like the arff files for Weka).

One needs to be extremely well organised to deal with that and program with great care not to miss any important peculiarities, exceptions or errors in the tons of data. Many principles of good software design like design patterns or refactoring paradigms are no big use for these tasks because things like security, maintainability or sustainability are of no real importance - once the program successfully processed the data one doesn't need it any longer. This has gone so far that I even stopped bothering about using classes or functions at all in my Python code and program in a simple procedural way. The next experiment will require different data sets with unique characteristics and in a different format so that their preparation will likely have to be programmed from scratch anyway. My experience so far is that it's not unusual to spend 80-90% of a project's time on the task of preparing training data. Hours and days go by only on thinking about how to get from one data format to another. At times, this can become quite frustrating.

Well, you probably guessed that I'm exaggerating a bit, on purpose even, but I'm positive you understand what I'm trying to say. My question, actually, is this:

Are there any general frameworks, architectures, best practices for approaching these tasks? How much of the code I write can I expect to be reusable given optimal design?

A1: I find myself mostly using the textutils from GNU coreutils and flex for corpus preparation, chaining things together in simple scripts, at least when the preparations i need to make are simple enough for regular expressions and trivial filtering etc.

It is still possible to make things reusable, the general rules also apply here. If you are programming with no regard to best practices and the like and just program procedurally there is IMHO really no wonder that you have to do everything from scratch when starting a new project.

Even though the format requirements will vary a lot there is still many common tasks, ie. tag-stripping, tag-translation, selection, tabulation, some trivial data harvesting such as number of tokens, sentences and the like. Programming these tasks aiming for high reusability will pay off, even though it takes longer at first.

487. <https://stackoverflow.com/questions/1250507/history-tables-pros-cons-and-gotchas-using-triggers-sproc-or-at-application/1250541#1250541>

T: History tables pros, cons and gotchas - using triggers, sproc or at application level

Q: I am currently playing around with the idea of having history tables for some of my tables in my database. Basically I have the main table and a copy of that table with a modified date and an action column to store what action was preformed eg Update,Delete and Insert.

So far I can think of three different places that you can do the history table work.

- Triggers on the main table for update, insert and delete. (Database)
- Stored procedures. (Database)
- Application layer. (Application)

My main question is, what are the pros, cons and gotchas of doing the work in each of these layers.

One advantage I can think of by using the triggers way is that integrity is always maintained no matter what program is implemented on top of the database.

A: I'd put it this way:

- **Stored procs:** they're bypassed if you modify the table directly. Security on the database can control this
- **Application:** same deal. Also if you have multiple applications, possibly in different languages, it needs to be implemented in each stack, which is somewhat redundant; and
- **Triggers:** transparent to the application and will capture all changes. This is my preferred method.

A2: Triggers are the quickest and easiest way to achieve simple history. The following information assumes a more complex example where history processing may include some business rules and may require logging information not found in the table being tracked.

To those that think that triggers are safer than sprocs because they cannot be bypassed I remind them that they are making the following assumption:

!) Permissions exist that stop users from executing DISABLE TRIGGER [but then permissions could too exist to limit all access to the database except for EXECUTE on sprocs which is a common pattern for enterprise applications] - therefore one must assume correct permissions and therefore sprocs equal triggers in terms of security and ability to be bypassed

!) Depending on the database it may be possible to execute update statements that do not fire triggers. I could take advantage of knowledge of nested trigger execution depth to bypass a trigger. The only sure solution includes security in database and limiting access to data using only approved mechanisms - whether these be triggers, sprocs or data access layers.

I think the choices are clear here. If the data is being accessed by multiple applications then you want to control the history from the lowest common layer and this will mean the database.

Following the above logic, the choice of triggers or stored procedures depends again on whether the stored procedure is the lowest common layer. You should prefer the sproc over the trigger as you can control performance, and side effects better and the code is easier to maintain.

Triggers are acceptable, but try to make sure that you do not increase locks by reading data outside of the tables being updated. Limit triggers to inserts into the log tables, log only what you need to.

If the application uses a common logical access layer and it is unlikely that this would change over time I would prefer to implement the logic here. Use a Chain Of Responsibility pattern and a plug-in architecture, drive this from Dependency Injection to allow for all manner of processing in your history module, including logging to completely different types of technology, different databases, a history service or anything else that you could imagine.

488. <https://stackoverflow.com/questions/40422613/sharing-data-between-isolated-microservices>

T: Sharing data between isolated microservices

Q: I'd like to use the microservices architectural pattern for a new system, but I'm having trouble figuring out how to share and merge data between the services when the services are isolated from each other. In particular, I'm thinking of returning consolidated data to populate a web app UI over HTTP.

For context, I'm intending to deploy each service to its own isolated environment (Heroku) where I won't be able to communicate internally between services (e.g. via //localhost:PORT). I plan to use RabbitMQ for inter-service communication, and Postgres for the database.

The decoupling of services makes sense for CREATE operations:

- Authenticated user with UserId submits 'Join group' webform on the frontend
- A new GroupJoinRequest including the UserId is added to the RabbitMQ queue
- The Groups service picks up the event and processes it, referencing the user's UserId

However, READ operations are much harder if I want to merge data across tables/schemas. Let's say I want to get details for all the users in a certain group. In a monolithic design, I'd just do a SQL JOIN across the Users and the Groups tables, but that loses the isolation benefits of microservices.

My options seem to be as follows:

Database per service, public API per service

To view all the Users in a Group, a site visitor gets a list of UserIDs associated with a group from the Groups service, then queries the Users service separately to get their names.

Pros:

- very clear separation of concerns
- each service is entirely responsible for its own data

Cons:

- requires multiple HTTP requests
- a lot of postprocessing has to be done client-side
- multiple SQL queries can't be optimized

Database-per-service, services share data over HTTP, single public API

A public API server handles request endpoints. Application logic in the API server makes requests to each service over a HTTP channel that is only accessible to other services in the system.

Pros:

- good separation of concerns
- each service is responsible for an API contract but can do whatever it wants with schema and data store, so long as API responses don't change

Cons:

- non-performant
- HTTP seems a weird transport mechanism to be using for internal comms

ends up exposing multiple services to the public internet (even if they're notionally locked down), so security threats grow from greater attack surface

Database-per-service, services share data through message broker

Given I've already got RabbitMQ running, I could just use it to queue requests for data and then to send the data itself. So for example:

- client requests all Users in a Group
- the public API service sends a GetUsersInGroup event with a RequestID
- the Groups service picks this up, and adds the UserIDs to the queue
- The 'Users' service picks this up, and adds the User data onto the queue
- the API service listens for events with the RequestID, waits for the responses, merges the data into the correct format, and sends back to the client

Pros:

- Using existing infrastructure
- good decoupling
- inter-service requests remain internal (no public APIs)

Cons:

- Multiple SQL queries
- Lots of data processing at the application layer
- harder to reason about
- Seems strange to pass large quantities around data via event system

Latency?

Services share a database, separated by schema, other services read from VIEWS

Services are isolated into database schemas. Schemas can only be written to by their respective services.

Services expose a SQL VIEW layer on their schemas that can be queried by other services.

The VIEW functions as an API contract; even if the underlying schema or service application logic changes, the VIEW exposes the same data, so that

Pros:

- Presumably much more performant (single SQL query can get all relevant data)
- Foreign key management much easier
- Less infrastructure to maintain
- Easier to run reports that span multiple services

Cons:

- tighter coupling between services
- breaks the idea of fundamentally atomic services that don't know about each other
- adds a monolithic component (database) that may be hard to scale (in contrast to atomic services which can scale databases independently as required)
- Locks all services into using the same system of record (Postgres might not be the best database for all services)

A: To evaluate the pros and cons I think you should focus on what microservices architecture is aiming to achieve. In my opinion Microservices is architectural style aiming to build loosely couple applications. It is not

designed to build high performance application so scarification of performance and data redundancy are something we are ready accept when we decided to build applications in a microservices way.

I don't think you services should share database. Tighter coupling scarify the main objective of the microservices architecture. My suggestion is to create a consolidated data service which pick up the data changes events from all the other services and update the database behind it. You might want to design the database behind the consolidated data service in a way that is optimised for query (like a data warehouse) because that's all this service will be used for. You might want to consider using a NoSQL database to support your consolidated data service.

489. <https://stackoverflow.com/questions/10988211/approach-for-disconnected-application-development>

T: Approach for disconnected application development

Q: Our company has people in every catastrophic event here in the U.S. and parts of Canada. An example is they were quite prevalent in Katrina immediately after the event.

We are constructing an application to improve their job in the field which may be either ASP.NET or WPF, and the disconnect requirement makes us believe it will be a WPF application. Our people need to be able to create their jobs, provide all of the insurance and measurement data, and save it as if in the database whether or not the internet is available.

The issue we are trying to get our heads around is that when at catastrophic events our people need to be able to use our new application even when the internet is not available. (They were offline for 3 days in Katrina)

Has anyone else had to address requirements like this and suggestions on how they approached functioning on small-footprint devices while saving data as if they were still connected to the backend services and database? We also have to incorporate security into this as well, and do it well enough that their entered data loads into the connected database without issues.

Our longterm goal is to also provide this application for Android and IPad Tablet devices as well as laptops. Our initial desire for ASP.NET was it gave us an immediate application for the tablet environment. In the old application they have, they run a local server, run remote connections on the tablets and run the application through terminal server. Not pretty. Not pretty.

I feel this is a serious question that is not subjective so hopefully this won't get deleted.

Our current architecture on the server side is Entity Framework with a repository pattern, WCF services to satisfy CRUD requests returning composite data transfer objects, and a proxy for use by the clients.

I'm interested in hearing other developers' input and this design puzzle.

Additional Information Added to the Discussion

Lots of good information provided!!! I'll have to look at Microsoft Sync for sure. For the disconnected database I would be placing only list tables (enumerations) in the initial database. Jobs and, if needed, an item we call dry books, will be added for each client we are helping. (though I hope the internet returns by the time we are cleaning and drying out the homes) These are the tables that would then populate back to the host once we have a stable link. In the case of Katrina we also lost internet connectivity in our offices which meant the office provided no communication relief for days as well.

Last night I realized that our client proxy is the key to everything working! The client remains unaware of the fact that it is online or offline and leaves the synchronization process within that library. We are discovering how much data we are talking about today. I also want to make it clear that ASP.NET was a like-to-have but a thick client (actually WPF with XAML) may end up being our end state.

Now -- for multiple updates. The disconnected work will be going to individual homes by a single franchise. In fact our home office dispatches specific franchises to specific events. So we have a reduced likelihood (if any) of the problem of multiple people updating a record. The reason is that they are creating records for each job (person's home/office/business) and only that one franchise will deal with it. Of course this also means that if they are disconnected for days that the device that creates the job (record of who, where, condition, insurance

company, etc) is also the only device that knows of the job. But that can be lived with. In fact we may be able to have a facility to sync the franchise devices on a hub.

I'm looking forward to hearing additional stories of how you've implemented your disconnected environment.

Thanks!!!

Looking at new technology from Microsoft

I was directed to look at a video from TechEd 2012 and thought I might have an answer. The talk was on using ASP.NET and MVC4 along with 2 libraries for disconnected behavior. At first I thought it would be great but then as it continued it worried me quite a bit.

First the use of a javascript backend to support disconnected I/O does not generate confidence. As a compiler guy (and one who wrote two interpretive languages) I really do not like having a critical business model reliant upon interpretive javascript. And script at that! It may be me but it just makes me shudder.

Then they show their "great"(???) programming model having your ViewModel exist as just javascript. I do not care for an application (asp.net and javascript) that can be, and may as well be (for lack of intellisense) written in notepad.

No offense meant to any asp lovers, but a well written C# program that has been syntactically and type checked gives me stronger confidence in software than something written with a hope and prayer that a class namespace has been properly typed without any means of cross check. I've seen too many hours of debugging looking for a bug that ended up in a huge namespace with transposed ie in its name. I ran my thought past the other senior developers in my group and we are all in consensus on this technology.

But we continue to look. (I feel this is becoming more of a diary than a question) :)

A1: Looks like a perfect example for **Microsoft Sync Framework**

<http://msdn.microsoft.com/en-us/sync/bb736753.aspx>

A comprehensive synchronization platform that enables collaboration and offline access for applications, services, and devices with support for any data type, any data store, any transfer protocol, and any network topology.

A2: I often find that building a lightweight framework to fit my specific needs is more beneficial to me than using an existing one. However, always look at what's available and weigh the pros and cons before making that decision.

I haven't use the Microsoft Sync Framework, but it sounds like that's a good one to research first. If you have Sql Server Standard (or some other version other than the Express version) then replication might also be an option.

If you want to develop your own homegrown solution, then be sure to put lastupdated and dateadded fields on any tables that need to stay in sync. It doesn't 'sound' like your scenario will be burdened by concurrency issues (i.e. if person A and B both modify a field at the same time, who wins?). If that's the case then developing your own lightweight solution will be pretty straightforward.

As Jeremy pointed out, you will need a way to get the changes. In addition to using a web service, you can also use WCF which is similar to a web service in some ways. But my personal bias would be towards just accessing a SQL server remotely over the internet. The downside of that solution is added security concerns, while the upside is decreased development overhead (i.e. faster/easier development now and less maintenance over time). Also, the direct SQL solution is also assuming that this is an internal application... that you're in charge of all development and not working with 3rd parties who need access to your data and wouldn't be allowed to access it this way.

A3: Not really a full answer but too much for a comment.

I have two apps one that synchs one way and the other two way.

I do a one way synch to client for disconnected operation. At the server full SQL Server and at the client Compact Edition. TimeStamp is a prefect for finding any rows that needs to be synched. I also don't copy the whole database as some of the largest table are non nonessential. The common use is the user marks identified records they want to synch.

If synch does what you need great +1 for Jakub. For me I don't have the option to synch the whole MSSQL both based on size and security.

Have another smaller application that synchs two way but in this case it has regions and update are only within the region. So a region only synchs their data and in disconnected mode they can only add new records. Update to an existing records must be performed in connected mode. That was manageable. In that case MSSQL for the master and used XML for the client.

No news to you but the hard part of a raw synch is that two parties may have added or revised the same record.

490. <https://stackoverflow.com/questions/1284703/what-alternative-is-there-to-post-redirect-get-in-asp-net-mvc>

T: What alternative is there to POST-redirect-GET in ASP.NET MVC?

Q: The ASP.NET MVC pattern of submitting forms via post, then redirecting to the same or different URL is very easy to code.

Imagine this scenario:

1. User goes to **/products/42/edit** to view and edit product 42.
2. They see something crazy on that page, edit it, and hit save. This causes a POST to **/products/42/edit**
3. The action updates the data and redirects to *or* returns the view for **/products/42/edit**
4. The user sees the updated data and is happy.
5. One hour later they click refresh to see if anyone else has messed with product #42.
6. Because the last retrieval for **/products/42/edit** was a POST, their browser asks to resubmit the form data. This is annoying *and* dangerous because it can overwrite someone else's data.

I fear that even if I use two different URLs for the POSTs and GETs (say **/products/42/edit** and **/products/42**), that the browser will still ask for the repost and can destroy data. Am I mistaken?

What alternative methods can be used so that after submitting product changes, the user can safely hit refresh to get an updated view?

Update I see now that my question and my design were muddled, my apologies for that. I see that it was a bad idea for me to share URLs (actions) between the POST and the GET. Am I right to assume then that if those two are different, then I won't have the "refresh causes rePOST" problem?

A1: To your update: yes.

Use **/product/{id}/** for viewing, and **/product/{id}/edit** for editing, and after the edit, redirect them to **/product/{id}/**.

Problem solved. Was wondering why you are/were using **/product/{id}/edit** for both viewing and editing.

A2: If you **really** want to have the same page for view and edit AND you need to handle **concurrency** you can includ hidden field that keeps last updated date. So the flow will be:

1. User1 submits data.
2. The same page gets rendered BUT with date element (lets say date1).
3. User2 submits this page.
4. User1 submits again. The action compares the date1 and actual updated date.

5. In out case they are different so the action should not update and tell user about it.
This is just another option.

A3: In order for your posting form to work in the manner that you describe, it needs to read the data from the database and prepopulate the fields on the form. It needs to do this from the very first time you enter the URL in question.

Then, when you post, it needs to save the values to the database once they are validated. This will complete your round trip loop.

If the page is a blank "new record" page, you are right, it will only round-trip once on a failed validation. On an F5 it will just give you a new blank form, by design.

491. <https://stackoverflow.com/questions/4628817/usability-techniques-for-better-form-presentation>

T: Usability techniques for better form presentation

Q: I'm trying to simplify a form (using ASP.NET MVC but I guess that might be irrelevant) with a lot of fields. My initial thought was to split it up into tabs, but then I read somewhere that this would be usability hell. Also, required fields would be split between different tabs, so validation would be a challenge. What are some ways to present forms in a nice way so that it's not one long page of fields?

A1: Personally I think showing "one long page of fields" is not only the most usable but also the nicest way to present a form.

There's an argument that users are more likely to fill in a long form that's split over multiple pages, however as a personal preference, I like to see what I'm in for and what needs to be filled in.

(from my own experience of multi page forms, I usually end up quitting half way through because I wasn't able to estimate how long it was going to take to fill out the form and I've got something else that needs doing.)

One thing I like to do is seperate the relevant areas using `<fieldset>`'s and then style these to offer a clean and clear form. This makes it easy for the user to see what data they need to fill in (seperated into logical fielsets) as well as provides the developer the opportunity to style each area in such a way that the form seems less daunting.

A2: I think the key is to respect the user's expectations.

- Tabs have their place, but I think to most users the expectation is that you go to a different tab to do a different task, rather than needing to go to multiple tabs to fill out a single form.
- A wizard approach can be nice for a long form, especially if you give feedback about the user's progress.
- If some questions only apply depending on the answers to other questions, it's definitely nice to hide the conditional questions until they are relevant.
- Sometimes it's possible to scatter questions throughout the user's interaction with the site rather than make them answer everything at once.
- Lastly, I do feel as a developer that I have a responsibility to advocate for the user by suggesting to the client that they may not need to ask for so much information.

A3: I must say that i really like the form on [StackOverflow Careers](#), where you post/edit your CV. It's a pretty long form in one page, but it does not become a problem since you always know where you are and what to do. Personally, one single page with the whole form is what i prefer. That way, you can in a quick way get a look of the form and what you have to do to complete it.

A4: Multiple tabs are fine, but instead of "submit" have "Next", until the last tab, where you have "Finish". Also indicate where you are at with a "Part 2 of 5" on top of the form.

You can disperse with the tabs, in fact, but it is nice if you can go back and fix things up, so if not tabs, then a "Previous" as well as a "Next" button is necessary.

Having just tabs, and a submit button on each tab, and required fields all over the place would be *very* annoying. :) That's even worse than having one humongous form where you have to scroll up and down.

A5: If you use the wizard like method, then it is better to validate each page after pressing Next instead of on the last page after pressing Finish.

<https://stackoverflow.com/questions/3334349/could-i-make-dynamic-render-rely-user-permissions-in-mvc-2>

T: Could I make dynamic render rely User Permissions in MVC 2?

Q: I make security system in mvc application. In MVC it must be done by AuthorizeAttribute and roles string via actions methods.

Could i make this stuff: instead of action resolve I want to make view where html parts are hidden depend on current user permission set (For example: save button are not visible if user not Administrator).

A1: Brian - i don't think this is a good idea to 'hide' the admin parts. you basically then just expose to logic to anyone opening the html in 'view source' mode. it would be better to have an admin view and a 'normal' view and just do a case statement in the controller action to deliver the appropriate view where required (still not the best option, but far better than hiding fields). better still, have a master view that contains partialviews which are only rendered if it's the correct user type etc..

just my 'view' on the topic.. jim

A2: Thanks to all for your answers. I see that view dynamic render is a bad practice in mvc applications. I'm used to think that there can be some libraries or templates.

BTW When i told to my PM that a string with roles is a common pattern he said "Hard code!!!!". Now I'm designing some WCF service with will be an "Application Authoriser"))).

492. <https://stackoverflow.com/questions/10235278/exception-handling-application-block/12587772#12587772>

T: exception handling application block

Q: what are the disadvantages of not using exception handling application block or any other unified exception handling library. The only thing I can think of is that code will end up with different type of Try/Catch all over the place depending upon the developer. How can lack of planning in this regard, cause real world problems down the line?

A: I've recently began reading up on this topic myself. My basic understanding is:

1. Only catch an exception if you plan to handle it.
2. Overuse of try/catch can lead to exception swallowing and/or the loss of valuable stack trace information and can lead to maintainability issues (what if you decide to standardize your errors/logging?). Instead use try/finally or using blocks to implement clean up.
3. Catch exceptions at the boundaries via a global exception handler.

Again, this is just what I've gathered initially. I think short answer to your question is maintainability and the potential loss of valuable trace information. Below are some sources:

[Good Exception Management Rules of Thumb](#)
[Understanding and Using Exceptions](#)

493. <https://stackoverflow.com/questions/6317172/entity-data-framework-and-web-app-architecture/6318088#6318088>

T: Entity Data Framework and Web app architecture

Q: I Am creating a web application and first use Entity Framework. I created Entity Data Model and now I am not sure, how to proceed now.

Premise: My database is really simple (Rating, WebPage, Visitor) and database tables corresponds to the business objects.

My suggestion is 3tier architecture but how to make it?

1. It is good idea create partial classes with the same name as Entity Framework objects (Rating, Visitor) and declare here new methods (GetAverageRating(...))? Or is better create some VisitorProvider, RatingProvider and place logic here?
2. It is better use EF objects in BLL and Presentation Layer or I should create my own BO objects on my BLL layer and transform EF object to BO?
3. I'm think, it is more practical use static methods on my DAL than instantiate classes on BLL. Do you agree? Can you recommend me some best practices? I have many ideas how to create it, but I do not know what is the right.

A: 3 layer architecture is quite popular but what it really means?

1. Presentation layer
2. Application layer
3. Database layer

If you ask what each layer means you can be pretty sure you will get several different answers. You can further divide each layer into sublayer and build layered hell like:

1. Client side presentation layer
2. Server side view layer
3. Controller layer
4. Service facade layer
5. Service layer
6. Domain objects layer
7. Repository + Factory layer
8. ORM layer
9. Stored procedure layer
10. Database view layer
11. Database table layer

WTF? That is just example that application can be easily over architected. It can go even worse if you insist that only neighbours can exchange data and if you decide to add special type of objects to be exchanged between layers instead of flowing sing set of objects through multiple layers.

Add layers which you need to make you more comfortable with developing the application and which will do reasonable separation of concerns and maintainability needed for the scale of your application. You can simply do the most simplest application which will be used just few weeks and must be developed as fast as possible. In such case you can do that within few days simply by using ASP.NET web forms and data source controls (or ASP.NET dynamic data). It can be badly extensible but in such situation it is exactly what you need to implement application quickly. Writing layers and doing all the stuff around maintainability and extensibility is reasonable if you need it. Another quick prototyping technique is ASP.NET MVC Scaffolding which can create quick multilayered skeleton of the application which can be further modified.

1. Both approaches are correct and it only depends on the approach you like. The first is called [active record pattern](#) but it is not used very often with entity framework. The second approach is more popular. You can either use EF directly in some middle class which you called Provider (common name is also Service). This class will do both data access logic and business logic. In more complex applications developers like to somehow wrap EF to separate class following [repository pattern](#) and call the repository either from service or directly from web app. code behind or controller (depending on amount of business logic). Try

to do it without repository first. My personal opinion is that people should start to use repository only once they understand EF itself.

2. Again both approaches are correct. In a simple application it is fully acceptable to create EF model with POCO classes (EFv4.x) and use them in all layers. If you are using ASP.NET MVC you can find that you need special classes as view models to fully represent needs of your individual views. In a more complex application you can have separate objects exposed from a business layer - this is especially used if the business layer is exposed as a remote service (WCF).
3. It depends how you write these DAL methods - it is absolutely necessary to not share the EF context among requests! It also depends if you want to write some test or not. Layer defined by static methods is something which goes directly against testable architecture where you want unit test just single layer (unit testing with EF can be hard). It also depends if you want to use dependency injection which is based on instances.

494. <https://stackoverflow.com/questions/35510344/web-api-in-n-tier-design-c-sharp/35511027#35511027>

T: Web API in N-tier Design C#

Q: I'm accustomed to seeing an n-tier design pattern like the following: 1) Database (SQL Server) 2) Domain (EF) 3) Facade Service Layer (WCF) 4) MVC Web app (IIS)

In terms of Firewalls and protected areas, the Web Server and MVC app live in a public facing area (DMZ) in front of a Web Service, that lives behind another firewall that processes business logic and connects to the data layer, for an added layer of security.

Is there any reason or advantage to using Web API behind the firewall (not DMZ) to pass business logic back to the Website? I was thinking this is where WCF excels.

If for example a native mobile app was created and needed to access the server, would an additional WebAPI web service live in the DMZ (similar to MVC site), that would then connect back to an internal service (WCF) that does back in and business logic processing?

I'm sure it depends on the specific needs of the application, but as a general design pattern, should Web API live that area of the architecture?

A: There is no 'general design pattern' you should use. What will consume the Web API? Is it just to be consumed internally, if so then hide it way and only allow access to what needs it.

One of the main advantages to a Web API is that loads of different clients can consume it, i.e. SPA, Mobile, other servers, etc. Therefore they are generally public and as Mant101 said, a lot of the time they live in the same project as your MVC implementation.

More importantly than where it live is maybe how do you secure it? How will applications/user authenticate themselves? Personally I would be thinking about this rather than which DMZ to put it in.

If you were to use something like OWIN middleware then you can provide different authentication methods to this API so it can be consumed by mobile and the like. If you really wanted to maintain something of the N-tier you could probably proxy the API somehow but try to solve it with network design rather than application.

495. <https://stackoverflow.com/questions/35510344/web-api-in-n-tier-design-c-sharp/35511027#35511027>

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496. <https://stackoverflow.com/questions/11865909/gridview-with-complex-sqldatasource-in-3-tier-architecture/12345214#12345214>

T: Gridview with complex sqldatasource in 3-tier architecture

Q: I have implemented a 3-tier arhitecture which can be seen in below link

<http://geekswithblogs.net/edison/archive/2009/04/05/a-simple-3-tier-layers-application-in-asp.net.aspx>
In the example above it uses a DataTable as sqldatasource and binds it to the gridview with below code.

```
GridView1.DataSource = Client.GetClients();
GridView1.DataBind();
```

However my datasource is not a datatable, it is a regular sqldatasource where you can edit, delete, and update. So I don't know how can it be separated from my presentation layer or should it be really separated?. Here my sqldatasource's codes:

A1: Roland's answer above already addresses :-

1. the point about how layered architecture (assuming a split of DAL / BL / UI) does not tie in with using SQLDataSource as there is no such separation when using a SQLDataSource.
2. How you could separate it out without using a SQLDataSource using POCO's / Datatables
I will give my 0.02\$ about the last part of your question :-
 1. should it be really separated?

Well, like most realistic answers. It depends.

It depends on things like - what is your main reason for having a 3 tier architecture? Some of the advantages of such a design include better maintainability, better testability and even better scalability. Conversely, using a SQLDataSource MAY speed up your development.

My personal experience is that it is usually a better idea to have a layered design for some of the above reasons and hence I would normally avoid using a SQLDataSource and even the speed of development advantage for SQLDataSource can be negated by using code-generators like CodeSmith. So, i just dont see any benefit of using a SQLDataSource in the long run at all

497. <https://stackoverflow.com/questions/8510135/wcf-based-federated-security-in-a-service-oriented-setup>

T: WCF-based federated security in a service-oriented setup

Q: So i have the following scenario:

I have a WPF-application which includes a login-box. Users enter credentials, which is used to get a security token from a SecurityTokenService (STS). This token is parsed to a backend web-service, and in this way the service authenticates the user. Since the binding between client and webservice is a wsFederationHttpBinding this happens pretty seemless.

Now my problem is that I, from the webservice, needs to call another webservice which is also protected by federated security, expecting security-tokens from the same STS.

So essentially what I would like to do is to re-use the security token given from the client, in order to carry the users security-token to the second webservice.

I have found a way to create a WCF-channel to the second service, by providing a securitytoken, which is a common approach when caching security tokens. However I am having trouble finding a way of getting a hold on the security token, from the client, in the backend webservice.

Anyone with any experience in parsing a security-token in a multi-layered setup?

A: You've just hit one of the most common issues with wsFederationHttpBinding. There is a sample on MSDN for a [durable issued token provider](#) that should help.

This sample shows how to build a custom token provider that caches tokens issued by a Security Token Service (STS).

498. <https://stackoverflow.com/questions/9389676/why-we-have-to-change-application-layer-in-ipv6-if-this-is-a-layered-architectur/10968816#10968816>

T: . Why we have to change application layer in IPv6 if this is a layered architecture?

Q: If TCP/IP is a proper layered architecture why do we need to change all the applications in the application layer in order to change a bottom layer protocol IP from version 4 to version 6?

A1: If the application is well-developed and really layered then it should not have to change. Unfortunately many applications use lower-layer details like IP addresses for access control, logging etc. In many cases understandable, but it does indeed break the layered architecture...

The basics are covered in <http://www.stipv6.nl/whitepaper-ip-aspecten-software>

And don't forget things like input validation with regular expressions and user interfaces that only handle IPv4 notation (providing four input boxes for the address or automatically inserting dots at certain places etc).

A2: I Think application layer softwares in general doesn't care about IP layer, but however for security reasons some applications need to deal with IP layer (i.e. Access lists at Web servers), this why we need to upgrade software in order to handle IPv6.

499. <https://stackoverflow.com/questions/3039236/where-should-i-handle-the-exceptions-in-the-bll-dal-or-pl/3039720#3039720>

T: Where should I handle the exceptions, in the BLL, DAL or PL?

Q: Which is the best place to handle the exceptions ? BLL, DAL or PL ?

Should I allow the methods in the DAL and BLL to throw the exceptions up the chain and let the PL handle them? or should I handle them at the BLL ?

e.g

If I have a method in my DAL that issues "ExecuteNonQuery" and updates some records, and due to one or more reason, 0 rows are affected. Now, how should I let my PL know that whether an exception happened or there really was no rows matched to the condition. Should I use "try catch" in my PL code and let it know through an exception, or should I handle the exception at DAL and return some special code like (-1) to let the PL differentiate between the (exception) and (no rows matched condition i.e. zero rows affected) ?

A1: At the architectural level we are concerned about:

- Services
- Components
- Security
- Infrastructure
- Backward/forward compatibility (migration, dual phase, etc)
- Scalability
- Reliability
- Federation
- Standards (not necessarily industry standards, just consistency)

Architecture is just as much about non-technical communication and business strategy as it is about anything technical. Architects are responsible for translating business goals into systems, which are implemented by developers and technicians.

As far as your existing list - "tiers" is a high-level development concept, while I would consider "roundtrips" relatively low-level. At an architectural level, and even a high-level software design level, "roundtrips" is an implementation detail of the communication between systems, and is not very interesting until it starts impacting one of the areas listed above. I'm not sure what you mean by "layering".

A2: Although the list is exhaustive, I tried to cover most basic points:

- [Functional requirements](#)
- [Non-functional requirements](#)
- [Architectural patterns](#)
- [Architecture models](#)
- [Design patterns](#)
- [Anti-patterns](#)
- [Application security](#)

500. <https://stackoverflow.com/questions/4953601/post-date-usability-and-architecture>

T: Post Date Usability and Architecture

Q: I have an application that deals with events. After an event has occurred, I need to email my users and ask them about the event, and allow to upload photos, etc.

My question is Whats the best way for my system to automatically detect that its "post event" time other than running some unix cronjob?

I use MySQL - is there some trigger that I can set, either in PHP or MySQL?

How do sites usually do this?

A1: A php script on a cronjob/scheduled task is the easiest, simplest way to do so.

I suppose you could make the check a part of the scripting for the site or something that checks when any user accesses the site. You'd want to store the last time it checked and check for events that occurred between then and now and email for them, and also check the last time it checked to determine if it should look again, so you don't have it running every time a user accesses the page.

A2: Yes, it is the [event scheduler](#) built-in mysql, but I have no idea how this can help you, since it will be very tricky to send emails from it.

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502. <https://stackoverflow.com/questions/5170092/how-to-identify-abstraction-and-scope-for-architecture-and-design-respectively/5175642#5175642>

T: Rebuild static library for a different architecture

Q: Is it possible to rebuild a static library (.a) for a different architecture? For example in an tvOS app I have this warning:

building for tvOS, but linking in object file built for iOS, for architecture arm64
I do not have the source code of the library.

A1: Generally speaking, yes. If you have only the object file, no.

Ask the vendor of the library to provide you with the binaries you need.

503. <https://stackoverflow.com/questions/41296458/what-should-be-included-in-an-architecture-checklist-that-aims-for-technology-in>

T: What should be included in an Architecture checklist that aims for technology independence or portability?

Q: I'm trying to come up with a set of questions/criteria to assess and evaluate proposed or emergent solutions that make them as portable as possible. What are the most important questions you ask when trying to design, assess or review a set of solutions?

A: This is a very open and subjective question, so I suspect it will be closed, but in general.

-Separate Concerns

-Build for Deployment

(make sure you can always build & deploy your latest code quickly)

-Build for what is required now, whether portable or not.

-Select tools & technologies that you know to get the job done.

-When large amounts change or scale, re-evaluate the above.

504. <https://stackoverflow.com/questions/5796288/what-is-the-difference-between-architecture-neutral-and-portable/26508855#26508855>

T: What is the difference between “architecture-neutral” and “portable”?

Q: I'm reading Herbert Schildt's book "Java: The Complete Reference" and there he writes that Java is portable AND architecture-neutral. What is the difference between this two concepts? I couldn't understand it from the text.

SQL 2008 backend datastore using Stored Procs

A: Take a look at this [white paper on Java](#).

Basically they're saying that in addition to running on multiple environments (because of being interpreted within the JVM), it also runs the same regardless of environment. The former is what makes it portable, the latter is what makes it architecture-neutral. For example, the size of an int does not vary based on platform; it's established by the JVM.

A2: Looking around I found another book that describes the difference between the two.

For architecture neutral the compiler will generate an architecture-neutral object file meaning that compiled Java code (bytecode) can run on many processors given the presence of a Java runtime.

For portable it means there are no implementation-dependent aspects of the specification. For instance in C++ an int can be 16-bit, or 32 bit depending on who is implementing the specification whereas in Java an int is always 32 bit.

I got my information from a different book (Core Java 2: Fundamentals) so it may differ from his meaning. Here is a link: [Core Java 2: Fundamentals](#)

A3: there are 3 related features in java.

1. platform independent -> this means that the java program can be run on any OS without considering its vendor. It is implemented by using the MAGIC CODE called "BYTE CODE". The JVM then either interprets this at runtime or uses JIT (Just in Time) compilation to compile it to machine code for the architecture that is being run on (e.g. i386).
2. architecture neutral -> it means the java program can be run on any processor irrespective of its vendor and architecture. so it avoids rebuilding problem.
3. portable -> a programming language/technology is said to be purely portable if it satisfies the above two features.

A4: With architecture-neutral, the book means that the byte code is independent of the underlying platform that the program is running on. For example, it doesn't matter if your operating system is 32-bit or 64-bit, the Java

byte code is exactly the same. You don't have to recompile your Java source code for 32-bit or 64-bit. (So, "architecture" refers to the CPU architecture).

"Portable" means that a program written to run on one operating system works on another operating system without changing anything. With Java, you don't even have to recompile the source code; a *.class file compiled on Windows, for example, works on Linux, Mac OS X or any other OS for which you have a Java virtual machine available.

Note that you have to take care with some things to make your Java code truly portable. If you for example hard-code Windows-style file paths (C:\Users\Myself...) in your Java application, it is not going to work on other operating systems.

A5: .class file is portable because it can run on any OS . The reason is , .class file generated by JVM is same for all OS. On the other hand JVM is differ as OS , but it generate same .class file for all OS, so JVM is architectural neutral.

A6: What is difference between Architecture Neutral and Portable? Architecture Neutral: Java is an Architecture neutral programming language because, java allows its application to compile on one hardware architecture and to execute on another hardware architecture. Portable: Java is a portable programming language because, java is able to execute its application and all the operating system and all the hardware system.

505. <https://stackoverflow.com/questions/3925947/what-is-portability-how-is-java-more-portable-than-other-languages>

T: What is portability? How is java more portable than other languages?

Q: I wonder how Java is more portable than C, C++ and .NET and any other language. I have read many times about java being portable due to the interpreter and JVM, but the JVM just hides the architectural differences in the hardware, right? We'd still need different JVMs for different machine architectures. What am I missing here? So if someone writes an abstraction layer for C for the most common architectures, let's say the CVM, then any C program will run on those architectures once CVM is installed, isn't it?

What exactly is this portability? Can .NET be called portable?

A: Portability isn't a black and white, yes or no kind of thing. Portability is how easily one can I take a program and run it on all of the platforms one cares about.

There are a few things that affect this. One is the language itself. The Java language spec generally leaves much less up to "the implementation". For example, "i = i++" is undefined in C and C++, but has a defined meaning in Java. More practically speaking, types like "int" have a specific size in Java (eg: int is always 32-bits), while in C and C++ the size varies depending on platform and compiler. These differences alone don't prevent you from writing portable code in C and C++, but you need to be a lot more diligent.

Another is the libraries. Java has a bunch of standard libraries that C and C++ don't have. For example, threading, networking and GUI libraries. Libraries of these sorts exist for C and C++, but they aren't part of the standard and the corresponding libraries available can vary widely from platform to platform.

Finally, there's the whole question of whether you can just take an executable and drop it on the other platform and have it work there. This generally works with Java, assuming there's a JVM for the target platform. (and there are JVMs for many/most platforms people care about) This is generally not true with C and C++. You're typically going to at least need a recompile, and that's assuming you've already taken care of the previous two points.

Yes, if a "CVM " existed for multiple platforms, that would make C and C++ more portable -- sort of. You'd still need to write your C code either in a portable way (eg: assuming nothing about the size of an int other than what the standard says) or you'd write to the CVM (assuming it has made a uniform decision for all of these sorts of things across all target platforms). You'd also need to forgo the use of non-standard libraries (no networking, threading or GUI) or write to the CVM-specific libraries for those purposes. So then we're not really talking about making C and C++ more portable, but a special CVM-C/C++ that's portable.

Once again, portability isn't a black and white thing. Even with Java there can still be incompatibilities. The GUI libraries (especially AWT) were kind of notorious for having inconsistent behavior, and anything involving threads can behave differently if you get sloppy. In general, however, it's a lot easier to take a non-trivial Java program written on one platform and run it on another than it is to do the same with a program written in C or C++.

A2: When you write a Java program, it runs on all platforms that have JVM written for them - Windows, Linux, MacOS, etc.

If you write a C++ program, you'll have to compile it specifically for each platform.

Now, it is said that the motto of Java "write once, run everywhere" is a myth. It's not quite true for desktop apps, which need interaction with many native resources, but each JavaEE application can be run on any platform. Currently I'm working on windows, and other colleagues are working on Linux - without any problem whatsoever.

(Another thing related to portability is JavaEE (enterprise edition). It is said that applications written with JavaEE technologies run in any JavaEE-certified application server. This, however, is not true at least until JavaEE6. ([see here](#)))

A3: Portability is a measure for the amount of effort to make a program run on another environment than where it originated.

Now you can debate if a JVM on Linux is a different environment than on Windows (I would argue yes), but the fact remains that in many cases there is zero effort involved if you take care of avoiding a few gotchas.

The CVM you are talking about is very much what the POSIX libraries and the runtime libraries try to provide, however there are big implementation differences which make the hurdles high to cross. Certainly in the case of Microsoft and Apple these are probably intentionally so in order to keep developers from bringing out products on competing platforms.

On the .net front, if you can stick to what mono provides, an open source .Net implementation, you will enjoy roughly the same kind of portability as Java, but since mono is significantly behind the Windows versions, this is not a popular choice. I do not know how popular this is for server based development where I can imagine it is less of an issue.

A4: Java provides *three* distinct types of portability:

Source code portability: A given Java program should produce identical results regardless of the underlying CPU, operating system, or Java compiler.

CPU architecture portability: the current Java compilers produce object code (called byte-code) for a CPU that does not yet exist. For each real CPU on which Java programs are intended to run, a Java interpreter, or virtual machine, "executes" the J-code. This non-existent CPU allows the same object code to run on any CPU for which a Java interpreter exists.

OS/GUI portability: Java solves this problem by providing a set of library functions (contained in Java-supplied libraries such as awt, util, and lang) that talk to an imaginary OS and imaginary GUI. Just like the JVM presents a virtual CPU, the Java libraries present a virtual OS/GUI. Every Java implementation provides libraries implementing this virtual OS/GUI. Java programs that use these libraries to provide needed OS and GUI functionality port fairly easily.

506.<https://stackoverflow.com/questions/5796288/what-is-the-difference-between-architecture-neutral-and-portable/12150519#12150519>

T: What is the difference between “architecture-neutral” and “portable”?

Q: I'm reading Herbert Schildt's book "Java: The Complete Reference" and there he writes that Java is portable AND architecture-neutral. What is the difference between this two concepts? I couldn't understand it from the text.

A: Take a look at this [white paper on Java](#).

Basically they're saying that in addition to running on multiple environments (because of being interpreted within the JVM), it also runs the same regardless of environment. The former is what makes it portable, the latter is what makes it architecture-neutral. For example, the size of an int does not vary based on platform; it's established by the JVM.

A2: I suspect that he means that code can run on many platforms without recompilation. It is also possible to write code that deals with the underlying system without rewrites or conditions.

E.g. Serialized objects from a 32 bit Windows system can be read on a 64bit Linux system.

A3: there are 3 related features in java.

1. platform independent -> this means that the java program can be run on any OS without considering its vendor. It is implemented by using the MAGIC CODE called "BYTE CODE". The JVM then either interprets this at runtime or uses JIT (Just in Time) compilation to compile it to machine code for the architecture that is being run on (e.g. i386).
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507. <https://stackoverflow.com/questions/41296458/what-should-be-included-in-an-architecture-checklist-that-aims-for-technology-in/41299083#41299083>

T: What should be included in an Architecture checklist that aims for technology independence or portability?

Q: I'm trying to come up with a set of questions/criteria to assess and evaluate proposed or emergent solutions that make them as portable as possible. What are the most important questions you ask when trying to design, assess or review a set of solutions?

A: This is a very open and subjective question, so I suspect it will be closed, but in general.

-Separate Concerns
-Build for Deployment
(make sure you can always build & deploy your latest code quickly)
-Build for what is required now, whether portable or not.
-Select tools & technologies that you know to get the job done.
-When large amounts change or scale, re-evaluate the above.

508. <https://stackoverflow.com/questions/1130569/how-important-is-portability/1956745#1956745>

T: How important is portability?

Q: I was just writing a procedure that is looking for a newline and I was contemplating using Environment.NewLine vs '\n'.

Syntactically: Is Environment.NewLine clearer than '\n'?

And how important is portability *really*?

A1: Depends on **how likely you are to run your program on another platform** doesn't it?

Any builtin API that abstracts platform specific semantics/syntax is always better to use, as it provides portability without much complexity overhead, but with **easy gains** for using it.

Writing portable C on the other-hand might be more complex and require a stronger business case for the effort. When dealing with things like C#, Python, Java and others ... use the provided abstractions for those **annoyances** across platforms, which in many cases is what they are reduced to.

A2: It is not *really* important if the program is written for a specific known target audience/platform and you are *certain* its scope will not extend beyond that. But that's where the problem lies: often you cannot be certain about these things. You cannot look into the future.

Often writing portable code is not harder than writing a non-portable alternative. So, always strive to write portable code.

A3: Environment.NewLine works well, I've used it a lot in the past, however, if the app is a web app, and you insert an Environment.NewLine in the rendered html, it will have no effect in the browser window, it will however affect your source layout.

If I remember rightly Environment.NewLine will also add a carriage return if the system expects it, where \n wont.

I forgot to answer the portability aspect. I would always make my code more portable, as someone working in a consultancy I dont want to have to redevelop code so by using Environment.NewLine (for example) I would reduce the amount of work I would have to do should the code need to be reused in future.

A4: There are two aspects to your question: how important is portability, and how do I represent a newline in a portable way.

The need for Portability is, as others said before me, a business requirement: your own private command-line tool needn't be portable, while a commercial library may better be. Based on this need you can choose the platform you're working on.

The newline character has to be recognized by your parser. If you're working in Python, C++, ... the parser will *always* recognize the '\n' sequence. If you are writing regular expressions, the '\$' will be recognized as end-of-line.

If the audience of your code is acquainted with '\n', I would use that one since it jumps out as a character. If you want to emphasize the meaning of "end-of-line", go with the symbolic thing.

509. <https://stackoverflow.com/questions/4080533/whats-the-most-important-in-the-long-run-how-a-site-looks-or-how-it-actually-works>

T: What's the most important in the long run... how a site looks, or how it actually works?

Q: Was having this debate with a friend recently.

If you only really had time to focus on **one or the other**, would you focus on how your site looked to pull most customers in and hap-hazardly botched together site architecture, navigation and a back-end.

Or would you be happy with a site with little or no design (like Jacob Neilson's), or a site that looks like a windows form, but does the job amazingly?

A: usability: if a site looks crappy, but i can still use it, i'm ok. i might comment on the design, but i managed to do what i set out to in the first place (browse, fill up forms, whatever else)

if a site looks amazing, but i don't know what to find where, and can't get anything done, i'm going to be frustrated.

A2: I think this is a question that Stack Overflow doesn't like very much. Anyway, at least for me, it's oblivious that a site that has a great design is attracting but if it has no functions i will be giving up in a very short while. Otherwise if a site is functionality i'll stay there for more long, or eventually forever. Let's take a look at Stack Overflow, i don't really like the design but i love it because it is very use-full.

That's my honest opinion.

A3: I'd go for the latter (function over form), but with a few considerations:

First of all, you have to distinguish between levels of functionality. For example, the user doesn't care if the database is a horrible mess so long as when they click a link, the page they want comes up in a reasonable time.

Secondly, you really do need both form and function to have a successful site in the mainstream. You have to play to your audience: are you creating a site for teenagers? Then it better have Flash, some fun things to do, etc. Are you targeting a tech-savvy crowd? Then simple, minimal CSS might be a better way to go.

Thirdly, a good/pretty/usable UI doesn't have to be complicated or take a long time to set up, so it's not really a "one or the other" kind of problem. You can and should have both.

510. <https://stackoverflow.com/questions/11602756/are-soa-and-agile-methodologies-complimentary/11605981#11605981>

T: Are SOA and Agile methodologies complimentary?

Q: I haven't yet started learning either of the two, but I was wondering whether any of you use Agile methodologies to implement SOA?

A:

Working full time with SOA implementations, I have some experience regarding this.

You can use different methodologies to implement SOA into an organisation. I've seen no attempt to go in and in one single project remake the entire enterprise integration design to SOA. Rather, this will happen step by step once business requirements emerge or change.

Often each sub project in a SOA implementation is rather small - often too small to divide into SCRUM sprints with production releases.

In many ways the Waterfall method is usually conceptually the easiest method to implement SOA. The specs of a service WILL CHANGE over time, but there is no way this can be planned into, say 6 months intervals, since it's very much driven by business requirement changes or influenced by upgrades/exchanges of enterprise information systems.

However, when the design phase is done and specs + technology pattern is decided, there might be a decent amount of changes of the design spec. in a project once the implementation phase has started. It is usually the case, from my experience, that once started to flip the stones, old and unknown things crawl up that require changes. A more iterative approach will usually be cheaper than strict waterfall - however not necessarily an agile approach.

Another important factor to decide upon the methodology is the way projects are financed and setup. An agile approach might get better overall result/cash ratio, but that is only if your organisation can cope with agile methods. If you are working as internal contractors to enable SOA for some business requirement, which I am used to, then a project plan might be setup, a cost estimate and a strict time schedule with responsibilities. It's rather hard to hold such a schedule for every single project with an agile approach, specifically, it's hard to give clear cost estimates for small-medium SOA projects.

For larger SOA projects, delivered to a single owner, I've successfully used SCRUM and really recommend it.

511. <https://stackoverflow.com/questions/37563584/architecture-of-server-location-for-components/37581603#37581603>

T: Architecture of server: location for components

Q: I have following things:

1) Django + Tornado server (SQL DB is remote)

- 2) Redis
- 3) RabbitMQ
- 4) Landing page (just static)

5) E-mail server ([iRedMail](#)) is connected to the same DB as Django and Tornado.
My question: Is it Ok if I install all of them on the same physical server (instance)?

Or the best way that I separate it like (1,2,3) and (4,5)?

I'm worry about an E-mail server, because it seems will be used many resources.. On the other hand there are not more than 4 users who are registered there.

And what about security of an approach if it is installed on the same machine?

A: Although your question is very specific to your application. However I can only give a general answer based on my personal experience, learned lessons, and best practices that I read elsewhere

You need to ask yourself a few questions that when answered, will help you figure out the best architecture to solve your problem:

1. Scalability

What are the usage patterns of each service in your solution? and could you scale some of them that are high demand, without scaling the other services?

Would you (at some point) require a higher throughput from RabbitMQ service and add more instances in a cluster to keep up with the load, without having to scale up the email server as well?

2. Consistency

What strategies would you use to distribute the workload across multiple instances of the same service? (replication, partitioning, clustering, sharding, etc.)?

RabbitMQ can work in a load-balanced cluster. but maybe your mail server cannot?

3. Efficiency

Some services can perform better if you scale them up (throw more CPU/RAM at them), not out (add more instances). choose wisely

4. Security

This is a big topic, but a few things I personally consider a must:

Most of your services expose endpoints (TCP sockets) that could be attacked. keeping everything behind a strict firewall and only exposing the most critical ports (web and mail server in your scenario)

Services should authenticate and verify each other (whenever possible) .. If one service got exposed, it should not compromise the entire system.

512. <https://stackoverflow.com/questions/19312515/how-to-document-non-functional-requirements-nfrs-in-a-story-feature/19390183#19390183>

T: How do document non-functional requirements (NFRs) in a story/feature?

Q: The [Specification By Example book](#) states the non-functional requirements (commonly referred to as NFRs) can be specified using examples.

I've also been told by a colleague that non-functional requirements may be specified using SBE stories using the format:

Scenario: ...

Given ...

When ...

Then ...

Here is an example functional and non-functional requirement taken from [wikipedia](#):

A system may be required to present the user with a display of the number of records in a database. This is a **functional** requirement. How up-to-date this number needs to be is a **non-functional requirement**. If the number needs to be updated in real time, the system architects must ensure that the system is capable of updating the displayed record count within an acceptably short interval of the number of records changing.

Question 1: Can the non-functional requirement be specified as a story?

Question 2: Should the non-functional requirement be specified as a story?

Question 3: What would the story look like?

A1: Q1: Yes, definitely they can. Take a look on [that](#) article describing Handling Non Functional Requirements in User Stories.

Q2. From my perspective if you able to create them it's really worth of keeping and tracking them in such a way. But citing [this](#) article

There is no magical agile practice that helps you uncover NFR. The first step is to take responsibility. NFR can be represented as User Stories if the team finds a that this helps to keep these visible. However, be aware that surfacing such stories may create issues around the priority of work done on them against more obvious features.

Q3. Take a look on the mentioned article from Q1.

A2: I'll give an answer by working through an example.

Let us say that your team has already implemented the following story:

Scenario: User can log in to the website

Given I have entered my login credentials

When I submit these credentials

Then I get navigated to my home screen

To answer Question 1) - Can the non-functional requirement be specified as a story?

The project stakeholders have given you a NFR which reads:

For all website actions, a user should wait no longer than five seconds for a response.

You could create a story for this as follows:

Scenario: User can log in to the website in a timely fashion

Given I have entered my login credentials

When I submit these credentials

Then I get navigated to my home screen

And I should have to wait no longer than the maximum acceptable wait time

Note that instead of imperatively specifying '5' seconds, I have kept the scenario declarative and instead specified "wait no longer than the maximum acceptable wait time".

To answer question 2) - Should the non-functional requirement be specified as a story?

The NFRs should *definitely* be specified as a story.

Creating a story will allow this task's complexity to be estimated (so that the team can determine how difficult it is relative to past stories), plus the team can break the story down into tasks (which can be estimated in hours, so that you can work out if the team can implement this story in the current sprint).

Hence in my contrived example, the team would have already implemented the code to log-in, but they'd then determine how to implement the requirement that it must take no longer than 5 seconds to log in. You will also allow be able to explore the inverse of this problem i.e. what happens if it takes longer than five seconds to log-in? e.g.

Scenario: User encounters a delay when logging in to the website

Given I have entered my login credentials

When I submit these credentials

And I wait for over the the maximum acceptable wait time

Then the Production team is informed
And the problem is logged
And I get navigated to my home screen

And finally, regarding question 3) - What would the story look like?

I've detailed how the stories would look like in answers 1) and 2)

A3: I think the boundaries of NFRs are still not fully agreed upon by everyone. Consider a story that says "As a manager, my employee must get all responses within 5 seconds to avoid hiring a second data entry person and adding \$50,000 in payroll expenses." I consider that a fully functional business requirement, along with any performance requirements that focus on the end user experience.

I categorize "traditional" NFRs as stories where the impacted person is not in the end user's or stakeholder's organization. "As a support person I need logs of the web site traffic to help me troubleshoot problems," or "As a software maintainer, I need a block architecture diagram to help me make changes." Including the role as you would with any user story helps with prioritization. It also helps identify the stakeholder for that NFR, should you have any questions about it.

NFRs may include some aspects of performance, at least those that don't impact the end user. "As a system administrator, I want to allocate no more than 10GB of disk space to the database in order to use SQL Express and avoid expensive SQL Server licenses."

Consider a typical NFR that might only state "Databases are limited to 10GB." It's an arbitrary number with no meaning or rationale, and there's no way to question it. Having the story-like role and explanation helps everyone understand that there is a valid reason for the NFR, so when you're prioritizing them you can ask smart questions. They lead to conversations like "I need to expand my table space to 20GB, but the sysadmin has this NFR about database size. How much do SQL Server licenses really cost him? OMG, that much? OK, I'll denormalize a few tables and save a few GB to fit it in there."

A4: As both @bensmith and @siemic show, yes, you can capture NFRs as stories.

Should you capture them in this way?

I don't think you want to capture NFRs as part of regular feature stories.

Most NFRs apply to more than one story. "The system must be responsive" means every story needs to define maximum wait times. "The system must not consume more than 10GB of disk space" means every story needs to consider disk space. The list of "and"s in the story becomes unmanageable in even trivial cases.

You *may* want to capture NFRs as independent stories, if both the product owner and team are comfortable with this.

For instance:

Given I have a PC with at least a dual core processor
and 8GB of RAM
and a gigabit connection to the system
when I interact with the system
then I never have to wait more than 5 seconds for a response
and 90% of attempts respond within 1 second

This provides a clear requirement, with measurable targets. You just have to make sure that each story takes all of the NFRs into account.

A5: I think you need to look at a few things, NFRs should follow the life span of the application, software, product etc. backup and recovery scenarios should be covered regularly, security scans and performance should be measured in prod as well as in development. Many NFRs need validation from teams outside of the development group so would not be expected to have a script or code written to verify. So obviously security, performance, scalability, resilience etc can and should be tested within the development phase or before code gets promoted into live. Most NFRs can be written up as stories but as said I don't think all need development effort to cover them.

T: Scala system process hangs

Q: I run hundreds of actors running in parallel. Sometimes, for an unknown reason, the execution of the process (!! never returns. It hangs forever. This specific actor cannot handle new messages. Is there any way to setup a timeout for this process to return, and if it exceeds retry?

What could be the reason for these executions to hold forever? Because these commands are not supposed to last more than a few milliseconds.

Edit 1: Two important facts that I observed:

1. This problem does not occur on Mac OS X, only in Linux
2. When I don't use ByteArrayInputStream as input for the execution, the program does not hang

A: That's some very heavy processing happening in parallel just to achieve a few millisecs of work in each case. Concurrent processing mechanisms rank as follows (from worst to best in terms of resource-usage, scalability and performance):

1. process = heavy-weight
2. thread = medium-weight (dozens of threads can execute within a single process space)
3. actor = light-weight (dozens of actors can execute by leveraging a single shared thread or multiple shared threads)

Concurrently spawning many processes takes significant operating system resources - for process creation and termination. In extreme cases, the O/S overhead to start & end processes could consume hundreds or thousands more CPU and memory resources than the actual job execution. That's why the thread-model was created (and the more efficient actor model). Think of your current processing as doing 'CGI-like' non-scalable O/S-stressing-processing from within your extremely-scalable actors - that's an anti-pattern. It doesn't take much to stress some operating systems to the point of breakage: this could be happening.

Also, if the files being read are very large in size, it would be best for scalability and reliability to limit the number of processes that concurrently read files on the same disk. It might be OK for up to 10 processes to read concurrently, I doubt it would be OK for 100.

How should an Actor invoke an external program?

Of course, if you converted your logic in myExecutable.sh into Scala, you would not need to create processes at all. Achieving scalability, performance and reliability would be more straightforward.

Assuming this is not possible/desirable, you should limit the total number of processes created and you should reuse them across different Actors / requests over time.

First solution option: (1) create a pool of processes that are reused (say size 10) (2) create actors (say 100) that communicate to/from the processes via ProcessIO (3) if all processes are busy with processing, then it is OK/appropriate that Actors block until one becomes available. The issue with this option: complexity; the 100 actors must do work to interact with the process pool and the actors themselves add little value when the processes are the bottle-neck.

Better solution option: (1) create a limited number of actors (say 10) (2) have each actor create 1 private long-running process (i.e. no pool as such) (3) have each actor communicate to/from via ProcessIO, blocking if the process is busy. Issue: still not as simple as possible; actors interact poorly with blocking processes.

Best solution option: (1) no actors, a simple for-loop from your main thread will achieve the same benefits as actors (2) create a limited number of processes (10) (3) via for-loop, sequentially interact each process using ProcessIO (if busy - block or skip to next iteration)

Is there any way to setup a timeout for this process to return, and if it exceeds retry?

Indeed there is. One of the most powerful features of actors is the ability for some actors to spawn other actors and to act as supervisor of them (receiving failure or timeout messages, from which they can recover/restart). With 'native scala actors' this is done via rudimentary programming, generating your own checks and timeout

messages. But I won't cover that because the Akka approaches are more powerful and simpler. Plus the next major Scala release (2.11) will use Akka as the supported actor model, with 'native scala actors' deprecated. Here's an example Akka supervising actor with programmatic timeout/restart (not compiled/tested). Of course, this is not useful if you go with the 3rd solution option):

514. <https://stackoverflow.com/questions/15633110/how-to-build-a-cloud-application-and-keep-portability-intact>

T: How to build a cloud application and keep portability intact?

Q: Please check the answer and comments of my previous question in order to get a better understanding of my situation. If I use Google DataStore on AppEngine, my application will be tightly coupled and hence loose portability.

I'm working on Android and will be using backend which will reside in the cloud. I need client-cloud communication. How do I build an application maintaining portability. What design patterns, architectural patterns should I be using?

Should I use a broker pattern? I'm perplexed.

A1: In order to maintain portability for my application, I've chosen Restlet, which offers Restful web apis, over endpoints. Restlet would help me to communicate between server and client.

Moreover, it would not get my application locked in to a particular vendor.

A2: Google AppEngine provides JPA based interfaces for its datastore. As long as you are writing your code using JPA APIs, it will be easy to port the same to other datastores (Hibernate for example also implements JPA).

I would ensure that the vendor specific code doesn't percolate beyond a thin layer that sits just above the vendor's APIs. That would ensure that when I have to move to a different vendor, I know exactly which part of code would be impacted.

A3: It u really want to avoid portability issues use google cloud sql instead. If u use the datastore unless its a trivial strucfure you sill not be able to trivially port it eve if you use pure jpa/jdo, because those were really not meant for nosql. Google has particularifies with indexes etc. Of course sql is more expensive and has size limits

515. <https://stackoverflow.com/questions/20576244/making-my-game-independent-from-graphic-api-in-c/20687454#20687454>

T: Making my game independent from graphic API in C++

Q: I would like to make my game independant from the underlying graphic API used (in order to reduce coupling in case I want to port it to another platform).

I'm currently using SDL, and initially I wanted to encapsulate the SDL_Renderer in a GraphicAPI SDL class, implementing my generic GraphicAPI interface. This API would have create Image SDL (encapsulating an SDL_Texture), which implements my generic Image interface.

My problem is that, when I want to render an Image using my GraphicAPI instance, the underlying GraphicAPI SDL has to cast the Image into an Image SDL, in order to obtain the SDL_Texture. And such a cast is ugly.

What is the best way to deal with that type of situation ? I've though about storing every SDL_Texture loaded in a vector inside my GraphicAPI SDL, with every instance of Image having just an integer corresponding to the index of the texture in the vector, so that only the GraphicAPI SDL class uses SDL directly, but is there a better way to proceed (with a pattern for instance) ?

A: If you are using SDL 2.0 (and are just making a 2D game) then you are already decoupled from the underlying Graphics API to a large extent. SDL 2.0 can automatically select the correct renderer (DirectX or OpenGL) for your system when you set up the window, your code shouldn't need to worry about it at all. However, if your game requires a lower level of drawing control (i.e, you're making a 3D game), you will need to handle the renderer by yourself.

For more information, see here: <http://wiki.libsdl.org/MigrationGuide#Video>

A2: First off, there is no such thing as platform independence. On every platform, you are forced to make some assumptions that may or may not be true on your next platform. And in any abstract platform, you will be making some assumptions (like the platform supports textures, matrix transformations, quaternions, no 3D support etc). All that an abstract platform will do in create unnecessary complexity.

And abstract platform only starts to make sense when you are considering supporting 2 or more platforms at which point you can abstract away common concepts (like textures and matrix transformations).

So unless you are planning to support multiple platforms, the best you can do is to just ensure that your application is properly layered.

SDL and OpenGL ES are supported on a large number of platforms and unless you are planning to port games to specialist game consoles, SDL and OpenGL ES covers most bases.

516. <https://stackoverflow.com/questions/14630215/javascript-inheritance-interface/26811329#26811329>

T: JavaScript inheritance, interface

Q: I have a few problem with JavaScript inheritance and prototype. All the research I have made, in stackoverflow/google lead me to use the prototype of my class, but that's the point I want to avoid. I now JavaScript is not conceived that way but I'm sure it's possible, I'm just stuck.

I have two classes (or more maybe later). One is the base, that will be the mother of all, I want it to have all the basics attributes and method (like a basic OO). My objects are for geometry.

The main class provide all the information for my classes, like square or circle... Extend it with prototype will lead to big problem and a great thing, Methods are well shared (that's cool), but my attributes are also shared so when I change it in my Square class, the attributes will also change in Circle (which is a bad things)

I know the main solution is to not provides an interface for attributes, and place them only in the Square/Circle classes, but it's not very clean (I mean I write same attributes twice or more).

My main goal is to create a new class with 2 or more other class, without them sharing anything or maybe just few method? And eventually writing clean code? :)

So I've tried many scripts... All of them use that technique. Or maybe I'm just wrong which is probably true.

Also I know that class doesn't exist in JS, it's just a big function. Is it better to write object like this? I tend to like it much, because using function is a bit confusion in my opinion. Maybe inheritance is much easier in this way?

A1: You've probably got [issues with the nested objects](#) (position, velocity). You will need to create the subobjects for each distinct instance separately.

Also I know that class doesn't exist in JS, it's just a big function. Is it better to write object like this?

No, not "better", it's just different. Instead of using constructor functions that are called with new and set properties on this, you can just use functions that return plain objects - less confusing.

Maybe inheritance is much easier in this way?

Not the [prototypical inheritance](#) that JavaScript uses. Also, you might want to have a look at [this answer](#) on how "classes" work in JavaScript.

517. <https://stackoverflow.com/questions/143403/how-does-the-portability-of-puremvc-benefit-the-application-developer/143432#143432>

T: How does the portability of PureMVC benefit the application developer?

Q: One of the stated goals of the PureMVC framework is to avoid platform dependencies in order to be portable. Considering that because of language and API differences application code will always be heavily dependent on the platform, and that avoiding platform dependencies makes the framework reinvent the wheel and/or only provide a least-common-denominator feature set, in what way does the portability of the framework benefit me as an application developer?

A1: I've worked with PureMVC. They're trying to implement their stuff in quite a lot of languages. You may be right about the least common denominator, but overall, it's not a bad framework, and I've seen a really nice AS3 app in PureMVC.

I don't think they're talking about portability in terms of porting actual code. The idea there is more that you're using a generalized MVC architecture, which you could apply to other projects and other languages.

They're trying to say that if you become familiar with the PureMVC pattern, you could potentially come into a new PureMVC codebase, even if it's another language, and you would already know the lay of the land.

You might also say that developers who develop good PureMVC skills are likely to develop good habits which will translate as they go from language to language. But then again, maybe not.. for the reasons you mentioned.

A2: PureMVC's portability will help you when you migrate to or reimplement in another language.

I can't count the number of platforms and languages I've written code for that are now extinct and for which, even if I still had the source code it would be mostly worthless and have to be rewritten from the ground up today, since the code was usually 100% platform specific.

But all application code need not be heavily dependent upon the platform. View components and services (the boundaries of your application) will necessarily be, but your application logic which is sandwiched between the boundaries need not be.

The scope of PureMVC is really quite narrow; merely to help you split your code into the three tiers proscribed by the MVC meta-pattern. There is no reason why this code has to be tied deeply to your platform in order to be optimal.

When it comes time to migrate, you'll appreciate that the framework actors and their roles, responsibilities and collaborations remain the same. This leaves you to deal with syntactic differences of the language, recreating the view components and services. At least you won't have to completely re-architect.

And for the case of reimplementing in a different language, imagine you're trying to capture a significant part of the mobile market with your app. The market is so fractured, you'll have to implement the same program on 2 or more of Windows Mobile, iPhone, Flash, and Java. Sure you'll probably have separate teams in charge of the apps, but why have a totally different architecture? With PureMVC, you could have a single architecture for all versions of your application.

A3: We've been using PureMVC on two projects now and in my opinion the attempted language-independence is quite a burden.

The promise of jumping straight in a project because the framework is already known does not seem relevant to me if the languages are not already pretty similar (C# to java would make sense, as3 to php not) -- I agree that it is useful to have known ways of solving things, but for that the 'plain' patterns are good enough.

However, I also don't really agree with the usage of the various patterns the project uses, so our choice to not use it on the next project might be related to both issues, and not just the attempt at language/platform independence.

A4: PureMVC is the only real option for Flash Platform developers who choose not to use the Flex Framework. For certain projects the size cost of Flex is too expensive (it happens!).

I like to prototype in Flex and then rip it out and replace my views with custom components when the application is near completion. PureMVC makes this really easy to do with its Mediator pattern. I'm not sure there is any other framework that would allow me this workflow.

Personally, I think PureMVC went too far with its portability goals: I enjoy that fact that it works with Flash AND Flex (for the reasons mentioned above), but feel that it should have stopped there, and made use of the native Flash Player event architecture.

A5: Are there examples of people using PureMVC to build and port applications across multiple platforms?

My company is building a Flex application that we may need to port to other platforms:

- Silverlight (likely)
- Mobile (maybe)
- Desktop (maybe -- not just AIR!)
- TV sets (maybe eventually)

I am considering PureMVC as a framework if it can ease porting and maintenance. I am curious to know if other people have ported a PureMVC app to a different platform and what their experience was with porting and then having development proceed in parallel for the app on multiple platforms.

518.<https://stackoverflow.com/questions/10829638/3-tier-application-with-singleton-pattern>

T: 3 Tier application with singleton Pattern

- Q: Is this the right architecture I am following and Is there any chance to create the base class as Singleton?
- Is there any other better architecture?
- Is there any pattern I can follow to extend my functionality?

A1: Lets see. I would try to give my input. What I see here you are trying to do is ORM. So please change the name of base class from Domain to something else

Is this the right architecture I am following and Is there any chance to create the base class as Singleton?
Why do you need your base class as singleton. You would be inheriting your base class and you would create instances of child classes. Never ever you would be creating a instance of base itself.(99% times :))

Is there any other better architecture?

Understand this. To do a certain thing, there could be multiple ways. Its just the matter of fact, which one suits you the most.

Is there any pattern I can follow to extend my functionality?

Always remember the SOLID principles which gives you loose coupling and allow easy extensibility.

SOLID

There are couple of changes that I would suggest. Instead of a base class, start with Interface and then inherit it to make an abstract class.

Also make sure your base class can do all the CRUD functionality. I do not see a retrieval functionality here. How are you planning to do it? Probably you need a repository class that returns all the entity of your application. So when you need person, you would just go on ask the repository to return all the Person.

All said and done, there are lots of ORM tool, that does this kind of functionality and saves developer time. Its better to learn those technologies. For example LINQ - SQL.

A2: Is this the right architecture I am following

There is no architecture which is optimal for any problem without context. That said, there *are* things that you can do to make your life more difficult. Singleton is not your problem in your implementation.

Is there any other better architecture?

Probably, yes. Just glimpsing at the code, I see quite a lot of stuff that is going to hurt you in the near and not so near future.

First, a piece of advice: **get the basics right**, don't run before you can walk. This may be the cause for the downvotes.

Some random issues:

- You are talking about 3-Tier architecture, but there are technically no tiers there, not even layers. Person doesn't look like business logic to me: if I understood correctly, it also must supply the string for the commands to execute, so it has to know SQL.
- Empty virtual methods should be abstract. If you want to be able to execute arbitrary SQL move this outside the class
- As @Anand pointed out, there are no methods to query
- CommandName and Parameters are exposed as fields instead of properties
- CommandName is not a Name, Domain doesn't look like a fitting name for that class
- It looks like an awkward solution to a well-known problem (ORM). You say that you want to be able to execute custom SQL but any decent ORM should be able to let you do that.

Suggested reads: [Code Complete](#) for the basic stuff and [Architecting Applications for the Enterprise](#) for some clarity on the architectural patterns you could need.

519. <https://stackoverflow.com/questions/7359533/c-sharp-microkernel-pattern-example>

T: C# Microkernel pattern example

Q: Does anyone have a simple but good explanation and possible C# .NET classes or libraries either built in or 3rd party that is a good example of the Microkernel architectural pattern.

To me it is a bit vague and mostly looks like it is the classes that are at your lowest level of design. Yet we never call this the microkernel but rather our Core assemblies.

I'm battling to understand the relevance outside of an os kernel for example.

thanks

A: The Microkernel analogy at application level in C# would be a main C# application (the micro kernel) which creates different app domains and loads different assemblies (kernel drivers services etc) in those app domain and communicate with them using IPC mechanism for message passing OR calling across app domain using Remoting (MarshalByRefObject). This will result in the required isolation level that is desired in a micro kernel arch.

520. <https://stackoverflow.com/questions/23239236/yesod-architecture>

T: Yesod Architecture

Q: I'm really new to Yesod and in particular to Functional programming and software architecture. I'm attending a course on software architecture and I have to explain Yesod architecture. Here's what I understand: Yesod implement the MVC pattern using Shakespeare as "View", Persistent as a "Model" and Yesod itself as a Controller. But I don't get where to collocate the Warp server. Can you tell me?

Furthermore, what is the Yesod architecture itself? I read "The Architecture of Open Source Applications" book but I don't really get if it uses a layered architecture or a component based architecture, I'm quite confident that it uses a component based architecture (correct me if I'm wrong) but I can't spot which are the component (can you tell me?).

Recap of doubts: - Role of Web server in the MVC pattern - Yesod architecture itself. - Component/Layer of the yesod architecture.

Thank you all for your time.

Here is the piece of the book description about Yesod:

The most basic feature of Yesod is routing. It features a declarative syntax and type-safe dispatch. Layered on top of this, Yesod provides many other features: streaming content generation, widgets, i18n, static files, forms and authentication. But the core feature added by Yesod is really routing.

This layered approach makes it simpler for users to swap different components of the system. Some people are not interested in using Persistent. For them, nothing in the core system even mentions Persistent. Likewise, while they are commonly used features, not everyone needs authentication or static file serving.

On the other hand, many users will want to integrate all of these features. And doing so, while enabling all the optimizations available in Yesod, is not always straightforward. To simplify the process, Yesod also provides a scaffolding tool that sets up a basic site with the most commonly used features.

And a link to the book [AOSABOOK](#)

A: I'm mainly a Rails developer, so my notion of MVC is arguably warped. But translating to Rails (if it helps anyone) I see the Yesod structure like this:

Handler/ contains your controllers (relatedly, config/routes is your routes file), templates/ are your views, and the add-on Persistent is your ORM for models.

521. <https://stackoverflow.com/questions/25246072/architectural-patterns-for-server-applications>

T: architectural patterns for server applications

Q: I have a bit of a dilemma here, I'll try to be specific.

I am working on my development stack for web applications, but I am a little unclear on how to architecture the server side. I have worked this matter before, but mostly it has been disorganized and unmaintainable code. I tend to keep the stuff that happens in the client separated from the stuff that happens on the server, meaning that the code on the server does not respond to events triggered by - nor influences the user interface, but instead it responds to requests made by the client application (a bit like a RESTful api).

As an example, think of a notes-taking web application where the server handles the user authentication requested by the client and online storage; while the client handles user interaction (DOM manipulation and responding to events), offline storage, syncing the notes to the server and other offline functionality.

My question is, what (server side) architectural patterns should I consider when developing these systems?

A: What you are looking for are not design patterns, but *architectural patterns*. And even those patterns have to be decided from case to case. It's a bad idea to set one of those patterns as a *standard*, since none of those patterns can be regarded to as a *standard*.

On the other hand Design patterns help you with even more specific problems.

some words to MVC: normally on webapplications your View and control are client based. While your model rests on the client AND on the server side. So on your server side you have neither a Control, nor a View anyway. The only decision that needs to be made, is how to synchronize the two halves of your model.

522.<https://stackoverflow.com/questions/5489440/implementing-database-functionality-objects-in-an-n-tier-architecture>

T: implementing Database-functionality objects in an N-Tier architecture?

Q: I'm adding functionality to our website which performs long-running processes asynchronously using MSMQ. Doing this anynch, however means we need to notify users when their requests are completed. Using the command pattern, I created an interface* called INotify and composed that into the message class, so the message processing class can simply call GiveNotice() on the message's INotify object. The first implementation, EmailNotify, was more difficult than expected, as I was surprised to discover MailMessage isn't serializable, but got it going.

Now I'm working on a new concrete notifier, DBNotify, which will call a SP of some sort and update a status in the main transactional database. I'm tripped up in that I would like to reuse the DAL architecture we've already created, but INotify is a member of the Model project, which is more fundamental than the DAL.

Our hierarchy looks like this: Common > Model > DAL > BAL

Here's more detail about the tiers. Bear in mind, I inherited this from : Common is responsible for all "utility" functions which are used many places in the application, things like accessing configuration settings, parsing strings, non-business related functionality.

Model are business objects, what some folks call data transfer objects, collections of getters and setters. I've added some "smarts" at this layer, but only business rules internal to that object, such as "An item's name must begin with an alphanumeric character."

DAL is the data access layer, in theory, all that happens here is model objects are moved into and out of the database.

BAL is the Business layer; in theory, business rules that govern the interaction of objects are enforced (i.e. "A form must have at least two items.").

So the INotify interface is defined an abstraction to allow the method of notification to vary independently (i.e. email, TXT, twitter, etc). It's fundamental to the system, so I have created it at the Model tier, which is independent of the DAL tier. However, I am creating a new concrete implementation of INotify whose notification method is to call a SP in a database.

Has anyone else dealt with a business object whose purpose is to interact with a database, and how do you situate that in your N-tier architecture?

Before you tell me to use Linq to Sql, great thanks. This is not a technical question (how do I do this), it's a design question (how should I do this).

I think there is a StackExchange site more focused on these sorts of language-independant design questions, so I'm going to copy this there.

A: You could use your data entities in your project if they are POCOs. Otherwise I would create separate models as you have done. But do keep them in a separate assembly (not in the DataAccess project)

imho people overuse layers. Most applications do not need a lot of layers. My current client had a architecture like yours for all their applications. The problem was that only the data access layer and the presentation layer had logic in them, all other layers just took data from the lower layer, transformed it, and sent it to the layer above.

The first thing I did was to tell them to scrap all layers and instead use something like this (requires a IoC container):

- Core (Contains business rules and dataaccess through an orm)

- Specification (Separated interface pattern. Contains service interfaces and models)
- User interface (might be a webservice, winforms, webapp)

That works for most application. If you find that *Core* grows and becomes too large to handle you can split it up without affecting any of the user interfaces.

You are already using an ORM and have you thought about using a validation block (FluentValidation or DataAnnotations) for validation? Makes it easy to validate your models in all layers.

A: Classes that are used in many layers get me worried.

Especially when they are also tied to the data-model/base/layer.

As soon as there is a change in these classes you could run into re-coding in all layers. In other words you are missing the helpful effect of abstraction.

That said, maintaining transformation code (from layer to layer) is not much fun either but in general less work.

An in between solution might be the use of interfaces/roles: Define for each layer the interface/role that an object should play and use that interface to be passed to the layer. A (shared) class should then implement a role (or many of them). This will provide a more loosely coupled system.

I learned a lot from [this neat lecture about DCI \(Data, Collaborations, and Interactions\)](#)

A2: Thank you everyone for your input, there are several ideas here for improvements I plan to implement, although none directly answer the question I was asking.

I cross-posted this over to Programmers, where I think this sort of question may truly belong, and got some helpful ideas. If you're interested, the thread is here: [Programmers thread on this issue](#). Admittedly, I added the "hint" of dependency injection based on my own research when I posted there, so the problem may have been clearer.

This is a great and helpful community, which I am so proud to participate in.

523. <https://stackoverflow.com/questions/839359/front-controller-vs-fa%C3%A7ade-pattern/4430089#4430089>

T: Front Controller vs. Façade pattern

Q: Okay, I have done a bit of searching online and found [this](#) thread, but it still does not quite clear it up for me. What exactly is the difference between a Front Controller Pattern and a Façade pattern?

As I understand it so far: A Façade pattern does not contain any business Logic, but merely centralizes access to multiple objects.

A Front Controller does the same thing, but may contain business logic to facilitate the decision logic of what is called based on the input data and the like.

Can a Façade call into lower layers of your application or is it really just to centralise access to many components on the same layer?

As I understand it, the front controller coordinates the complete function call process.

Example: A Front controller would examine the data, and then decide what action to take. Then it would compile the data for each subsequent call to lower level classes, until it arrives at a suitable response that can be provided to the calling system.

I think my understanding of the Façade pattern is wrong or just too simplistic. Please correct me if I'm wrong.

If my understanding of this is correct, would it then not make more sense to change the Application Façade, into a Front Controller in the [Microsoft Application Architecture Guide 2.0](#)? I'm specifically looking at the Service Architecture in chapter 18. (I have the Beta 2 version though)

Update: Thanks for a great response Rune. Why do you say it is not correct to change the Facade to a Front controller? I'm a big fan of the Front-controller because it keeps all lower level things a little more controlled. So although it may not make MORE sense, would it be completely wrong to do that? If yes: Why?

A1: The Front Controller pattern defines a single component that is responsible for processing application requests. Often used as a "bottleneck" to (for instance) channel requests through to consolidate standard behavior that needs to be performed each time.

See these links for short to the point explanations:

- <http://java.sun.com/blueprints/patterns/FrontController.html>
- <http://www.oracle.com/technetwork/java/frontcontroller-135648.html>
- <http://martinfowler.com/eaaCatalog/frontController.html>

A facade is on the other hand rather used to wrap other methods/services to provide a unified interface, hide complexity or reduce dependency on external systems (Exemplified in DDD's anti-corruption layer: <http://www.goeleven.com/blog/entryDetail.aspx?entry=168>), etc.

A facade is a thin wrapper that shouldn't contain any logic except the logic used to translate between the two systems. Front Controller has no such requirements.

See for instance: http://en.wikipedia.org/wiki/Facade_pattern

And to answer your questions concerning AppArchGuide: No, that's not correct.

524. <https://stackoverflow.com/questions/37208996/need-design-guidance-to-develop-a-java-spring-hibernate-web-application>

T: Need design guidance to develop java spring hibernate web application [closed]

Q: I want to create java web based application using Spring-Hibernate. I know its not difficult to implement the functionality, but i need some help/guidance from the architecture perspective. Can any one suggest me the best design which will cover interfaces,design patterns etc.

Also need which version should i use of spring and hibernate.

A: The best way to start implementing a web application using the technologies you mentioned is to follow a tutorial from the large variety of tutorials you can find using google.

Another good option is to find a skeleton for an application that someone has created and shared in a source code sharing service like [github](#) or [bitbucket](#) (check the licenses also). You can check-out the code and have an initial working example you can work on and expand.

If something does not work during these attempts, then please come back here, search if your question is already asked by someone else, and if not place your question with specific code snippets and error messages you may get.

If everything works well and you need advices on different ways to improve performance, your architecture and the software patterns, then come back here also with a specific question, or in some cases you will find [codereview](#) more suitable for this kind of questions.

525. <https://stackoverflow.com/questions/77670/what-is-the-best-way-to-create-a-security-architecture>

T: How should I design a plugin system in a layered Java EE Application?

Q: I have a Java EE based REST api application. It has a layered architecture like the following:

1. Resources (Jax-rs resources)

- Object Validation
 - Object Mapper
2. Service Layer
 3. Repository Layer
 4. JPA Entities

Everything is wired using Spring dependency injection.

I need to design this core application in such a way that it allows other external developers to write extensions/plugins and override or extends any minor or major functionality in the core. Think of it like Wordpress CMS in Java EE if that helps. How would you design a plugin system around the current architecture?

One obvious way that I can think of is override or add new functionality to the proper resource (with validation, objectmapper), service, repository and entity and create a jar + xml out of it. But I want to make sure that the plugin developer has to write the absolutely minimum amount of code to get the new functionality working, while reusing much of the core code.

Assume, you want to create a wordpress blog post extension that lets you create blog posts with few extra fields that don't exist in core yet. What would be the simplest and cleanest way to go about designing the current Java EE app, so its easy for the plugin/extension developers? Any patterns that could be useful like strategy or template method pattern?

Are there any open source Java CMS that follow the model using Spring/JPA and standard technologies?

A1: I think you mean to extend the functionality, rather than override the core. Typical architecture examples define concerns which can be overridden (separate from core) and make provisions. Eclipse framework achieves this using a combination of plugin-extensions & extension-points mechanism. This is taken further using OSGI bundling.

Another alternative is to breakdown the application into smaller independent modules/services. All you need to do is host these modules over an ESB/Application Integrator (like Mule/Spring Integration) and allow users to configure their version of routing/transformation. Extension would mean creation of new transformers which get added to the message flow.

526.<https://stackoverflow.com/questions/44980693/how-to-route-requests-to-mvc-controllers-to-an-application-tier>

T: How to route requests to MVC controllers to an applications tier

Q: My team is reviewing security on a 2-tier ASP MVC application and has decided to introduce a service tier to prevent the website connecting directly to the database. I'm looking for ways to avoid a large rewrite of the application.

Is there a framework to route all controller calls to a service? Microsoft have a similar framework to introduce an intermediary for WCF services. Is there anything similar for MVC?<https://docs.microsoft.com/en-us/dotnet/framework/wcf/feature-details/routing-service>

A1: I'm trying to introduce another physical tier so that if the web server is compromised...

Cool. You can solve that problem without changing the application at all using a Reverse Proxy. Like

[IIS Application Request Routing](#)

Or, for internet-facing or cloud applications [Azure Web Application Gateway / Web Application Firewall](#).

527.<https://stackoverflow.com/questions/10604708/architecting-designing-a-new-program>

T: Architecting/Designing a new Program

Q: I had a, lets say, deficient program design/architecture class in undergrad and thus am really struggling on how to design programs given a problem*. I was wondering if there was a set of resources (books, websites, etc) or problems(kind of like projecteuler.net)** or path to help me work on this deficiency.

I'm looking for resources/problems/etc to better learn design/architecture patterns within programming.

A great example: For my job, I have implemented an MVC framework in PHP(custom, because I want to learn). I needed to bake User management into this framework and am just struggling with the implementation (I understand to use the `$_SESSION` var, I just want to user management to be modular and flexible like the rest). **This post is not intended to solve my user management issue. I know fixing the design issue will fix this naturally.**

I've looked around these here forums and haven't seen any great list of resources to draw off of. If anyone has anything or point me to a post that I missed, feel free to point me there. I really appreciate any insight/help/resource/etc that might be pointed out to me.

*I am familiar and can work with OOP/MVC frameworks, not completely proficient but I can do it

**ProjectEuler, where I am tends to be more functional than anything else. I'm slowly working towards integrating OOP etc. But my architecture skills in programming are terrible.

A: I'm not really sure what the question is, but if you are only looking for some resources, there is this a good book for architectures - [Patterns of Enterprise Application Architecture by Martin Fowler](#), with some parts available [online](#).

Than there are [GoF patterns](#) summed up by Gamma.

[Software architecture in practice](#) can be useful too.

Some basic intro to architectures is in [this paper](#), it's kinda old, but still valid...

Basically, GoF patterns, Enterprise patterns and [GRASP](#) are patterns you should be aware of...

Was this helpful?

A2: I would start with [Head First Design Patterns](#) and the Architecture sections of [Code Complete by Steve McConnell](#). I think those 2 are the best introductions to the concepts and then move into the other stuff.

528. <https://stackoverflow.com/questions/45412393/how-to-reuse-an-entity-to-work-with-different-components>

T: How to reuse an entity to work with different components

Q: 'm reasonably new to vhdl and wondering what the best way is to manage the following situation / pattern:

Say I have an entity A whose architecture instantiates a component B. I would then like to reuse A but this time instantiate a component C in the place of B. C has a completely different functionality to B. B and C may have different sized ports, however the functionality of A is such that it can handle the different port sizes, using, say, generics and generate statements. Essentially A is like a container for either component B, C or maybe D, E, F etc. It maybe performs some logic/buffering on the inputs and outputs of B, C etc. in a way that is common for all these components.

I have read about configurations and my understanding is that I can instantiate a component in A (call it Z), and then link its entity to different architectures using configurations. It seems not many people use this feature of vhdl.

Are configurations the right way to go for this situation?

Ideally, I would like all of the parameters in the design to depend ultimately on the architecture chosen for Z so that the architecture dictates the port sizes of the entity its linked to (Z), and in turn the port sizes of Z dictate the parameters of A and finally these parameters dictate the port sizes of A. Is this possible?

(I am using 'parameterisation' in the general sense to mean a way of configuring a design. Generics, packages, 'range attributes etc would all be examples of parameterisation)

529. <https://stackoverflow.com/questions/865328/which-design-pattern-i-should-follow-to-develope-asp-net-application/865369#865369>

T: which design pattern i should follow to develope asp.net application?

Q: There are lots of design patterns available for developing the asp.net site. Every one design patterns are having their pros and cons. I want to develop high performance application using asp.net. Which pattern i should follow? A: For security purposes, it's not best to allow demo and dev to access the production database, so putting the data there seems to be a bad idea.

A1: The best practice that I've seen today separates all of the business logic from the presentation layer. Classic ASP.NET Webforms tend to make this a bit more difficult and encourage lazy programming because you can use all of the events off of the page rather than forcing good code separation and single responsibility principle.

If you were to utilize the ASP.NET MVC framework, you will most likely have a structure in place that would lend towards better coding practices. However, you can still find ways to fall back to the webforms style of coding.

If you focus on the **single responsibility principle** and **ASP.NET MVC**, you're going to be off to a great start. **Domain Driven Design** may also be worth looking at.

A2: It can depend on the applications aims and goals. Is it going to be user-centric? Pretty/Ajaxy? SOAP Service?

Design patters are there to make life simpler. If you get it wrong, then it may well make life harder. Architectural patterns, behavioural patters, Structural Patterns and Data Semantics can only be decided in the context of the application's **functionality**, which form, in the end, is a slave to.

A3: **Model–view–controller (MVC)** is a popular one used to develop this sort of things

A4: There's a really good, free **architecture guide book** available from patterns & practices. It discusses in some detail many of the different patterns and where they can be used in the development of an ASP.NET (and many other types of) application.

530. <https://stackoverflow.com/questions/41767133/how-to-implement-the-repository-pattern-the-right-way>

T: How to implement the repository pattern the right way?

Q: When implementing the repository pattern for my ASP.NET project, I encountered some problems on which I can't get my head around. So I have a few questions on how to implement the repository pattern the right way.

From my experience I think that having classes/models without behaviour only in my application, next to their repositories is not good OOP. But, this was the way I implemented the repository pattern. I just make everywhere I need an repository instance, to perform some actions. The result of this approach was that all my domain classes didn't have behaviour.

They were just objects holding data with no methods. My teacher said to me that I was using thin models and that I should strive to make fat models. In response to that feedback, I implemented some business logic in the classes, but I ran into some problems:

Scenario:

My User class had a list of Friends with User objects in it, to represent the friends of a certain user. When adding a new friend to an user the domain class method checks if the "friend" already exists in the friends list. If not, he will be added to the list. These changes need to be sent to the database for persistence.

I know this has to be done in the repository for each domain class, but where do the calls to the repository methods belong in the architecture of the application?

I find it a weird thing to have a method adding a new entity to the database in a domain class, which is that entity itself. Also for the GetAll() method, I think it's weird to have a method in a class itself that gets all trams. So a tram object can get all trams. I think this is a weird way of implementing the repository pattern. Am I right?

So, what kind of abstraction is needed here? Does there have to be an extra layer? If so, how does this layer look like? (Example code) Or am I searching in the wrong direction and is there another solution that counters the problem of unit testing with the repository pattern?

This architecture problem I encounter every time, made sure I need it to be answered.

I find it hard to explain this problem clearly, but I hope you guys understand it.

A: Your questions are absolutely normal, but don't expect to find an absolute answer. Welcome to the software industry!

Here is my opinion:

1. Is it good OOP to have an application that relies on an architecture that, next to their repositories, only has models/classes that hold values with no behaviour?

I think you try to implement a repository pattern, but you miss a higher architecture view. Most apps are at least decoupled in 3 layers: View (Presentation), Business and DataAccess. The repository patterns takes place in the DataAccess, this is where you can find pure data object. But this data access layer is used by a business layer, where you will find a domain model, classes with business behavior AND data. The unit tests effort must be on domain model in the business layer. These tests should not care about how the data are stored.

2. Where do I call repository methods in the architecture of the application?

Again no absolute answer, but usually it makes sense to use Something like a business service. These services could arrange the flow between different domain object, and load, and save them in repositories. This is basically what you do in your AddFriend class, and it belongs into a business layer.

Regarding to unit testing, we need with this approach some dependancy injection, which says to me that it is not a independant class

Business services are ususally dependant on Repositories, it is a really common case for unit testing. The Tram class can hold business behavior and is still independent. The AddTram business service need a repository, and dependency injection allows to test it anyway.

3. Methods that insert, update and delete new entities in a database, are they supposed to be in a class itself?

For this one I can be clear and loud: please don't do that, and yes, CRUD operations belong to the Tram Repository. It's certainly not a business logic. That's why in your example you need two classes in two different layers:

- Tram could be the business object in the business layer (No Crud operation here)
- TramRepository is the object which need to store the data for a Tram (where you will find the CRUD operation)

"Because i have seen some other students making use of static methods in a domain class which provides these functionality"

Use of static methods is clearly not a good idea for that, it means anybody could store data through your object, even though it's supposed to handle business case. And again, data storage is not a business case, it's a technical necessity.

Now to be fair, all these concepts need to be discuss in context to make sense, and need to be adapted on each new project. This is why ou job is both hard and exciting: context is king.

Also I wrote a [blog article](#) centered on MVVM, but I think it can help to understand my answer.

A2: The result of this approach was that all my domain classes literally had no behaviour. They were just objects which holds data with no methods.

1. Is it good OOP to have an application that relies on an architecture that, next to their repositories, only has models/classes that hold values with no behaviour?

No of course not, but this is how web developers are being taught these days.

It's back the old modular programming style from the 1970s (static classes + data in objects). Modular programming caused many problems, so they invented encapsulation and object-oriented languages to solve them.

Making all data public will be fine as long as you are making simple websites:

- load data
- display data
- save data

The problems start if you need complex behavior - then your data is actually part of the software's implementation, and you made it public! This causes serious maintenance problems when there are several developers working on the same project.

Web developers are not being taught OOP. They are being taught a simple way of programming - steering them towards simple websites (which is what governments need).

531. <https://stackoverflow.com/questions/9881417/web-app-architecture-advice>

T: Web app architecture advice

Q: The team I work with (3 people) are currently discussing the architecture of a new medium size web application and as you can imagine there are contrasting opinions within the team about how the application should be designed. What I'm trying to do is post some of these ideas with the advantages /disadvantages to each approach that we know of so the SO community can help us go down the best route and/or achieve a compromise.

Architecture A:

1. Repository layer:
Calls to Entity Framework
2. Service / Business Layer:
 - Each 'Manager' to have an interface
 - Each 'Manager' to have 2 implementations (1 mock / 1 actual)
 - Methods in Manager classes to call Repository and then apply business logic
 - Each method to be unit tested
3. Presentation Layer (MVC):
 - Managers to be created via some sort of Service Locator pattern
 - Each controller to have unit tests written against it

Architecture B:

1. Service / Business Layer:
 - Contains only concrete 'Manager' classes
 - Methods call Entity framework directly (eg we're treating EF as the repo)
 - Interfaces may be used but only where there is a need for different implementations
 - Unit tests as and when required
2. Presentation Layer (MVC):
 - Manager classes to be created directly
 - Unit test only code that is fragile or of significant complexity

Some assumptions you can make:

- Most methods within the app will be database calls with the odd bit of authentication / restricting data returned based on user permissions / etc
- 95% of controllers contain no significant complexity
- There is no business need to swap out or have different implementations of the Business layer classes. The business are happy to take the refactoring hit in the unlikely event we have to switch databases / etc
- The estimated code size including markup etc is about 50k lines (based on the previous version of the web app which is a mess)
- Development time is tight
- There is a dedicated QA person

Sorry, if this appears contrary, but my preferred architecture is actually B for a number of reasons.

1. I've worked on projects that are abstracted to the nth degree and it does take a lot longer to make changes to each of the layers, rebuild in VS, revise the tests / mock methods / etc and it offers not much return for projects that are essentially simple CRUD applications
2. The business don't care if the app has the cleanest architecture in the world, they just want to ship the product quickly without too many bugs
3. For the vast majority of methods (in all layers) a simple functional test is all that's required. If the method GetProductById doesn't work, fix it! In my opinion a unit test method containing more lines of code than the method being tested just isn't required for simple methods.
4. I want to be able to right click a method, choose 'Go to definition' and see that actual method source! I don't want to see the interface definition and then have to lookup the actual method elsewhere. Sure if everything uses interfaces then swapping to a different database should* be a breeze but realistically that just doesn't happen nor is it likely to happen for this project.

In summary, I'm not against interfaces or unit tests however where there seems to be a proliferation of either that brings little to no benefit I can't see the point.

Anyone have any suggestions/ advice?

A1: Architecture A

1) Repository layer: Calls to Entity Framework

Abstracting away the OR/M is a good way to make the dependning classes (SL/BL) testable.

2) Service / Business Layer: - Each 'Manager' to have an interface - Each 'Manager' to have 2 implementations (1 mock / 1 actual) - Methods in Manager classes to call Repository and then apply business logic - Each method to be unit tested

Don't put mocks in the business layer. They do not belong there. Use a mocking framework instead, those also allows you to verify that the classes call the correct methods in the dependencies.

3) Presentation Layer (MVC): - Managers to be created via some sort of Service Locator pattern - Each controller to have unit tests written against it

Service location hides dependencies. Use Dependency Injection instead (easiest approach today is to use an Inversion Of control container)

Architecture B

1) Service / Business Layer: - Contains only concrete 'Manager' classes - Methods call Entity framework directly (eg we're treating EF as the repo) - Interfaces may be used but only where there is a need for different implementations - Unit tests as and when when required

Sure. You can mock EF4, but it's a lot harder to verify that all calls are correct. Unit tests as and when when required. That should always be the case. Why test something that don't need testing. A company policy telling when and what to test should *always* exist.

2) Presentation Layer (MVC): - Manager classes to be created directly - Unit test only code that is fragile or of significant complexity

Creating classes directly makes scoping hard and how do you create complex object graphs? It invites you to make the manager classes god classes or to create high coupling between the classes.

Questions

1) I've worked on projects that are abstracted to the nth degree and it does take a lot longer to make changes to each of the layers, rebuild in VS, revise the tests / mock methods / etc and it offers not much return for projects that are essentially simple CRUD applications

Very few applications are CRUD. Crud applications do not validate the model more than checking that the syntax is correct. Those applications will contain a lot of data which is invalid from the business perspective (but valid as correctly formatted)

2) The business don't care if the app has the cleanest architecture in the world, they just want to ship the product quickly without too many bugs

They do care a few years from now when the maintenance cost skyrocket.

3) For the vast majority of methods (in all layers) a simple functional test is all that's required. If the method GetProductById doesn't work, fix it!

What do you do six months from now when you introduce a new change/feature? Force the users to test everything that *might* be affected by your change? Since you can't now if GetProductById doesn't work until you test it.

In my opinion a unit test method containing more lines of code than the method being tested just isn't required for simple methods.

imho that method needs to be refactored and broken down into smaller methods. Methods that are hard to test do most likely smell.

4) I want to be able to right click a method, choose 'Go to definition' and see that actual method source! I don't want to see the interface definition and then have to lookup the actual method elsewhere.

This one scares me. Are you willing to sacrifice code quality just because your IDE doesn't help you? Buy ReSharper and you get "Goto implementation". ReSharper got a lot of software quality checks, it's well worth the money.

Sure if everything uses interfaces then swapping to a different database should* be a breeze but realistically that just doesn't happen nor is it likely to happen for this project.

That doesn't happen in any project and is not the reason to use interfaces. Well defined interfaces make it a lot easier to refactor code and follow the SOLID principles.

A2: It seems quite clear to me according to the business needs that you should just stick with writing the code in the simplest fashion and I would skip all the TDD stuff and use that dedicated QA guy instead and skip formal interface declarations except where they make sense.

532. <https://stackoverflow.com/questions/5813154/am-i-breaking-mvc>

T: Am I breaking MVC?

Q: This question is mostly for my own curiosity, as I understand architecture patterns are there to help us, not control us, but I'm curious to know if the way I've structured this small pet project is a proper implementation of the MVC architecture.

I'm used to developing in the browser for web applications, where the browser acts as a sort of "master controller" (you click a link, it will change views for me, without having to code anything extra). However I'm working on a desktop application for this pet project, and I'm curious how to implement the "browser", if you will. I've looked back at some Flash project I've worked on, and I noticed they had the code for handling the view creations in the root class for the project. Does this make sense? Another thought I had was to create a "ViewPort" class or something that basically took that functionality out of the root class, and basically acted as a combination view/controller (or I can even make a controller class to go along with it) and have that class change between all the views I need to navigate through. But I also wasn't sure if that made sense.

Is there a standard way to manage your views in the MVC? Do you use a controller for the root window which then displays your different views (which also have controllers of their own?) Like I said, this is more for my own curiosity, so I appreciate any answers.

A: You may use a controller for the root window in MVC if I'm understanding your comparison properly.

So in the case where you have a shared layout page, you have a view that will automatically load for every view that uses this _layout.cshtml file.

Now if you have for instance a customer order window you could have all of this 1. the layout.cshtml file for the overall shared look and feel of your site 2. the main view say /MySite/CustomerOrder/Index/656 - the contents created by your CustomerController.cs file, a method named Index. 3. On your /Views/CustomerOrder/Index.cshtml view, you can then call off to show other views RenderAction("Index", "CustomerOrderHistory", new {customerId=@Model.CustomerId}) That goes through a controller named CustomerOrderHistoryController.cs and looks for a method named Index or RenderPartial("CustomerHistory") That goes directly to a view and copied and sends over the current view's model to it.

So to answer your question, you can have a main view with other views in it.. but it depends if you want to do it this way - you dont have to.

533.<https://stackoverflow.com/questions/3973557/how-to-implement-undo-redo-operation-without-major-changes-in-program/3973597#3973597>

T: how to implement undo/redo operation without major changes in program

Q: Hi I'm about to add new functionality to application which I'm currently writing. I need to write a undo/redo functionality. However 90% of our application is ready and I don't know what is the best way to implementing this functionality without affecting(too much) code which has been already created.

A: There aren't many details here. However, Undo/Redo functionality is typically handled via some variation of the [Command Pattern](#). Depending on your architecture, this could be a simple reworking of your basic functionality into "commands", or a major overhaul.

A2: You'll need an undo/redo stack, and major changes to make everything aware of this stack.. I'm sorry, but magic doesn't exist :

A3: Couple of questions: What does the undo do? Does it undo all changes or only the last one?

In any case, you would first store the state of the input fields (initial state, or last desired position), then the undo button would take that state and apply it to the field.

Redo would be the same concept, but it would store the state previous to the undo.

A4: There's a [free library](#) written by Rockford Lhotka for Business Objects that includes built in undo/redo functionality. I think he even implements it through an interface, so it should be "minimally invasive".

<https://stackoverflow.com/questions/36188708/safest-way-to-connect-to-your-database>

T: Safest way to connect to your database

Q: I've been thinking about this quite a while and it's bugging my head off, lets say we have a website a mobile app and a database.

Usually when we develop our websites we pretend to store our database credentials in a configuration file and connect the website directly to the database without using a multi-tier architecture, but when it comes to a mobile application such Android or iOS this applications can be engineered reversed meaning that there's a risk of exposing your database credentials.

So I started thinking about this multi-tier architecture and kind of thinking about how Facebook and other social network do their job, they usually make an API and use a lot of HTTP Requests.

Usually social networks APIs have a app_id and a secret_key, this secret key would be used to increase the safety of the application but I'm thinking about how could I store these keys inside my application since I would

go back to the begining of my discussion, if I was to use Java I could use the Java Preference Class but that isn't safe either has I saw in this question, plus I would need to make sure my HTTP Requests are CSRF safe.

So, how could I store these keys inside my app? What's the best way to do it, since hard-codding it's out of the question.

A1: You should always require users to log in - never store credentials or private keys in an app you'll be distributing. At the very least, don't store them unless they're specific to the user who has chosen to store them after being validated.

The basic idea is that the user should have to be authenticated in some manner, and how you do that is really too broad to cover in a SO answer. The basic structure should be:

User asks to authenticate at your service and is presented with a challenge

User responds to that challenge (by giving a password or an authentication token from a trusted identity provider).

Service has credentials to access the database, and only allows authenticated users to do so.

There are entire services out there built around providing this kind of thing, particularly for mobile apps.

You might store the users own credentials on the device, and if so it should be encrypted (but you're right, a malicious app could potentially pick them up).

Bottom line: never distribute hard coded access to a database directly.

534. <https://stackoverflow.com/questions/28319278/how-to-connect-separate-microservice-applications>

T: How to connect separate microservice applications?

Q: I am building huge application using microservices architecture. The application will consist of multiple backend microservices (deployed on multiple cloud instances), some of which I would like to connect using rest apis in order to pass data between them.

The application will also expose public api for third parties, but the above mentioned endpoints should be restricted ONLY to other microservices within the same application creating some kind of a private network.

So, my question is:

How to achieve that restricted api access to other microservices within the same application?

If there are better ways to connect microservices than using http transport layer, please mention them.

Please keep the answers server/language agnostic if possible.

A1: One way is to use HTTPS for internal MS communication. Lock down the access (using a trust store) to only your services. You can share a certificate among the services for backend communication. Preferably a wildcard certificate. Then it should work as long as your services can be addressed to the same domain. Like *.yourcompany.com.

Once you have it all in place, it should work fine. HTTPS sessions does imply some overhead, but that's primarily in the handshake process. Using keep-alive on your sessions, there shouldn't be much overhead with encrypted channels.

Of course, you can simply add some credentials to your http headers as well. That would be less secure.

A2: The easiest way is to only enable access from the IP address that your microservices are running on.

535.<https://stackoverflow.com/questions/27559710/authorization-in-multi-layered-architecture>

T: Authorization in multi layered architecture

Q: For an application that is split in multiple logical layers how does one go about authorization?

What are the available options? Are there some existing frameworks out there? n Where should these checks be performed in the Service layer?

A1: Security is a cross cutting concern (like logging, validation, caching and so on) and since of this you don't code this in the domain model. The application layer should allow only an authorized call to reach the domain layer.

Usually, security *at the gate* is the preferred approach. This means that you apply security as top as you can in the call stack (even starting from hiding some buttons in the UI).

For all about "frameworks", DDD don't say anything about that. Google around and use the one that most inspire you, bearing in mind security at the gate aspects.

536.<https://stackoverflow.com/questions/11976543/security-in-3-tier-applications-in-which-layer/11976751#11976751>

T: Security in 3-Tier applications: in which layer?

Q: By "security" I mean data access rights, for example:

- Andrew only has read-only access to clients in France
 - Brian can update clients in France and Germany
 - Charles is an administrator, he has read and update rights for everything
- I can see potential arguments for each layer.

5. Data Access Layer

The DAL only exposes clients to which the user has access, and passes an appropriate error up to the business layer when the user tries to do something unauthorised.

This simplifies the upper layers, and can reduce the data traffic for users who only have access to a small fraction of the data.

6. Business Layer

Because this is where the business logic resides and only the business layer has the complete knowledge of how the security should be implemented.

7. UI Layer

A tangent argument is because the UI layer is the one that deals with authentication. A stronger argument is when the application has non-UI functions: calculating the daily P&L, archiving, etc. These programs don't have a security context and creating a fictitious 'system' user is a maintenance nightmare.

8. A separate layer?

Slotted somewhere inside the 3?

I'm looking for a cogent argument which will convince me that layer X is the best for large-scale 3-Tier applications. Please refrain from 'it depends' answers ;-).

A: I guess this may be a subjective topic. Nevertheless, we follow the principle to never trust any external source (e.g. data crossing a service boundary). Typically, modern applications are a bit different from the old client-server three-tier model, since they are usually service-oriented (I see a web server is also as a service).

This rules out the delegation of access checks to the client - the client may know about the allowed access and use this information to behave differently (e.g. not offer some functionality or so), but in the end only what the service (server) decides to allow counts.

On the other hand, the database or DAL is too low, since most checks also depend on some business logic or on external information (such as user roles). So this rules out the data layer; in our environments the data access is a trusted space that does not do any checks. In the end, the DB layer and the application server form a logical unit (one could call it a fortress - as per Roger Sessions Software Fortresses book), where no service boundary exists. If the app layer accesses another service however it has to perform checks on the received data.

In summary, you might want to get a copy of [Roger Sessions book](#) because it does give some valuable input and food for thought on large-scale applications and how to deal with security and other issues.

537. <https://stackoverflow.com/questions/9272314/2-tier-o-3-tier-which-is-safer/9272362#9272362>

T: 2-tier o 3-tier: Which is safer?

Q: I'm reading about architecture and found the following expression:

For instance, in a 2-tier Windows Forms or ASP.NET application, the machine running the interface code must have credentials to access the database server. Switching to a 3-tier model in which the data access code runs on an application server machine running the means that code no longer needs those credentials, making the system potentially more secure. (Rockford Lhotka)

I can not realize why i should use 3-tier app.

A: In a three-tier application, the middle tier (the application server) controls all access to data, so it is possible to specify very fine and specific access control rules (in code), much more than the database itself offers. Whatever an end-user wants to do, has to go through your code (in a two-tier application, the end-user "directly" talks to the database).

OTOH, if you stop using the database access protections, securing the data is now entirely up to your application and coding errors can create huge security holes.

538. <https://stackoverflow.com/search?q=%5Bsecurity%5D+architecture+pattern>

T: Bank-style Navigation Restrictions

Q: Some web applications, banking websites in particular, prevent you from using the browser's navigation buttons, opening links in new tabs or even refreshing the page. Often they'll warn you not to do so and even kill the session forcing you to login again.

Is there a particular architectural pattern they are following to achieve this? What are their goals? How does this increase security?

A: From javascript you can detect a new window by checking the length of the history.

You can capture a backbutton event by injecting an iframe in your page, pointing to (e.g.) http://www.example.com/cacheable_blank_page.html then changing its location to http://www.example.com/cacheable_blank_page.html#offset. When the user clicks on the back button, the

iframe reverts to its original location. If you attach an event handler to this then you can detect the back button and handle the situation appropriately.

There's some code to do that here.

Ultimately the problem that people usually use this for is that their server-side code is poorly written and is inappropriately storing transaction related data in the session and/or overusing PRG patterns - ultimately this is a nasty hack intended to pre-empt problems rather than a solution to the root cause of the problem.

SilverlightFox's token based solution is great for CSRF but does not solve the problem of poor state management on the server.

539. <https://stackoverflow.com/questions/782930/can-you-recommend-me-a-book-about-authorization-architecture-and-associated-paras/1166097#1166097>

T: Can you recommend me a book about authorization architecture associated paradigms?

Q: I come from an ASP.NET background and find the entire roles based authorization scheme limiting to say the least. I've read about Microsoft's new Identity Model and the Geneva Framework with its Claims based architecture but it seems overly complex.

In general, I'd like to know more about possible authorization architectures to find out what fits my needs best.

For instance, application wide roles seem to be good enough if you want to create, well, application wide roles, like "Administrator". But what if I have i.e. a project management application with project entities where every project has its own set of roles ("Editor" on project A and "Photographer" on project B for instance) and associated permissions.

Are there any books on this subject that you could recommend?

A: Since you're coming from an ASP.NET background, probably the most specifically focused book on the subject of security/authorization within the ASP.NET framework is:

[Professional ASP.NET 3.5 Security, Membership, and Role Management with C# and VB](#)
(or its previous editions that target ASP.NET 2.0 etc.)

There is also the older:

[Programming .NET Security](#)

However, these books will simply detail the existing authentication and authorization mechanisms as they exist within ASP.NET membership model and, as you say, are heavily based upon a user/role setup.

If you're looking to stay specifically within the Microsoft/.NET world, one thing that could be worth looking into is the *federated security* model that can be employed by technologies such as WCF (Windows Communication Foundation). This mechanism allows a relatively lightweight approach to security management and makes it easier to accomplish the kind of thing you're after in your example (ProjectA: Editor / ProjectB: Photographer).

Some links on this are:

[Federation \(from MSDN\)](#)

[Federation and Issued Tokens](#)

[patterns & practices: WCF Security Guidance Learning WCF Book - Federated Security Section](#)

If you're after a more general or generic approach to security and authentication/authorization mechanisms that is fairly platform agnostic, some good resources / books would be:

[Designing Security Architecture Solutions](#)

(This book details different security concepts and architectures not only for authenticating/authorizing users but also for concepts such as [code access security](#))

There is also:

Enterprise Security Architecture: A Business-Driven Approach

(As its name suggests, it's a bit more "business" focused, and does primarily focus on the SABSA (Sherwood Applied Business Security Architecture) methodology)

540. <https://stackoverflow.com/questions/24354511/correlation-between-code-maintainability-and-development-velocity>

T: Correlation between code maintainability and development velocity

Q: Has anyone seen a clear correlation data between the code maintainability and a team's development velocity? Can anyone suggest an own experience, a research paper or any other information sources?

I have often experienced that long-lasting architectural problems, such as application modularity, migrating between dbs, are difficult to be refactored due to urgent demands from the business side. It is also difficult to argue from developer's view point how quantitatively such refactoring would enhance the development speed and longer-term benefits.

This question might not be suited for StackOverflow. I am happy to post this question somewhere else if someone could give me a suggestion just where.

541. <https://stackoverflow.com/questions/39878596/what-is-reliability-in-the-context-of-a-web-application>

T: What is reliability in the context of a web application?

Q: How do we say a web application is reliable and is reliability related to correctness i.e. the correctness of the web application's algorithm?

A: Reliability involves providing both stable and consistent results. They don't necessarily have to be correct. Do you know someone who is always late? You can technically rely on them being late, but that doesn't make them correct in behaving that way.

The "correctness" of its associated algorithms is more closely related to the concept of accuracy.

Rikard Edgren, Henrik Emilsson, and Martin Jansson compiled a very thorough list of software quality characteristics that I find helpful. It places accuracy as a subcomponent of capability, along with completeness, efficiency, etc. Reliability, on the other hand, they put at the top tier of characteristics, being comprised of components such as stability, robustness, error handling, and so on.

A2: The Website is reliable if you see the same behaviour every time for the same specific set of actions. Well, reliability and correctness are not really related since I would say when you are trying to identify the reliability of the application, make sure that the application has been tested for correctness first. For example, if your application has a Search field for user to enter a State/Zip, the search results should appear correctly as per the State/Zip entered. This is correctness. Now, let's switch to reliability. In the same scenario, reliability will make sure that the user is able to use the Search feature every time under normal conditions and should see the same results for particular entry. Reliability of an application is its probability of failure-free software operation for a specified period of time in a specified environment. I would say correctness is a pre-requisite to test Reliability of a web app.

542. <https://stackoverflow.com/questions/33041733/microservices-vs-monolithic-architecture/33662057#33662057>

T: Microservices vs Monolithic Architecture

Q: I did some reading about microservices, and I'm little bit intrigued. Seems like it is interesting concept. But I wonder, what are advantages and disadvantages using microservices over monolithic architecture, and vice versa.

When microservices suitable better, and where better to go with monolithic architecture.

A: While I'm relatively new to the microservices world, I'll try to answer your question as complete as possible.

When you use the microservices architecture, you will have increased decoupling and separation of concerns. Since you are literally splitting up your application.

This results into that your **codebase will be easier to manage** (each application is independent of the other applications to stay up and running). Therefore, **if you do this right**, it will be **easier in the future to add new features** to your application. Whereas with a monolithic architecture, it might become a very hard thing to do if your application is big (and you can assume at some point it will be).

Also **deploying the application is easier**, since you are building the independent microservices separately and deploying them on separate servers. This means that you can build and deploy services whenever you like without having to rebuild the rest of your application.

Since the different services are small and deployed separately, it's obvious **easier to scale** them, with the advantage that you can scale specific services of your application (with a monolithic you scale the complete "thing", even if it's just a specific part within the application that is getting an excessive load).

However, for applications that are not intended to become too big to manage in the future. It is better to keep it at the monolithic architecture. Since the microservices architecture has some serious difficulties involved. I stated that it is easier to deploy microservices, but this is only true in comparison with big monoliths. Using microservices you have the added complexity of distributing the services to different servers at different locations and you need to find a way to manage all of that. Building microservices will help you in the long-run if your application gets big, but for smaller applications it is just easier to stay monolithic.

A2: This is a very important question because a few people get lured by all the buzz around microservices, and there are tradeoffs to consider. So, what are the pros and cons of microservices (when compared with the monolithic model)?

Pros:

- **Deployability:** more agility to roll out new versions of a service due to shorter build+test+deploy cycles. Also, flexibility to employ service-specific security, replication, persistence, and monitoring configurations.
- **Reliability:** a microservice fault affects that microservice alone and its consumers, whereas in the monolithic model a service fault may bring down the entire monolith.
- **Availability:** rolling out a new version of a microservice requires little downtime, whereas rolling out a new version of a service in the monolith requires a typically slower restart of the entire monolith.
- **Scalability:** each microservice can be scaled independently using pools, clusters, grids. The deployment characteristics make microservices a great match for the elasticity of the cloud.
- **Modifiability:** more flexibility to use new frameworks, libraries, datasources, and other resources. Also, microservices are loosely-coupled, modular components only accessible via their contracts, and hence less prone to turn into a big ball of mud. Dynamic discovery and binding via a registry (e.g., Apache ZooKeeper, Netflix Eureka) is sometimes used for location transparency.
- **Management:** the application *development* effort is divided across teams that are smaller and work more independently.
- **Design autonomy:** the team has freedom to employ different technologies, frameworks, and patterns to design and implement each microservice, and can change and redeploy each microservice independently

Cons:

- **Deployability:** deployment becomes more complex with many jobs, scripts, transfer areas, and config files for deployment.
- **Performance:** services more likely need to communicate over the network, whereas services within the monolith may benefit from local calls. Also, if the microservice uses dynamic discovery, the registry lookup is a performance overhead.
- **Availability:** if you use a registry for dynamic discovery, unavailability of the registry may compromise the consumer-service interaction.
- **Modifiability:** changes to the contract are more likely to impact consumers deployed elsewhere, whereas in the monolithic model consumers are more likely to be within the monolith and will be rolled out in lockstep with the service. Also, mechanisms to improve autonomy, such as eventual consistency and asynchronous calls, add complexity to microservices.

- **Testability:** automated tests are harder to setup and run because they may span different microservices on different runtime environments.
- **Management:** the application operation effort increases because there are more runtime components, log files, and point-to-point interactions to oversee.
- **Memory use:** several classes and libraries are often replicated in each microservice bundle and the overall memory footprint increases.
- **Runtime autonomy:** in the monolith the overall business logic is collocated. With microservices the logic is spread across microservices. So, all else being equal, it's more likely that a microservice will interact with other microservices over the network--that interaction decreases autonomy. If the interaction between microservices involves changing data, the need for a transactional boundary further compromises autonomy. The good news is that to avoid runtime autonomy issues, we can employ techniques such as eventual consistency, event-driven architecture, CQRS, cache (data replication), and aligning microservices with DDD bounded contexts. These techniques are not inherent to microservices, but have been suggested by virtually every author I've read.

Once we understand [these tradeoffs](#), there's one more thing we need to know to answer the other question: which is better, microservices or monolith? *We need to know the non-functional requirements (quality attribute requirements) of the application. Once you understand how important is performance vs scalability, for example, you can weigh the tradeoffs and make an educated design decision.*

A3: I'd just like to offer a slight variation and bring about the organizational perspective of it. Not only does microservices allow the applications to be decoupled but it may also help on an organizational level. The organization for example would be able to divide into multiple teams where each may develop on a set of microservices that the team may provide.

For example, in larger shops like Amazon, you might have a personalization team, ecommerce team, infrastructure services team, etc. If you'd like to get into microservices, Amazon is a very good example of it. Jeff Bezos made it a mandate for teams to communicate to another team's services if they needed access to a shared functionality. See [here](#) for a brief description.

In addition, engineers from [Etsy](#) and [Netflix](#) also had a small debate back in the day of microservices vs monolith on Twitter. The debate is a little less technical but can offer a few insights as well.

543. <https://stackoverflow.com/questions/3718311/software-engineering-principles-with-javascript>

T: Software Engineering Principles with Javascript

Q: We are always trying to improve on our ability to apply our skills to solve a problem. Software engineering principles have significantly helped my ability to write higher quality code. This includes testing, modularization, using OO where appropriate, etc.

Here's an example of how I achieved some modularization in my JS. Maybe it is a bad way to achieve this, but it serves as an example of what I mean and contains a few questions of its own.

Question:

In what ways do you apply [software engineering](#) principles to improve the readability, maintainability, and other quality attributes of your JS?

Other Related (more specific) Questions to help in answering:

I had once written a simple JS unit testing framework, which had simple asserts and a test helper method taking a lambda. What are your thoughts on unit testing javascript?

How important is defining the boundary between your code and framework?

JS is mostly used in a browser or in a website. Does this reduce/nullify certain concerns?

Do you suggest usage of Classes and OO principles?

Usage of undefined and/or null? Should it be forbidden?

Usage of try/catch? Suggested?

When do you go from JSON to classes? Do you use Util methods that operate on the data?

Usage of prototype? Suggested? What is a good case where you wouldn't use it?

544. <https://stackoverflow.com/questions/4435792/what-should-you-put-into-an-architecture-specification/4564216#4564216>

T: What should you put into an Architecture specification

Q: I'm currently revising a number of document templates for my company. One thing we've never had is a formal Architecture Specification, so I'm starting to put one together.

What sort of things do you put into your architecture specs? Feel free to copy and paste a table of contents - that would be helpful. Are there any good templates already available on the web?

A1: I agree with Asaph's sentiment; fortunately it's not impossible to produce useful / practical architectural documentation - just not common.

For me the key thing is to understand who the document is for: when would they use it? Why would they use it? Too many times it simply becomes a form-filling exercise for ticking boxes on some project plan.

I'm assuming you mean a software architecture document or solution architecture document - and not an enterprise strategy or something.

Remember too that there're two things a typical architecture document will do:

- Providing input into decisions to be made elsewhere: "this is our current thinking - would someone please decide whether to spend the big \$\$ for a DR site or not, etc".
- Recording decisions: particularly justifying your decisions.

In terms of both structure and key information to capture I'd recommend looking at different views of the system: logical, physical, data, security, and so on. A good starting point is the [4+1 model](#).

[Update:] One of the uses of such an **artefact** is Traceability - from requirements and design artefacts through to code artefacts; and while that might sound Waterfall orientated it actually applies (and works) for Agile based projects as well.

[Update:] Artefact **doesn't** mean "Word Document". The ToC example below is a supporting document / document based version of the system modelled in a UML modelling tool (SparxEA) which includes requirements as well. Sometimes you "have to" use a document, but I try to be as sparing as possible.

[Update:] The other good thing about a nice clearly laid out document is that it's easier for new blood to get some understanding of what they are inheriting - especially if previous staff are not available.

The Software Engineering Institute at Carnegie Mellon has a bunch of information, and on the page below there's a link to a template: <http://www.sei.cmu.edu/architecture/tools/viewsandbeyond/>

Beware that it's very comprehensive - not for the faint of heart (or lacking in time).

[Update:] Finally, here's an example Table of Contents from a recent project. Despite the many sections the document's not overly long (only about 35 pages, and a good portion of that is diagrams)

A2: In my personal opinion I consider the following topics to be useful when defining **Software Documentation**:

- **Introduction**(document objectives)
- **Context diagram**(application purpose)
- **Hardware Requirements**(memory and processor requirements)
- **Software Requirements**(operative systems, database server, frameworks, libraries)
- **Operation Model**(business operation, process sheets)
- **Physical Architecture Model**(physical disposition, servers, DMZ, firewall)
- **Application Architecture Model**(application layers, services, components, UML diagrams)
- **Database Model**(UML-PDM; tables, Sps, Views, triggers)

- **Security Model**(authentication, authorization, personification, hashing techniques)
- **GUI Model**(screens, use-case diagrams, generic controls)
- **Data Dictionary**(Excel format)

545. <https://stackoverflow.com/questions/45661006/what-is-the-difference-between-monolith-and-n-layer/45661246#45661246>

T: What is the difference between Monolith and n Layer?

Q: I have a few questions regarding **monolith** and **n layer architecture**.
First, what's the difference between Monolith and n Layer architecture?

Second, let's say I have a single Visual Studio solutions that consist of multiple projects such as:

7. Presentation Layer
8. Service Layer
9. Business Layer
10. Cross Layer
11. Data Layer
12. Unit Test

Is that considered as Monolith or n layer architecture?

If I have microservices that consist (let's say) 3 Web API and I build each service in single separate Visual Studio solutions, **it is ok** to implement my previous project structure (service layer, business layer, data layer, etc)?

A: Ok, so Monolith solutions are the old way of basically having ONE project in a single solution which has *all* the code in there.

So lets say you're doing a website.

This means you would create a single Solution with a single Project and all the database calls (persistence), logic (business logic/services) and finally figuring out how to display that calculated data (presentation) are all mixed in, in a chaotic way in that single project. Sometimes people have tried to split the concerns into folders, but usually it's a large mess. This makes support/maintenance of the application a nightmare. If you wish to make a single change to the website/application, *the entire application will go offline/restart*.

vs

n-tier / n-layered solutions/applications. This is where we have multiple projects (usually) in a solution which separates the concerns of our application into more bite-sized components. This enables us to keep the problem space to a single area making it way easier to maintain and support. This also enables easier **reuse** of your various components/projects/dll's into various *other* subsystems of your application. It's way better than the old monolith architecture pattern. But, if you wish to make a single change to the website/application, *the entire application will go offline/restart* still.

Finally, we have microservices. This is a more modern concept and continues on with the evolution of monolith -> n tier -> microservices. This is when we split up our application concerns into individual applications so that when one microservice needs to be updated, then *entire application* hasn't come to a stop. Sure, the *part* of the application that has a dependency on the microservice might stop/be affected, but it's possible that the *entire app* is not.

Lets use an example:

I have a website that sells Pets (cats/dogs/etc). I might split this website up into separate microservice mini websites:

- authentication

- administration/backend management (think: stuff only an admin can see)
- public website
- animal inventory
- shopping cart

So each of those are a single website, like the n-tiered architecture'd application. So it would have a presentation layer (the MVC website), some database project and some basic services.

Now each of the 4 microservices (mini websites) all do that.

Now, you need to update some stuff with your administration section of the website. You take that offline and the main website stays up. People can still browse and buy animals.

So yes, it's a nice thing to implement microservices *if your application is large enough that it has areas you might want to segment*. It does add some more complexity but it also brings about its own advantages. And yes, your microservices should follow the n-tiered pattern *if your application isn't some silly hello-world app or some Research Project*.

546. <https://stackoverflow.com/questions/44556411/what-are-the-advantages-of-mvvm-pattern-to-the-user>

T: What are the advantages of MVVM pattern to the user?

Q: I'm searching a lot about MVVM pattern.

The advantages that I found are about the developer/design, architecture, etc.

But what are the advantages to the user? (User interaction)

A: None. Users use the user interface, not the code.

547. <https://stackoverflow.com/questions/41574854/is-layered-architecture-useful-without-any-design-pattern-or-repository>

T: Is layered architecture useful without any design pattern like DI or Repository?

Q: I'm a little bit confused on this matter: is layered architecture useful without any design pattern like DI or Repository? I'm not talking about direct DI and Repository patterns; they are just examples. As per my knowledge, we use architecture mainly to remove dependencies across layers; but without using the above mentioned design pattern, we just code direct references to those layers. As an example if we have a Logic layer and Database layer with design pattern, we heavily couple each layer. Can anyone explain this?

A: Longer answer: Layered Architecture is almost always a design goal of a good developer, regardless of what project they are working on (assuming a project of sufficient size at least + good developer).

Layered Architecture at its most fundamental concept is just "division of labor" into "logical units"... which sounds a lot like 'methods'. Technically you can write an entire 10,000 line java program in a single class inside the main method... but obviously it is beneficial (regardless of what other design decisions you make) to subdivide your program into packages, classes, and methods based on grouping of similar code (I'm being VERY broad here). So multi-layered arch. is just another level of 'abstraction' to assist in dividing an application into different 'parts'.

Even without the use of DI, etc. Designing your application to use a set of interfaces to define interactions between different components will not only assist you in developing alternative implementations of different layers (which would then be easy to change via a few lines of code for testing before final integration/merging) but it also will help you mentally design your project better. This is more of an 'experience' thing, but having a good guideline like mutli-layers helps you more quickly make the decisions of what parts should be part of which layers, etc.

It can also help with dividing the workload and reducing the number of issues when you go to merge everyone's code. For example, in my undergraduate software engineering course we designed a 3 layered program and we used ui, logic, storage as our 3 layers and besides defining 3 segments of the code, we were then able to divide the workload among the group and finally combine our different parts with 0 hassle.

A2: Looking at your question, I assume that you are asking about 3-Tier Layered Architecture (Database | Business Logic | UI). I would first list your questions and thoughts, then emphasize the overall picture.

- (1) Is Layered architecture useful without any design pattern?
- (2) we use layered architecture mainly to remove dependencies across layers.
- (3) but without using the above mentioned design patterns, we just code direct references to those layers.
- (4) without any design pattern, we heavily couple each layer.

In above [(1) & (2)] and [(3) & (4)] are related with each other.

I'll first talk about (1) & (2). Simply, Layered Architecture makes up our application into 3 *isolated* layers. It addresses a *System-level* concern. Some advantage, we follow LA are

- Since we have separated out the UI layer and it's not mixed with lower levels, we can *reuse* same server (assume an API with Database + Business Logic) for different UI (web & mobile).
- If we develop stand-alone desktop app, we can *reuse* same (Business Logic + Database) and build a mobile app.

If I talk about (3) & (4), Design patterns are simply *problem-solution* pairs, which we often get involved with. So it describes an answer for a *general-problem*. In contrast with Layered-Architecture, Design Patterns addresses *class-level*.

One thing I notice in your description is you believe that not-using design patterns will lead to bad-code. Actually it is not. And conversely if we add a design pattern in a wrong way, we would end up with creating an anti-pattern and going to suffer high time. As I said it's an answer for a general problem, but your practical problem will be much specific one for your system. So how good you can tailor that general one into the specific will really matter. In simple terms, if you are good at utilizing basic OOP principles and good at keeping the things simple, you might not need a thing called design patterns at all. And you have used design patterns in your code would not necessarily claim that you have a solid code (This does *not* claim that design patterns are a bad concept). In fact there are some design patterns which are not very good in general. And there are very good ones too.

As a direct answer for your main question. Those 2 are not much interrelated. I agree that there is a little. But more over they are two different things which addresses different context. :))

A3: Layer architecture is software architecture where layers are (physically) separated. Examples: [multi layer](#), [network osi layers](#)

In Java you if all source code is in one project you can use package names for layering if you have multi project then layering can be defined on project level.

Dependency Injection pattern is a way to write a code with "programming against interfaces" principle, so there is no direct relation.

548. <https://stackoverflow.com/questions/710122/we-made-it-reliable-whats-next-usability/710172#710172>

T: We made it reliable. What's next? Usability

Q: I'm working in a small development group. We are building and improving our product.

Half a year ago we couldn't think about higher characteristics, such as usability, because we had so many problems with our product. Many bugs, high technical debt, low performance and other problems kept us from being able to focus on usability.

With time we've improved our process substantially. What we've done:

Real Agile iterations

Continuous integration

Testing(unit-tests, functional Smoke tests, performance)

Code quality is 'good'

Painless deployment process

So we are now producing stable, reliable releases. The following quote (paraphrased) describes our current situation:

first - make it work; after that, make it reliable; after that, make it usable

We are geeks, so we can't 'make' a great UI by ourselves. So what should we do? What direction can you recommend? Maybe we should hire Usability experts part-time or full-time? How can we explain the importance of Usability to our stakeholders? How do we convince them that this is useful?

A1: You ask, "How can we explain the importance of Usability to our stakeholders?" but I'm not sure that you yourselves get it!

Interaction design (iD) and usability aren't things that you can tack on to an existing products when the "important" things are done. They should be there from the very first start, preferably done in small iterations with small tests and studies. I'm talking about cheap and dirty iD/usability, stuff like lo-fi prototyping, user testing with just four people, having enough stats to be able to detect user errors and such.

If you don't do iD/usability from the start, you risk ending up with the same crappy product as your competitors and/or providing users with band aids when they need surgery.

A2: What do your Business people say will make you the most money? Do that. Maybe usability is the next thing to do, maybe more features, maybe a different product. It's not something a "geek" will necessarily be able to guess.

A3: I'm in the same boat as you are - I basically live on the command line, and I'm completely out of touch with the modern UI (both web and desktop application).

The solution for me was using a real UI developer for all my GUIs, and I just live in the back-end as it were.

There are quite a few benefits of this arrangement:

- You **don't have to debug your own crappy UIs** anymore :) that's their job, and they're better at it than you, so no worries.
- Your **code will naturally gravitate to a MVC** or at least tiered API approach, which is easier to code against for all parties involved.
- Good UI people **know what questions to ask end users**, and know when those users don't know what they're talking about. I certainly don't have that skill.
- You can **do what you do best**, and they do what they do best, making a stronger team overall.

The cons are obvious - you need to not only find the money for a talented UI dev, but you need to find a talented UI dev!

Now, I can't speak for you and your company's position in your market etc etc (I also don't do businesspeak :)) but if you can afford another hire, it will give back more to the team than the cost of the position. It did for me!

A4: What do your users want ? They're probably the people best placed to identify requirements.

A5: You are the ones who know and understand the product, so don't assume that just because someone else has 'usability expert' in their title that hiring them will somehow make your product usable.

Also, don't undercut your own instincts for usability. As a programmer, you use software all the time, what products do find the most usable? Think about what you like about them and compare them to your product.

Think about what your product does, and imagine that you are the person having to use the product and imagine how *you* would want it to work. Think of what a user wants to accomplish using your product, and imagine the steps they would have to go through to do it. Does it seem easy to understand what to do? Can it be done in fewer steps?

Most importantly, talk to your customers. Find out what they found confusing or difficult to accomplish. See if they have come up with their own workarounds for using your product in ways you didn't initially picture.

If you put as much thought, planning and effort into usability as you did into improving the reliability and deployment, you will end up with a much better product.

A6: When analyzing the next step it really all comes down to business requirements & goals.

What is upper management like? Are they tech-savvy? Are they open to new ideas? Do they think that the current product needs adjustment, improvement, etc? Is the product still in high demand? Is the marketplace changing such that the product/service will soon be obsolete? etc. etc. etc.

IF there are real business reasons for spending the \$/time/resources then you can begin to explore product improvements. At that point consider the opinions of previous posters regarding user opinion.

A7: I think the answer is in the order of things, you say its:

"first - make it work; after that, make it reliable; after that, make it usable"

But the most important thing here is "make it work". Acceptance criteria for a functionality to "work" is that it is in fact - usable. If not, it will not be executed. Then it's just a block of dead code. And dead code should not be in the system in the first place.

A8: I know so many geeks including myself who know usability, so one way would be learning it. Another way bringing someone in who can do UI design and usability.

To convince them that usability is important: **It's useless if you can't use it!**

I don't know what sort of product you build but you always got clients, and clients always love usable applications. This will increase sales, happy client count and decrease tech support.

A8: What does it do for your users? What do they think about the usability? Maybe it's not an issue for them.

Make it more valuable to your users. Deliver more business value. Help your customers get a better return on their investment. Do this by making it do more of what they need it to do, to do it better (more accurately, more quickly, more reliably, more usefully), or to do it at lower cost (less infrastructure needed to run it, reduced maintenance costs because of improved reliability), more flexibly (deals with their business changes)...

Lots of dimensions which do connect with the technical ones you refer to (usability, reliability, stability, etc.). But paying customers normally care about their business needs/features, not your technical ones that deliver them.

Go talk to your users (or potential users)

549. <https://stackoverflow.com/questions/29644916/microservice-authentication-strategy/48176393#48176393>

T: Microservice Authentication strategy

Q: I'm having a hard time choosing a decent/secure authentication strategy for a microservice architecture. The only SO post I found on the topic is this one: Single Sign-On in Microservice Architecture

My idea here is to have in each service (eg. authentication, messaging, notification, profile etc.) a unique reference to each user (quite logically then his user_id) and the possibility to get the current user's id if logged in.

From my researches, I see there are two possible strategies:

How do those two solutions compare in terms of:

security

robustness

scalability

ease of use

Or maybe you would suggest another solution I haven't mentioned in here?

I like the solution #1 better but haven't found much default implementation that would secure me in the fact that I'm going in the right direction.

I hope my question doesn't get closed. I don't really know where else to ask it.

Thanks in advance

A1: you can use [identity server 4](#) for authentication and authorisation purpose
you must use **Firewall Architecture** hence you have more control over **security , robustness ,scalability and ease of use**

A2: API gateway pattern should be used to implement this using OpenID Connect. User will be authenticated by IDP and will get the JWT token from authorization server. Now API gateway system can store this token in Redis database and set the cookie on the browser. API gateway will use the cookie to validate the user request and will send the token to the Microservices.

API Gateway acts as a single entry point for all types of clients apps like public java script client app, traditional web app, native mobile app and third party client apps in the Microservice architecture.

You can find more details about it on <http://proficientblog.com/microservices-security/>

550. <https://stackoverflow.com/questions/698220/mvc-vs-n-tier-architecture>

T: MVC vs n-tier architecture

Q: I was wondering what exactly is the difference between MVC(which is an architectural pattern) and an n-tier architecture for an application. I searched for it but couldn't find a simple explanation. May be I am a bit naive on MVC concepts, so if anyone can explain the difference then it would be great.

A1: N-tier architecture usually has each layer separated by the network. I.E. the presentation layer is on some web servers, then that talks to backend app servers over the network for business logic, then that talks to a database server, again over the network, and maybe the app server also calls out to some remote services (say Authorize.net for payment processing).

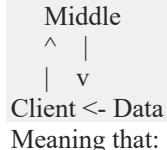
MVC is a programming design pattern where different portions of code are responsible for representing the Model, View, and controller in some application. These two things are related because, for instance the Model

layer may have an internal implementation that calls a database for storing and retrieving data. The controller may reside on the webserver, and remotely call appservers to retrieve data. MVC abstracts away the details of how the architecture of an app is implemented.

N-tier just refers to the physical structure of an implementation. These two are sometimes confused because an MVC design is often implemented using an N-tier architecture.

A2: If a 3-tier design were like this:

Client <-> Middle <-> Data
the MVC pattern would be:



Meaning that:

- in the 3-tier equivalent, communication between layers is *bi-directional* and *always passes through the Middle tier*
- in the MVC equivalent the communication is in *unidirectional*; we could say that *each "layer" is updated by the one at the left and, in turn, updates the one at the right* –where "left" and "right" are merely illustrative

A3: This is what  say about [n-tier architecture](#)

At first glance, the three tiers may seem similar to the MVC (Model View Controller) concept; however, topologically they are different. A fundamental rule in a three-tier architecture is the client tier never communicates directly with the data tier; in a three-tier model all communication must pass through the middleware tier. Conceptually the three-tier architecture is linear. However, the MVC architecture is triangular: the View sends updates to the Controller, the Controller updates the Model, and the View gets updated directly from the Model.

A4: The only similarity is that the two patterns have three boxes in their diagrams. Fundamentally they are completely different in their uses. In fact, it is not usually a choice between which pattern to use, but both patterns can be used together harmoniously. Here is a good comparison of the two: <http://allthingscs.blogspot.com/2011/03/mvc-vs-3-tier-pattern.html>

551.<https://stackoverflow.com/questions/47860158/how-to-design-a-maintainable-flutter-app>

T: How to design a maintainable Flutter app?

Q: I am required to build a Flutter app that is maintainable, and I am looking to use a design pattern or a particular architecture, which would help to make the app easy to test, and extend. I am aware that there is an example using MVP pattern At the moment, I am still unsure how to design the app to meet the above requirements, therefore I am looking for suggestions or your experience in building Flutter app.

A: I don't like redux with flutter. InheritedWidgets are already extremely powerful.

552.<https://stackoverflow.com/questions/6497277/specification-pattern-and-performance>

T: Specification Pattern and Performance

Q: I've been playing around w/ the specification pattern to handle and contain the business logic in our c#/mvc application. So far so good. I do have a question though - since we'll be creating a number of specification objects on the heap, will that affect performance in any way versus, say creating helper methods to handle the business logic? Thanks!

Q: Of course it will affect performance, every line of code you write and design choice you makes affects performance in one way or another. This one is unlikely to be meaningful, be a bottleneck in your application or be worth caring about as this is almost surely a case of premature optimization. These days you should just focus on modeling your domain properly, and writing extremely clear and maintainable code. Focus more on developer productivity than on machine productivity. CPU cycles are cheap, and in nearly limitless supply. Developer cycles are not cheap, and are not limitless in supply.

But only you can know if it will impact the real-world use of your application on real-world data by profiling. We don't, and can't know, because we don't know your domain, don't know your users, don't know what performance you expect, etc. And even if we knew those things, we still couldn't give you as powerful of an answer as you can give yourself by dusting a profiler off the shelf and seeing what your application actually does.

A1: Most design patterns trade off some overhead for cleanliness of design - this is no exception. In general, the amount of memory that the specifications add is very minimal (typically a couple of references, and that's it). In addition, they tend to add a couple of extra method calls vs. custom logic.

That being said, I would not try to prematurely optimize this. The overhead here is incredibly small, so I would highly doubt it would be noticeable in any real world application.

553. <https://stackoverflow.com/questions/16176990/proper-repository-pattern-design-in-php>

T: Proper Repository Pattern Design in PHP?

Q: Preface: I'm attempting to use the repository pattern in a MVC architecture with relational databases.

I've recently started learning TDD in PHP, and I'm realizing that my database is coupled much too closely with the rest of my application. I've read about repositories, and using an IoC container to "inject" it into my controllers. Very cool stuff. But now have some practical questions about repository design. Consider the follow example.

This leads me to believe that repository should only have a fixed number of methods (like save(), remove(), find(), findAll(), etc). But then how do I run specific lookups? I've heard of the Specification Pattern, but it seems to me that this only reduces an entire set of records (via IsSatisfiedBy()), which clearly has major performance issues if you're pulling from a database.

554. <https://stackoverflow.com/questions/17727607/which-pattern-to-choose-asp-net-mvc-4>

T: Which Pattern to choose ? Asp.net Mvc 4

Q: I'm really confused, I learned with the book "Apress pro Asp.net Mvc 4", that the best pattern for Mvc 4, is the Dependency Injection, (to put the Model data of the database etc... in another project (Domain) and then create interfaces and implementation to those interfaces, and then connect it to the controller with Ninja..

And all the connect to the db is only from the data-layer solution, the only model in the web solution in viewModel.

Some questions:

5. which patter is better for performance (fast website)?
6. is't good to use " public Db db = new Db();" in the controller, instead of use it only in the domain layer (solution)??
7. What is the advantages of using Dependency Injection? is't bad to use my pattern?
8. What is the advantages of split the project into 2 solutions for the Data Layer?

A: which patter is better for performance (fast website)?

Impossible to answer. You could have non-performant code in either of these approaches. Don't try to prematurely optimize for performance, optimize for clean and supportable code and address performance bottlenecks that are actually observed in real scenarios.

is't good to use " public Db db = new Db();" in the controller, instead of use it only in the domain layer (solution)
It's a question of separating concerns and isolating dependencies. If your controller internally instantiates a connection to a database then that controller can *only ever* be used in the context of that database. This will make unit testing the controller very difficult. It also means that replacing the database means modifying the controller, which shouldn't need to be modified in that case.

Dependency injection frameworks are simply a way of addressing the [Dependency Inversion Principle](#). The idea is that if Object A (the controller) needs an instance of Object B (the database object) then it should require that the instance be supplied to it, rather than internally instantiate it. The immediate benefit here is that Object B can just be an interface or abstract class which could have many different implementations. Object A shouldn't care which implementation is given to it, as long as it satisfies the same observable behavior.

By inverting the dependency (whether or not you use a dependency injection framework), you remove the dependency on the database from the controller. The controller just handles client-initiated requests. Something else handles the database dependency. This makes these two separate objects more portable and re-usable.

What is the advantages of using Dependency Injection? is't bad to use my pattern?

See above. Dependency injection is a way to achieve inversion of dependencies, which is the core goal in this case. Note that there are a few different ways to achieve this. Some frameworks prefer constructor injection, some support property/setter injection, etc. Personally I tend to go with the service locator pattern, which has the added benefit of being able to abstract the dependency of the dependency injector itself.

It's only "bad" to use your approach if you run into any problems when using it. There are good patterns to address various concerns, but if your project doesn't legitimately *have* those concerns then using those patterns would be over-engineering and would actually hurt the supportability of the code. So, as with anything, "it depends."

What is the advantages of split the project into 2 solutions for the Data Layer?

Two solutions? Or two *projects* in the same *solution*? (Resulting in two assemblies.) The advantage is that you can re-use one without having a dependency on the other. For example, in some of the code you posted there is an allusion to the repository pattern. If you have an assembly which serves only the purpose of implementing repositories to the back-end data then any application can use those repositories. If instead it's all implemented in the MVC application directly then no other application can use it, it's tightly coupled to the MVC application. If you will never need to re-use that functionality, then this isn't the end of the world. If you would like to re-use that functionality, separating it into a portable assembly which internally isolates its dependencies would allow for that.

555. <https://stackoverflow.com/questions/5013255/which-design-patterns-improve-performance>

T: Which design patterns improve performance

Q: Always the first thing i hear when we talk about design pattern is like a documented solution to common architectural issues.

I am curious to know which design patterns are good solutions to improve performance of an application in general.

A1: Flyweight reduces memory consumption.

The Proxy pattern can be used for speed optimization.

The Bridge pattern can change the implementation of an abstraction on the fly - always picking the most efficient one.

A2: On a more serious note, design patterns will probably reduce performance. From my experience, the usage of design patterns gives cleaner, more maintainable code. Should you need to optimize anything, you would probably need to de-design pattern the code.

Often performance of code is dependent on a relatively small piece (a data structure, a function, or even a single loop), so it doesn't go into the scope of design patterns any way. Changing a straight forward function in C to a super optimized version in assembly probably won't change the way the entire class behaves.

A3: Probably the "don't-do-stupid-things" pattern. If followed to the tee, you'll find it beats:

- Factory
- Singleton
- MVC
- Aspect Oriented Programming
- Extreme Programming and Extreme Programmers (mercilessly)
- DotNetNuke (twice)
- Drupal (once)

556. <https://stackoverflow.com/questions/5212568/scalability-and-performance-in-java-web-applications>

T: scalability and performance in java web applications

Q: Let's say you want to build a web application with high scalability (over 10,000 simultaneous users). How do you guarantee good and steady performance? What design patterns are recommendable? What are most frequent mistakes?

Are there frameworks that force yourself to write scalable code? Would you maybe consider php as frontend and Java as backend technology? Or is let's say JSF reasonable as well and it's all about your architecture? And how good is developing with Grails in that context?

Hope this thread is not too subjective but I like to gather some experiences of you :-)

A1: If you want to build a highly scalable application then it should be stateless and use shared nothing architecture as much as possible. If you share nothing between nodes and a node don't have a state then synchronization is minimum. There are several good web frameworks suitable for your requirements (Play Framework and Lift for Java, Django for Python, Ruby on Rails for Ruby).

As for JSF and related technologies, I don't think it would be wise to use them in your case. A good old request-response is better.

A2: If you want your application to scale nicely and perform well then you need to have a Distributed Cache. Distributed cache can incredibly boost up application performance and for this purpose you can use any third party distributed cache like NCache.

A3: With so many simultaneous users (a situation I confess I've never encountered myself), what I think is the most important is to be able to load-balance your traffic across many web servers.

If you want failover (which is probably a must-have), this means that you must be very careful about state : the more state you have, the more memory you need, and the more difficult it is to handle failover between servers : either you need to persist the session state in a location that is common to all the servers, or you need to replicate the state across servers.

So, I would choose an architecture where you don't need too much state on the server. IMHO, an action based framework is more suited to this kind of architecture than a component-based one, unless the state is handled at client side, with rich JavaScript components.

557. <https://stackoverflow.com/questions/6544026/what-are-possible-architecture-options-for-large-scale-web-applications/6549469#6549469>

T: What are possible architecture options for large scale web applications?

Q: I am assigned a task to develop a large scale social web application like Facebook, twitter etc, using ASP.net with C#

Before this my development was based on three tier architecture (i.e Presentation Layer, business logic layer, and data access layer) but for this project i am confused because its my first large scale project :(

I just want to know what are other possible architectural choices i have?

I know its difficult to answer such question, but i only want to have good resource, then i study each possible option and finally, choose one that suits my requirement. I did a little RnD over internet but didn't succeed much.

A1: You should check out Windows Azure. it offers hosting, 3 types of scalable (but not relational) storage in the form of Blobs (or files / images / raw), Queues (for distributed communication) and Table Storage (to maintain 'entity' data in a non-relational manner).

There is also SQL Azure for relational storage and AppFabric for hybrid (on-prem/cloud) application addressability and Access Control for Claims-based Identity Management.

It has built-in diagnostics and if you know C#/ASP.NET/ASP.NET MVC no new skills are needed to take advantage of this platform. It also works with Java and PHP.

A2: As far as architecture goes, you can still maintain your 3 tiers. What you want to be able to do is easily scale your database reads and ideally have a caching layer in place like memcached or membase. Facebook, YouTube, and basically every other high traffic application use these caches.

After that, it's optimizing the page load and delivery time - which is a broad task, but also much easier than trying to figure out how to modify a table with 100 million records.

A3: I would choose Service Oriented Architecture. All business logic and DAL on good server to perform all time and resource consuming operations, logic. There is all architecture patters elaborated for us by best practices and patterns Microsoft Team. Read about Web Service Software Factory and choose it to perform BLL and DAL, and simply call services from server on which is hosted web site. On another server you should put presentation layer - pages.

This will give up following benefits:

1. Best practices and architecture
2. If you are developing with someone else, you can easily split the work.
3. Performance, all work is done on server.

These are major perspectives, which are more than enough.

A4: I think for designing large web architecture not only performance, you have to look broadly, both the resource, the data architecture, easy to refactor and can view different handling service (multi-layer), see my blog post about large web architecture with javascript.

558. <https://stackoverflow.com/questions/7621832/architecture-more-suitable-for-web-apps-than-mvc/7622038#7622038>

T: Architecture more suitable for web apps than MVC?

Q: I've been learning Zend and its MVC application structure for my new job, and found that working with it just bothered me for reasons I couldn't quite put my finger on. Then during the course of my studies I came

across articles such as MVC: No Silver Bullet and this podcast on the topic of MVC and web applications. The guy in the podcast made a very good case against MVC as a web application architecture and nailed a lot of what was bugging me on the head.

However, the question remains, if MVC isn't really a good fit for web applications, what is?

A1: It all depends on your coding style. Here's the secret: It is impossible to write classical MVC in PHP.

Any framework which claims you can is lying to you. The reality is that frameworks themselves cannot even implement MVC -- your code can. But that's not as good a marketing pitch, I guess.

To implement a classical MVC it would require for you to have persistent Models to begin with. Additionally, Model should inform View about the changes (observer pattern), which too is impossible in your vanilla PHP page (you can do something close to classical MVC, if you use sockets, but that's impractical for real website).

In web development you actually have 4 other MVC-inspired solutions:

Model2 MVC: View is requesting data from the Model and then deciding how to render it and which templates to use. Controller is responsible for changing the state of both View and Model.

MVVM: Controller is swapped out for a ViewModel, which is responsible for the translation between View's expectations and Model's logic. View requests data from controller, which translates the request so that Model can understand it.

Most often you would use this when you have no control over either views or the model layer.

MVP (what php frameworks call "MVC"): Presenter requests information from Model, collects it, modifies it, and passes it to the passive View.

To explore this pattern, I would recommend for you begin with this publication. It will explain it in detail.

HMVC (or PAC): differs from Model2 with ability of a controller to execute sub-controllers. Each with own triad of M, V and C. You gain modularity and maintainability, but pay with some hit in performance.

Anyway. The bottom line is: you haven't really used MVC.

But if you are sick of all the MVC-like structures, you can look into:

event driven architectures

n-Tier architecture

And then there is always the DCI paradigm, but it has some issues when applied to PHP (you cannot cast to a class in PHP .. not without ugly hacks).

A2: From my experience, the benefits you get from an MVC architecture far outweighs its costs and apparent overhead when developing for the web.

For someone starting out with a complex MVC framework, it can be a little daunting to make the extra effort of separating the three layers, and getting a good feel as to what belongs where (some things are obvious, others can be quite border-line and tend to be good topics of discussion). I think this cost pays for itself in the long run, especially if you're expecting your application to grow or to be maintained over a reasonable period of time.

I've had situations where the cost of creating a new API to allow other clients to connect to an existing web application was extremely low, due to good separation of the layers: the business logic wasn't at all connected to the presentation, so it was cake.

In the current MVC framework eco-system I believe your mileage may vary greatly, since the principles are common, but there are a lot of differences between, for instance, Zend, Django, RoR and SpringMVC.

If there are truly other good alternatives to this paradigm out there... I'm quite interested in the answers!

Sorry for the slight wall of text!

A3: I think it would depend on what you're trying to do, personally. Magenta uses MVC pretty successfully, and it makes it fairly easy to add new functionality or modify existing.

Of course if you're trying to make something fairly simple, going with an MVC architecture could be overkill.

559. <https://stackoverflow.com/questions/536744/what-are-the-advantages-and-disadvantages-of-using-the-front-controller-pattern/4369671#4369671>

T: What are the advantages and disadvantages of using

Q: I currently design all of my websites with a file for each page, then include common elements like the header, footer and so on. However, I've noticed that many frameworks and CMSs use the Front Controller pattern.

What are the advantages and disadvantages of using a Front Controller? Is the pattern simply used in frameworks and CMSs because it's not known which pages will exist in the final system?

A1: These are the reasons why I would never use a front controller.

- We have a perfectly good front controller it's called a web browser.
- Each http request is unique and separate and should be treated as such.
- It is not possible to scale an application using a front controller.
- If you break a web application into small modules that are loosely coupled it's easier to test the unit/module (you're not testing the architecture as well as the controller for example).
- Performance is better if you deal with a single request uniquely.

The front controller pattern simply doesn't fit IMHO. Build applications much the same way as UNIX, break a larger problem into small units that do one task, and do that task really well. Most of the frameworks are pushing developers to use front controllers and they are simply wrong.

T2: Rephrasing the [Wikipedia article on Front Controller](#):

In a sentence -- **you use it to avoid duplication**.

A little more detailed:

Front controller "provides a centralized entry point for handling requests." Let's assume the front controller for your web-app is index.php.

This script, index.php, would handle all tasks that are common to the whole application or the framework around, like **session handling, caching, input filtering**. Depending on the given input it would then instantiate further objects and call methods to handle the particular task.

The alternative to a front controller would be individual scripts like login.php and order.php that would each include the code or objects that are common to all tasks. This would need a repetition of the inclusion code in each script but might also leave more room for specific needs of a script.

A2: One advantage of using a Front Controller is its testability. If you use TDD it is a lot easier to test a controller than it is to request a lot of different websites.

Added later: Tom: The reason I mean it is more testable is because you normally implement the webhandlers as class rather than server pages. and then you can do a lot of testing directly on the classes.

560. <https://stackoverflow.com/questions/11542960/main-difference-between-3-tier-n-tier-architecture-in-.net/37505622#37505622>

T: Main Difference Between 3-tier & n-tier Architecture in .NET?

Q: I have searched Google to find the main difference between 3-tier and n-tier architecture in .NET but I have failed to find it out. Several sites said both are the same in nature and some of the sites said there are differences between them.

I want to know the major differences, and which one is better in performance optimization?

A: An N-Tier application is an application where you have 3 or more physical tiers. I mean with that things like, "Presentation/Client Tier", "Application/Business Server Tier" and "Data Tier" (a database server in most of the cases) and nowadays we use web services (or even better, WCF Services) to communicate between presentation tier and the application server tier. Here you see a simple & typical picture about N-Tier architecture:

A different matter is that we'd probably design our application as an N-Layer application, I mean, with several logic layers where we implement different logic tasks. For example we could have the DAL layer (Data Access Layer), BLL Layer (Business Logic Layer), BLU Layer (Business Logic Unit Layer), WCF Service Layer and several Presentation layers depending on the pattern we use, like MVC (Model-View-Controller), MVP (Model-View-Presenter), etc.. Also, within the N-Layer architecture, you can guess that Entity Framework fits as the DAL Layer (Data Access Classes) as well as using EF entities as our disconnected entities to pass through all the layers, all right?

BTW, not all N-Layer apps should be N-Tier apps, but all N-Tier Apps must internally be designed as N-Layer. I mean, there are many cases where the less you physically split your model, the better for performance (more tiers is good for scalability but not for pure performance, due to latencies). Remember, N-Layer is about logic layers.

OK!, so if we get back to the N-Tier architecture (physical tiers), like I said, we need remote mechanisms to communicate the client tier with the application server tier (for instance, WCF Services) and therefore when we query the database from the app server tier, to obtain data (like an Order), we keep it as an EF entity, then we disconnect it from the EF context (detach), WCF serializes it and sends that disconnected entity to the presentation tier (client apps & machines).

561. <https://stackoverflow.com/questions/1263886/making-decisions-about-the-architecture-of-your-project-what-is-your-decision-p/1264203#1264203>

T: Making decisions about the architecture of your project; what is your decision process like?

Q: Many of us, who have designed and developed systems from scratch, have been in situations where you had to make tough decisions about the architecture of a project. Where did you, or would you, draw the line on taking the "next step" in building an architecturally sound, and scalable system?

I've built a large scale web site that was rather collapsed in terms of architecture. There was a web layer with the front-end code, then business and data layers that handled the real work to be done. The various layers of logical separation co-existed on the same physical machine. A physical, or even simply logical, separation could have existed through the use of a web services layer/tier. For various reasons, it wasn't implemented that way. Whether the decision was right or wrong is simply a matter of opinion. I've been in other situations where a relatively simplistic application was over engineered, from my point of view.

What are some of the factors you consider while designing the architecture for a new project? Do you have a consistent project design you often use, are you n-tier from the start, or do you evaluate as each project comes in?

Having these experiences repeatedly, I often wonder how others in the same position justify and make these considerations. I'm sure we all will have varying opinions, but I believe understanding the thought process behind the opinions will be enlightening.

A1: The correct architecture for a given problem depends entirely on the problem. Your question is too general to offer a real answer, other than to say I keep the architecture as simple as I can to account for all known and expected requirements, but no simpler.

EDIT:

For "typical" business solutions, here are some of the factors that I consider:

- UI
 - Can it be web-based? What are the user interaction requirements?
 - If a classic web interface is not sufficient, can I use a more interactive technology such as Silverlight?
 - If it has to be thick-client (yes, there are still scenarios that justify that), how serious are the deployment challenges? Small user base, large user base? Do I need to include automatic updating? Does it need to be enforced?
- Business Layer
 - Do I have performance/scalability considerations that require a physically separate business layer? (My business layers are always logically separate, and easy to physically separate if need be. I sometimes use [CSLA](#) to allow for that decision at deployment time when targeting Windows, but that's a heavy framework and not always appropriate).
 - How simple or complex are my business rules? Are they likely to evolve considerably over time? Is it worth incorporating a rules engine such as [Drools](#)?
 - Are there asynchronous processing requirements? Do I need a work queue system?
 - Are there external systems to interface with? What types of interfaces are they present? Web service, COM+, XML over HTTP, proprietary, DB, batch files, ...?
- Data Persistence
 - What ORM choices are available to me given any pre-existing platform choices/constraints?
 - Will I benefit from extensive use of stored procedures? Will there be a DBA to maintain stored procedures and modify them over time? If no DBA, I only use stored procedures where really necessary for performance. If there is a DBA, more extensive use of stored procedures gives the DBA flexibility to manage the physical architecture independent of the application (but as with all added complexity, that comes with a cost).
- Cross-Cutting
 - What are the security requirements? Is there an existing mechanism (Active Directory/LDAP/...) to be integrated with? Do I need to support role-based security?
 - What are the operational monitoring requirements? "Report this bug" functionality? Simple logging?

A2: Well, let me be the one to tell you - simply do it. Concentrate on whatever requirements you have now but do not try to address all possible future features, imaginary requirement changes and the various courses of development.

There is a great article written by Joel: [Don't Let Architecture Astronauts Scare You](#).

Analyze whatever requirements you have, whatever features your software needs, look at your previous experience with similar projects and go for it.

A great architecture is never born right out of the first brain storming session. You start with one approach, adjust your course as the weather changes, have code review sessions that will yield ideas to improve the architecture, refactor some bad code pieces into good and reusable components, then finally your garage will be transforming into a castle.

Follow the [KISS principle](#) and avoid premature optimization.

Do you have a consistent project design you often use?

Of course. An individual or a team develops his own style, the techniques to solve typical problems, reusable components which altogether will form your tool set. Why would you throw them away each time you start a new project?

are you n-tier from the start?

I try to be. It serves the goals of consistency, clean structure and the separation of concerns.

or do you evaluate as each project comes in

That as well. There may be a different way to address the problem and solve it in the most efficient manner.

A3: My observation is that really good architects take the time to understand deeply the known requirements and use considerable judgement in understanding where future flexibility is provided for.

They also understand the difference between logical and physical separation of tiers.

All too often I see one of two patterns:

- This worked on the last project so we use it here ... even though the requirements are different.
- That didn't work before so we won't use it ... even though the reason it didn't work was that the implementation was done badly

(If the only architecture problems you need address are how many tiers to have in your solution then you are indeed lucky :-)

A4: Where did you, or would you, draw the line on taking the "next step" in building an architecturally sound, and scalable system?

I don't understand this part of the question.

What are some of the factors you consider while designing the architecture for a new project? Do you have a consistent project design you often use, are you n-tier from the start, or do you evaluate as each project comes in?

I've been fortunate enough to do almost all of my work in small teams, and unfortunate enough to do almost all of it on teams with high turnover. I've learned **never to try to architect a system all by myself**; results are better with a team effort. Sometimes we've done rapid prototyping, but if the team is good I've found that you can get surprisingly far with a whiteboard, index cards, and a paper design.

We definitely do *not* have a consistent project design; each architecture is potentially one-off for the project—but I've worked almost exclusively in research and advanced development.

Factors considered:

7. Does the team think the architecture will get the job done? Trumps all other considerations.
8. Can the architecture be easily learned by junior team members or newcomers? Other groups will steal your best people, they will leave to start companies. In one case we had a group that was just too busy servicing field requests to learn a new architecture, even though the architecture they had was holding them back.
9. Does the structure of the architecture reflect the structure of the organization that needs to create it? :-) Somewhat tongue in cheek, but we need to believe we can build it with the people and the time we have, not the perfect development team. So being able to identify pieces of the architecture that match with individuals is a good thing.
10. Are there parts we don't understand—or worse, are there parts we're afraid of? If so, major red flags.
11. Is it beautiful? Is it something we'd be proud to talk about at lunch with people from other teams? If not, the design/architecture probably isn't good enough yet.
12. Is there an identifiable new idea? Something that others can learn from? (This is important in a research environment, but I suspect not important elsewhere.)

A5: I find that it's generally very bad practice to assume performance bottlenecks up front. You can spend a lot of up front optimizing that makes no noticeable difference at the end.

We have some great refactoring tools these days and a lot of resources on development patterns. Because the tools have gotten so much better I do not spend nearly as much time as I used to in the architecture function. Very roughly my process is like this:

7. Gather Requirements
8. Prioritize requirements (don't spend a lot of time on gold plating features)
9. I generally start with 2 tier (UI / Data&Business logic) unless I know that the Data & Business logic tiers will be separated up front.
10. For each requirement, first make it work. No patterns here unless it's painfully obvious that it is needed. I find that the need for patterns emerges in the implementation.
11. After it works, clean up the code, identify places for patterns and implement them *only if you need to*
12. If performance is a requirement, do performance testing, refactor as necessary.

If you work in this manner, you'll find that you err on the side of simplicity. Patterns, 3rd party tools, etc can be totally awesome at solving specific problems, but I like to keep in mind that every time I add something like that, it raises the bar of understanding required to maintain the application later. So I start simple, and add complexity only when it specifically gains me something.

I actually get a pretty bad taste in my mouth when dealing with other architects who even for a small, simple application will reach for a Dependency Injection framework, NHibernate, NUnit, roll their own logging library, write 3x as many unit tests as they have lines of code, etc. All of these tools have specific instances where the ROI (Return on Investment, "bang for your buck") is very good, and other cases where it isn't. A good architect provides as much value as they can at the lowest time/cost possible.

A6: I initially consider the complexity of the domain. If complex and in business, commerce or industry, rather than computer or data sciences, I default to an architecture based on an object domain model.

I next consider size, criticality, expectations and other non-functional requirements.

562. <https://stackoverflow.com/questions/8930721/how-to-best-represent-database-views-summary-info-in-3-tiered-application/8931847#8931847>

T: How to best represent database views/summary info in “3-Tiered” application

Q: This is basically asking the same question as in [How to handle views in a multilayer-application](#). However, that post didn't receive much feedback.

Here's the problem: we have built a 3-tiered web application with the following tiers:

- Data Access (using repositories)
- Service
- UI (MVC 3)

DTO's are passed between the UI (Controller) Layer and Service Layer. Heavier Domain Models, containing a lot of domain-level logic, are passed between the Service and Data Access Layers. Everything is decoupled using IOC and the app follows SOLID principals (or tries too) --a big happy decoupled family!

Currently the DTO->Domain Model and Domain Model->DTO conversion happens all in the service layer.

So, finally to my question:

We are going to need to start displaying more complex read-only subsets of information, (i.e. summary views joining multiple entities doing rollup totals, etc). So what is the best practice for representing this type of read-only data in the n-tiered system? Having to map read-only Domain Model types to DTO types in this case doesn't make sense to me. In most cases, there would be no difference between the 2 types anyway. My thought would be to "break" the layering boundaries for these read-only types, having the Data Access Layer serve up the DTO's directly and pass those through to the Service Layer and on to the UI.

Can anyone point me in the right direction?

A1: Your thought on breaking the layering for reading and then displaying values make sense completely. After all, the architecture/design of the system should help you and not the other way around.

Displaying report-like data to the user should be queried simply from the database and pushed to the view; no domain/dto conversion, especially if you're in a web app. You will save yourself a lot of trouble by doing this. Personally, I had some attempts to go through these mappings just to display some read only data and it worked poorly; the performance, the unnecessary mappings, the odd things I had to do just to display some kind of report-like views. In this case, you'll likely have your domain model and a read model. You can look up CQRS pattern, it might guide you away from thinking that you want to use the same data model for both writes and reads.

So, to answer your question, I believe that in this case the best way would be to skip layering and read DTOs directly from the database through a thin layer.

563. <https://stackoverflow.com/questions/15138222/which-architecture-is-more-scalable/15144907#15144907>

T: which architecture is more scalable

Q: I'm developing an application for *Windows azure cloud service*.

The general description for the application is quite simple: a front end on MVC 4, a middle tier for processing front-end processing requests and a SQL Azure/Blob backend...

I did not start to write code so far, and before that I would like to get some feedback on the which of the following scenario would models be more scalable and possibly why. If you think that there's a N'th option that I did not consider please expose it!

Just to be clear single tier app is out of question.

Scenario 1:

Front-End consumes a WCF service on middle tier that does all the processing.

Scenario 2:

Front-End consumes a WCF service on middle tier that queues up that request on a SB and waits. "Tier 3" consumes the message and processes it, also queueing the answer for WCF Service to respond...

Scenario 3:

Front-End queues a message and loops waiting for response message. "Tier 3" consumes the message, processes it and re-queues it for Front-End to stop waiting...

Basically all the questions reduce to "How well WCF scales-out horizontally?"...

A1: The most scalable solution is the one that you ruled out — a single tier web app with no shared state that can have as many nodes as you like. There is nothing more *scalable* than n web servers behind a load balancer and m distributed database nodes. Since you've ruled out the most scalable architecture, you are asking the wrong question, because you are probably not after scalability. Perhaps you are looking at some other architectural principle such as availability.

Why do we separate out functionality across multiple services? There are many reasons. Asynchronous processing allows better availability (by writing to a queue and not being concerned about failures). It also allows us to manage bottlenecks, such as the database. We also break our application up into services in order to ease development, deployment. So it may be availability, maintainability, security, performance, deployability, cost, usability, testability, compliance, or something else that you are looking for. You kinda need to answer that question for yourself before grabbing the scalability hammer. I wrote [CALM](#) specifically to help ask, and answer, these difficult questions.

Back to the specifics of your question. The *de facto* asynchronous processing pattern that is generally scalable (if that is what you really need) on Windows Azure does not have WCF in it. Is there a specific reason for WCF? It had better be a good one, because WCF and Service Bus, if not needed, introduces unnecessary complexity. On Windows Azure we implement asynchronous processing with Web Roles (that host the MVC app), that place messages on Windows Azure Queues, these are processed by worker roles. If you need the client (browser) to know about the result, you can hand roll a CQRS pattern, or use SignalR, as other people have mentioned. I would seriously look at taking out WCF.

In terms of your scenarios:

Scenario 0: Stateless web servers do all processing and communicate directly with distributed database node. This is the most scalable, but has other disadvantages.

Scenario 4: Front end places message on Azure queue and returns result to client. Worker role processes message and puts result *somewhere* (table storage or blob). Browser Javascript polls for result data and presents it to client when 'done'. This is CQRS-ish. (dunnry's answer)

Scenario 5: Front end places message on Azure queue and returns result to client. Worker role processes message and sends result to client via SignalR. (jgauffin's answer)

I would prefer Scenario 5

A2: Messaging is always the most scalable solution since you can configure any number of workers to consume the messages and process them.

The switch to asynchronous handling is however not trivial if you still want the UI to act synchronously. You typically switch to task based UI where there is no immediate feedback to the users (or faked feedback).

I've blogged about how you can use queries, domain events and commands to scale out: <http://blog.gauffin.org/2012/10/writing-decoupled-and-scalable-applications-2/>

A3: You didn't say what the front-end requirements are. Is this a website that expects a response with data? Typically, a message queuing pattern will be more scalable (but not faster) as you then have many options to process the requests. However, once you go that path, it is harder to get direct synchronous-like feedback to the user without a few tricks (SignalR might be a choice here).

For what it is worth, I tend to use the CQRS pattern in the cloud as it scales well for what I need. I have to deal with the fact that the command is processed async and the user does not get a synchronous response. The UI has to deal with it then. We use a command processing table with status. The web (our client in this case) has to poll that table to figure out when a command has been completed in order to know when to try and display any results to the client. For us, this is a worthy trade-off to get the scale we are looking for (and other benefits of CQRS).

564. <https://stackoverflow.com/questions/10560407/architectural-analysis-help-for-new-project>

T: Architectural analysis help for new project

Q: I could really use some help with my class model above. I'm ashamed to say that I have been one of "those" developers that learned object orientation at university, wrote the exams, aced them but then never set about implementing the principles in my real world code. I never truly sat down and considered my application design before beginning the codification of it. Thus my design and coding skills have been slowly dying and stagnating under the weight of monolithic legacy banking application development and maintenance. After years of this I've decided that it's definitely time for a change! I've been delving deep into the world of design patterns, DDD, NoSQL, DI, etc etc. The last 2 weeks have been a really intense experience for me, and at times I think I was nearly brought to tears at the sheer volume of best practices and tech that I had missed while working for large corporations and banks. I simply couldn't believe how far removed I had been from cutting edge tech and good design approaches for so long, and the sudden swathe of everything threatened to send me into a state of coding paralysis! I simply could not start coding, as I felt my design needed more tweaking, or I needed more studying on a particular topic. Enough is enough though, and I need to crack on and at least make a first iteration on the project.

Anyway, enough of the drama, on to my issue:

I have begun work on the model creation for my golfing app. Wanting to adhere somewhat to DDD and also wanting to make use of NoSQL (RavenDB), I set about with the following requirements.

- My platform stack is Windows / IIS / MVC 3.0 / RavenDB
- I need to find my aggregate roots! I have set about defining them as the only elements in my system that are capable of persisting in their own right. Everything else I've simply deemed a "sub-component" of the aggregates. Note that no real behaviour has yet been defined.
- My aggregate roots will be the only classes to actually persist in my RavenDB doc store, and they will persist "as-is". Having large tree-like class structures would appear to be a best case scenario for RavenDB in terms of performance benefits realised.

- I don't feel the need for a repository layer (been following some of Ayende's posts), as the RavenDB API feels fluent and quite lightweight. I'll be simply opening and closing my sessions via Custom Action Attributes on my controllers where required. I've seen that without the repository layer testing might be tricky, but surely I should be able to simply mock some "in-memory" domain objects?
- Writes to the DB will happen in a separate service layer
- At one point I stopped and asked myself: "Where on earth am I going to put my domain behaviour!?". The general consensus from searching the web would seem to indicate I should leave my domain (entities) void of any behaviour (business logic) and have it all handled in my service layer. But after reading some Eric Evans, I'm convinced that as much of my domain behaviour should exist right there... in the domain!

Questions - As a bona fide noob in the area of DDD and architectural design, am I at least on the right track, or am I destined for destruction? - Any thoughts, admonishments, constructive criticism and insights into the above would be greatly appreciated!

A1: To counter being overly academic about it all and be stuck in analysis too long: First make it work. Then make it pretty.

Put behavior near data as much as possible. Use services where you can't cleanly assign a responsibility to a class (e.g. should a 'transfer money' method be on an SavingsAccount class?). Services can be part of an aggregate.

Do use repositories (I don't agree with Ayende). You mention using a separate service layer for DB writes. Repository is a perfect interface to put that layer behind. It's also a perfect testing seam.

Didn't look at your class diagram thoroughly, but you may be overusing inheritance here and there. Favor composition over inheritance. Inheritance can rear its ugly head quite quickly.

When choosing aggregate roots, an important criteria is life cycle. When the aggregate root dies, everything else in the aggregate dies also. The aggregate root is also in control, everything outside the aggregate passes through it. When in doubt just create a lot of them (single entity aggregate). With a document database you would typically store a document per aggregate, so that does matches somewhat with how you choose them. Store IDs of references to different aggregates

A2: So yeah, going down the rabbit hole will not increase your productivity in short term, but may help you mature as a developer in long term. There is so much to DDD, NoSQL, etc that you could spend years just learning.

If you want your next project to be successful, my advice would be to stick to what you know, and introduce new techniques gradually so that you can always feel in full control, and not depend on "best practices" someone has to put up for you.

A3: Firstly, may I congratulate you on deciding to take the steps to try and become more professional. I despair at the lack of profession in this industry and sometimes feel like I'm walking amongst 80% cowboys/hackers 20% professionals.

To your question:

- Have you read [this article](#) by Vaughn Veron? If not, you should. It provides an excellent guide to designing aggregates, which I think is underrated in its complexity.
- Looking at your model, I'm not sure if you actually have defined aggregates? I can see you have identified aggregate roots, but the aggregates should have clear boundaries and be separate from other aggregates (i.e. don't have entities referencing other aggregate roots, let them reference their ID). The property name *RefereeUserIDList* hints that you are in fact doing this, but the diagram shows it holding reference to the actual 'User' aggregate root?
- In terms of identifying aggregates & roots & the model design, I don't really think we can help you here as this is entirely circumstantial to the behavioural requirements. I will say though: try to base your design on *behaviour*, not data structure. It's a difficult mindset to shift to, but try not picturing the database structure.

- I haven't read what Ayende has said about repositories, but as long as you can mock the Raven API (which I assume you can given he made Rhino mocks) then it shouldn't be a problem.
- Possibly most importantly, **do not put all your domain logic into the service layer**. You'll end up with an [Anemic domain model](#), which is the DDD equivalent to the anti-christ.
- Personally when learning DDD I understood all of the principals but struggled when attempting to turn theory into practice. If I'm honest I'd say I've only really been successful with it since I understood the principals [CQRS](#) which compliments DDD. I'd really recommend watching some videos on the subject by [Greg Young](#).

565. <https://stackoverflow.com/questions/2632126/architecture-with-nhibernate-and-repositories/2640584#2640584>

T: Architecture with NHibernate and Repositories

Q: I've been reading up on MVC 2 and the recommended patterns, so far I've come to the conclusion (amongst much hair pulling and total confusion) that:

- **Model** - Is just a basic data container
- **Repository** - Provides data access
- **Service** - Provides business logic and acts as an API to the Controller

The Controller talks to the Service, the Service talks to the Repository and Model. So for example, if I wanted to display a blog post page with its comments, I might do:

If so, where is this being set, from the repository? the problem there being its not lazy loaded.. that's not a huge problem but then say I wanted to list 10 posts with the first 2 comments for each, id have to load the posts then loop and load the comments which becomes messy.

All of the example's use "InMemory" repository's for testing and say that including db stuff would be out of scope. But this leaves me with many blanks, so for a start can anyone comment on the above?

A: Traversing the Model like that is achievable, and desirable. You are absolutely right though that it is an implementation ideal that comes at a performance price, especially when dealing with collections (and you won't have any hair left when it comes to hierachic data structures).

You'll want to configure NH mappings to do batched lazy loading. (fetch=subselect batch-size=#), otherwise eager loading will pull back too much data, and lazy loading will results in an N+1 selects problem (1 query to fetch the posts, + N queries to fetch comments where N is the number of posts - your loop).

If your requirement is really to show 2 comments for each post, a batchsize of 2 will do, but as you'll no doubt have guessed, as soon as your app tries to access the 3rd comment, NH will perform another select to fill the comments collection with 2 more, so you might want a bigger batch size from the outset. Plan for a perf tuning phase when you know your use cases. This may be very difficult if you are developing a general purpose data access API. (Also, you will want to add an order-by="SOME_COLUMN_NAME" on your comments collection mapping to control how to get the 'first' comments). It's easy to underestimate the importance of the NH mappings settings; ORM solves many dev problems, but adds a whole world of new ones.

'Domain Driven Design' by Eric Evans defines the repository pattern & services. They are not always appropriate. I've stopped using them for all but the very complex projects, and rarely on MVC builds. The benefits of the repository pattern & services are separation, isolation, testability and flexibility of your architectural components. In real-world terms - consider your 'usings' namespaces. If you would rather avoid having 'using nhibernate' in your controllers, then hide it away in a repository and just reference the repo assembly.

This ties in with testability - you can unit test your repo in isolation from the controllers. If you are now offended by having repo references in your controllers then employ a service layer. It's all about loose coupling.

Benefits of a service layer include complete hiding of the data access mechanics, exposing the service methods remotely over other transport options (web services, for instance), and veiling generic repository methods with API friendly names. For example, post = MyAwesomeAPI.PostService.Get(id); might simply be a wrapper to a generic - get any type by id - Repository.Get(id); This API wrapping is massively useful when developing a set

of services for 3rd parties to consume, or just other devs on your team. Provided your method signatures stay the same, you can change the underlying implementation at any time - your switch from NH to plain SQL for example would not break existing apps that consume that API.

For maximum flexibility you would not even link your services assembly to your repo implementation assembly at all. Rather you would use a dependency injection tool like Structure Map to wire everything up at runtime. This allows you to switch repo implementations by configuration alone without recompiling/linking. You could even have multiple data access techniques. The consumer of the API would not know, nor should it care.

If you don't need any of those things, put 'using nhibernate' in your controllers and be done. The risk is that you have tightly tied your MVC app to NH and everyone needs to know everything to do make the smallest change to your app. That decision will likely be made by your project constraints (time/money/people/calendar). If you do need all those things, check out Sharp architecture, or assemble your own stack. MVC is so much more VC than M.

566. <https://stackoverflow.com/questions/10055290/middleware-soa-by-example/10188644#10188644>

T: Middleware & SOA by Example

Q: I am an inexperienced Java developer trying to wrap my head around some fundamental middleware/SOA concepts and technologies, specifically:

- Service-Oriented Architecture (SOA)
- Message-Oriented Middleware (MOM)
- Message Queue
- Apache Camel
- Mule
- EJBs
- Endpoints & Routes
- Service Bus/ESB
- JMS

After looking each of these up online/on Wikipedia, I was able to get (for the most part) decent *definitions* for each of these. What I am not understanding is **how all of these technologies/concepts work together** on the backend to provide a 2nd/business tier solution.

Can someone please give an example of an architecture that would use all of these technologies/concepts, and explain what **role** each of them play in the overall solution? Once I see a working example I'm sure it will help me connect most of the dots.

Edit: Since I added the bounty, I've had several answers that suggest reading books. Although I appreciate all feedback here, I simply can't part ways with 300 reputation points for an answer that, essentially, boils down to "RTM" (especially when I'm flat broke and can't *afford* the manual!) To reiterate, the bounty and definitive answer will go to someone who can hit all of these bullets in a meaningful, practical example. **This does not have to be a middleware compendium!!!** Just a paragraph or two that shows how all these can be used together in harmony to produce a Java business-tier solution. Thanks again.

A1: SOA main principles: Build systems as set of services where each service is

- Coarse-grained
- Interoperable
- Loosely coupled

A company offers a lot of business services (coarse-grained) developed over many years and exposed to the users (human or other systems) in some form. There are more chances that each of these features have been designed and developed not keeping the above three principles in mind. Moreover, each of those features might be running on disparate heterogeneous platforms, using different technologies etc.

What if you want to integrate these disparate features thus creating new solutions (For e.g. Amazon store front is a new service composed of their catalog service, shopping cart service etc)?

You have two choices:

3. Building the new feature from scratch keeping the 3 principles in mind. But it is a very costly endeavor, and one that's almost never successful.
4. An effective and less risky alternative is to assemble/compose it from existing, proven (well tested) services.

Option 2 is where **ESBs** can help with their support for routing, transformation, monitoring etc. [Apache Camel](#), [Mule](#) are open-source ESB's. Endpoints & Routes are the terminology used in EIP ([Enterprise Integration Patterns](#)) that these ESB's implement. ESB's can take help of **MOM's** when they want to route/integrate services that are running on heterogeneous platforms (For e.g. the catalog service might be running on a mainframe system but the shopping cart is implemented using **stateful EJBs** running in a Java Application server). **Message queue** is a concept in MOM that acts a temporary storage of the message between the sender and receiver. This temporary storage provides lot of benefits like asynchronous delivery, guaranteed delivery etc. Now, there can me multiple MOM vendors like IBM (WebSphere MQ), open-source ActiveMQ etc. We can use **JMS** to keep your code independent of the vendor.

I tried to relate all the concepts with an example. I also tried to keep it short. Please ask follow up questions to gain more understanding.

MOM is not a requirement to implement SOA. For e.g. if all of your services are exposed over SOAP via HTTP then you doesn't need a MOM in this case.

A2: [Enterprise Integration Patterns](#) can help you understand how everything fits together.

[update:] Your follow-up question on another answer made me realise that you're confused about specific products. That's partly because software in practice tends to map to more than one concept and partly because different companies argue that they provide "everything", when really they don't.

The ESBs are toolkits / libraries that let you connect everything together. They are neither the services themselves, nor the messaging implementations, but the goo that fills the odd little gaps in-between. If you were writing everything from scratch you might not even need one, because what they are best at is fixing the mismatch between a whole pile of different technologies, and if you are starting from scratch you can avoid that mess.

The services are, well, the services. You might use some EJBs when implementing one (I only mention this because for some reason you include them in your question).

The messaging middleware is software that gets messages from A to B. That's extremely useful, but also complex, and everyone and their brother has invented their own. So you need some abstraction that lets you avoid lock-in. That can be an ESB or, if you are all-Java then it can be JMS. But even when you are all-Java with JMS you may still want to use an ESB because they are libraries of all the bits of Java code you would still need to write (random bits of routing logic, message reformatting, etc etc).

Hope that helps. My original answer is more about the abstract patterns that you build with these tools - when you're wiring things together the same problems come up again and again.

A3: ou mix a lot of different concepts and technologies with different abstraction levels. But all of your concepts have something to do with (enterprise) application integration. I will try to comment your definitions:

- Service-Oriented Architecture (SOA)
SOA provides a set of principles and methodologies to integrate existing applications as loosely coupled units. From the Enterprise Integration Patterns (see below): "*SOAs blur the line between integration and distributed applications*".
- Service Bus/ESB
The ESB is a main concept of SOA to reduce the dependencies within the applications in a SOA. Instead of a lot of dependencies between the applications each application is connected to the ESB.
- Message-Oriented Middleware (MOM)
MOM is a infrastructure for sending and receiving messages between distributed systems. This is used to

integrate applications. MOM was the golden hammer before the SOA hype came up. Since both are useful, big integration suites provides both ESB and MOM (or use MOM inside their ESB).

- Message Queue
A message queue is just a technical detail aspect in MOM architecture. When message sending/receiving is decoupled, message are stored in queues until the recipient is ready.
- Apache Camel
When the book [Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions](#) hit the market, some software solutions have been created which provides implementation for the patterns in this book. Apache Camel is one of them. Camel is also a part of Apache ServiceMix which is also an open source ESB. FuseSource and Talend are packaging Apache ServiceMix, Apache Camel and Apache Active MQ (MOM) to bundles with commercial support.
- Mule
Mule is also an open source ESB and integration platform.
- EJBs
From Wikipedia: *Enterprise JavaBeans (EJB) is a managed, server-side component architecture for modular construction of enterprise applications.* This means EJB is a component within an application and has primary nothing to do with integrating applications.
- Endpoints & Routes
When you work with Apache Camel you are designing routes between endpoints, see a [tutorial](#). In short, message are entering/leaving your system via endpoints and are processed in a flow defined by a route.
- JMS
JMS or Java Message Service is a Message Oriented Middleware (MOM) with an standardized Java API.

A4: Taking all of your requirements and packaging them into a query, I came across an *excellent* case study that should meet your needs:

- [Service Oriented Architecture: An Integration Blueprint](#)

I went ahead and fulltext searched the book using Amazon's "Search Inside This Book" feature. It covers all of the integration cases you've discussed, appears to be thorough, and steps you through the entire design and implementation process.

I'm embarrassed to state I haven't read through this *myself*, but I highly recommend using the same tools I did to see if it fits your needs before investing in a copy. It seems more thorough, more complete, and more helpful than simply foisting you on a whole lot of incomplete documentation or spooling out content into an answer here.

A5: **Enterprise Application Integration (EAI)** is key to connecting business applications with heterogeneous systems. Over the years, architects of integration solutions have invented their own blend of patterns in a variety of ways. But most of these architectures have similarities, initiating a set of widely accepted standards in architecting integration patterns. Most of these standards are described in the Enterprise Integration Patterns Catalog available at:<http://www.eapatterns.com/toc.html>.

WSO2 [ESB](#)

WSO2 Enterprise Service Bus (ESB) 4.7.0 documentation! WSO2 ESB is a fast, lightweight, 100% open source, and user-friendly ESB distributed under the Apache Software License v2.0. WSO2 ESB allows system administrators and developers to conveniently configure message routing, mediation, transformation, logging, task scheduling, failover, load balancing, and more. It supports the most commonly used Enterprise Integration Patterns (EIPs) and enables transport switching, eventing, rule-based mediation, and priority-based mediation for advanced integration requirements. The ESB runtime is designed to be completely asynchronous, non-blocking, and streaming based on the Apache Synapse mediation engine.

567. <https://stackoverflow.com/questions/34167965/mvc-with-service-architecture/34168330#34168330>

T: MVC with service architecture

Q: I'm creating a MVC project where in one of its View, there will be search part and the listing part. At the same time I have an idea of using a service layer (Web API or WCF).

I would like to ask which one is correct way or setup for building this search and listing page ?

The way I'm doing it at the moment is using partial view for listing part that will get updated every time searching occurs and position the service layer behind the controller (service layer in the middle of controller and business layer).

A1:

MVC Controllers should be thin route drivers. In general your controller actions should look similar to

```
[Authorize(Roles = "User,Admin")]
[GET("hosts")]
public ActionResult Hosts(int id)
{
    if (false == ModelState.IsValid)
        return new HttpStatusCodeResult(403, "Forbidden for reasons....");

    var bizResponse = bizService.DoThings();

    if(bizResponse == null) return HttpNotFound(id + "could not be found")

    if(false == bizResponse.Success)
        return new HttpStatusCodeResult(400, "Bad request for reasons....");

    return View(bizResponse);
}
```

You can also generalize the model state checking and response object checking (if you use a common contract - base type or interface) to simply have:

```
[Authorize(Roles = "User,Admin")]
[GET("hosts")]
[AutoServiceResponseActionFilter]
public ActionResult Hosts(int id)
{
    var bizResponse = bizService.DoThings();

    return View(bizResponse);
}
```

I am a proponent of using serialization to pass from the business layer to the http/MVC/ASP.NET layer. Anything that you use should not generate any http or tcp requests if it is in-process and should used named-pipes for in memory transport. WCF with IDesign InProcFactory gives you this out of the box, you can't emulate this very well WebApi, you may be able to emulate this with NFX or Service Stack but I am not sure off hand.

If you want the bizService to be hosted out of process the best transport at this point is to use a Message Bus or Message Queue to the bizService. Generally when working with this architecture you need a truly asynchronous UI that once the http endpoint accepts the request it can immediately receive the http OK or http ACCEPTED response and be informed later of the execution of the action.

In general a MVC controller / ASP.NET http endpoint should never initiate a http request. Your bizService if necessary is free to call a third party http service. Ultimately roundtrip network calls are what kills the perceived performance of everything. If you cannot avoid roundtrip calls you should strive to limit it to at most one for read and at most one for write. If you find yourself needing to invoke multiple read and multiple write calls over the wire that is highly illustrative of a bad architectural design of the business system.

Lastly in well designed SOA, your system is much more functional than OO. Functional logic with immutable data / lack of shared state, is what scales. The more dependent you are on any shared state the more fragile the system is and starts to actively become **anti-scale**. Being highly stateful can easily lead to systems that fracture at the 20-50 req/s range. Nominally a single server system should handle 300-500 req/s of real world usage. The reason to proxy business services such as this is to follow the trusted subsystem pattern. No user is ever able to authenticate to your business service, only your application is able to authenticate. No user is ever able to

determine where your business services are hosted. Related to this is users should never authorize to business service itself, a business service **action** should be able to authorize the originator of the request if necessary. In general this is only needed for fine grained control such as individual records can be barred from a user.

Since clients are remote and untrustworthy (users can maliciously manipulate them whether they're javascript or compiled binaries) they should never have any knowledge of your service layer. The service layer itself could literally be firewalled off from the entire internet only allowing your web servers to communicate to the service layer. Your web server may have some presentation building logic in it, such as seeding your client with userId, name, security tokens etc but it will likely be minimal. It is the web server acting as a proxy that needs to initiate calls to the service layer

Short version, only a controller should call your service layer.

One exception, if you use a message queuing system like Azure Service Bus for example, depending on security constraints it could be fine by your UI to directly enqueue messages to the ASB as the ASB could be treated as a DMZ and still shields your services from any client knowledge. The main risk of direct queue access is a malicious user could flood your queue for a denial of service type attack (and costing you money). A non-malicious risk is if you change the queue contract out of date clients could result in numerous dead letters or poison messages

I really believe the future of all development are clients that directly enqueue messages but current technology is very lacking for doing this easily and securely. Direct queue access will be imperative for the future of Internet of Things. Web servers just do not have the capacity to receive continuous streams of events from thousands or millions of light bulbs and refrigerators.

568. <https://stackoverflow.com/questions/21839783/more-layers-and-performance-issue>

T: Based on this presentation(for more detail) it seems that having unduly layers and assembly could cause performance problem. take a look at this scenario , it's about sending a message on "Contact Us" part of an application.

Q: I blogged a post about it, although it's not the easy to optimize n-layered architectures but I've talked about some tips: <http://ehsanghanbari.com/Post/115/disadvantages-of-n-layered-architectures>

569. <https://stackoverflow.com/questions/24851276/mvc-search-functionality-using-repository-pattern>

T: MVC Search functionality using repository pattern

Q: I'm trying to build a simple Search functionality into an application using repository pattern, domain models, and a service layer.

I've searched around and haven't found anything that fits the repository pattern. I've had a quick read on the Specification method, but that doesn't look like it will fit what I require. Please read on.

A typical search would involve: Find a student that goes to college xyz, and studies subject abc, and speaks english, and... So, I'm hitting each table essentially.

I have the following layers:

Service layer

AppStudentService, AppCollegeService, ...

Business Logic Layer (BLL) which contains the following domain models:
Student, College, Subject, Language, SearchService ...

Data Access Layer (DAL) which contains the following repositories:
StudentRepository, CollegeRepository, SubjectRepository, LanguageRepository

To attack this problem, I built an AppSearchService in the Service layer. This instantiates the SearchService in the BLL, and all required repositories in the DAL.

In the BLL I built a SearchService which contains the search logic and calls a SubSearch() method on each of the repositories to fetch data for it's area, e.g. StudentRepository.SubSearch returns student(s) details. The business logic will tie up all the sub-search results together for the final search results to be returned.

I decided to break the search into a number of small queries, i.e. SubSearch methods, rather than a massive search query which would contain many joins. Using Entity Framework.

Question 1.

Each repository has it's standard methods, e.g. Add, Save, Remove, FindAll, FindBy, and a SubSearch method. Is adding my custom (non-repo) method a good idea here, or does it contaminate the repository design?

Question 2.

Would it be better put all the SubSearch methods and search logic together into a new Search class (and method) in the DAL? This way all the logic is together and doesn't require instantiating all the BLL objects and Repo objects, i.e. better performance.

Question 3.

Is what I've done a good approach for the repository pattern? If not can someone point me in the right direction, thanks.

A1: You would be better off create a SearchRepository, that is used to search across your data layer. This will be the most efficient, because joining the results of multiple repositories together is going to be ugly, and inefficient at best. A nightmare to maintain at worst.

You don't want to perform multiple queries for a search if you don't have to. You should perform the query as a single unit. This is most efficient.

570. <https://stackoverflow.com/questions/11383355/application-server-design>

T: Application server design

Q: I would like to design an application that consists of an application server.

There would be a layered core with different responsibilities:

- Receiving messages from the network (e.g. using Netty) using different protocols (e.g. SIP, DNS...)
- Parsing the incoming messages
- Converting the protocol-specific messages into application-specific messages. A particular application may be interested to receive messages of different protocols (e.g. both SIP and DNS).

My question concerns the above layers. Since there will be different applications on top of the core, I would like to find an efficient way to distribute the incoming messages to the relevant applications. By efficient, I mean using a good design (including good patterns), good performance... Which advice can you give me for such a scenario?

A: Maybe the [Enterprise Integration Patterns](#) can help you for designing the message flow within your application.

Depending on what you are planning exactly it can also be worth looking into [Spring integration](#) or [Apache Camel](#).

571. <https://stackoverflow.com/questions/2637114/what-are-the-benefits-of-an-n-layered-architecture/2637150#2637150>

T: What are the benefits of an N-layered architecture?

Q: What are the benefits of an N-layered architecture? How does that make an application better?

A1:

- A: Other applications will be able to reuse the functionality exposed by your layers.
- You will be able to distribute your layers over multiple physical tiers. This can make a very good impact on your application by improving performance (sometimes), scalability and fault tolerance.
- The maintenance of your application is easier because of the low coupling between layers.
- Adding more functionality to your application is made easier.
- Layers make your application more testable.
- Building a well formed layers makes the orientation in your application more easier.
- Having your application not layered means that you have to deal with all security threats in one place which is very difficult. Having your application distributed to layers makes it much easier for design and implement
- Without a good deployment plan it is not trivial to distribute your layers over multiple physical tiers in distributed computing. You need to plan ahead your layers when you create a distributed application.

A2: Maintenance of and enhancements to the solution are easier due to the low coupling between layers, high cohesion between the layers, and the ability to switch out varying implementations of the layer interfaces.

Other solutions should be able to reuse functionality exposed by the various layers, especially if the layer interfaces are designed with reuse in mind.

Distributed development is easier if the work can be distributed at layer boundaries.

Distributing the layers over multiple physical tiers can improve scalability, fault-tolerance, and performance. For more information, see the Tiered Distribution pattern.

Testability benefits from having well-defined layer interfaces as well as the ability to switch out various implementations of the layer interfaces.

Summary

Benefits are

5. Reuse of layers
6. Support for standardization
7. Dependencies are kept local
8. Exchangeability

A3: First of all, layered architecture is a type of "Modular Design". Hence, in order to appreciate the benefits of layered architecture, one needs to know what modular design is. Secondly, it is a special type of modular design, specifically organized to manage dependencies in order to minimize tight coupling, thus achieving the objectives of modular design - autonomous modules/components. When we have autonomous/independent modules, then they can be reused, extended, tested, and so on, compared to the case where the architecture/design is not modular.

I have an article about layered architecture, where I discuss these things in more detail. It might be helpful.

572. <https://stackoverflow.com/questions/31742485/what-is-the-standard-i-should-use-in-mvc-coding/31742915#31742915>

T: What is the standard I should use in MVC coding

Q: what is the impact on my website performance if I will use the mentioned above code inside controller or inside Model?

which method I should use? for example if I want to work with a team, is there a standard I should follow to separate the code, kindly advise

for using the repository pattern: I read that we should not use it as mentioned for example [here](#), i will copy some of what mentioned:

The single best reason to not use the repository pattern with Entity Framework? Entity Framework already implements a repository pattern. DbContext is your UoW (Unit of Work) and each DbSet is the repository. Implementing another layer on top of this is not only redundant, but makes maintenance harder.

if my database contains the following tables: **Manufacturers** , **Cars** , **Rent** , **Clients** , rent class is the a table with 2 foreign keys between Clients and Cars and contains other detailed fields.

how to deal with Rent Object which need to get data from 2 different repositories Cars and Clients in order to display the renting grid based on search criteria entered by the user, if I will use the repositories Cars and Clients , they have their own dbContext, **BOOM** my head cannot understand this technique, kindly advise

A: The answer to your question is, it does not really affect performance but it will definitely become an issue in terms of maintainability as the application grows bigger. You can adopt the SOLID architecture principles: [SOLID architecture principles using simple C# examples](#). This enables you to develop high quality software.

You can create a multi-layered application:

5. Interface Layer - MVC application
6. Business Layer - Class Library with classes with logic
7. Data Access Layer - Database Contexts and Repositories, unit of work with CRUD operations
8. Shared layer - Logging, AppSettings, validations, utilities, extensions, constants, enums

Having your application in this structure would require you to consider things like inversion of control, dependency injection and many more to ensure loosely coupled classes, easy unit testing and most of all a solid application.

You can also read this: [Implementing the Repository and Unit of Work Patterns in an ASP.NET MVC Application](#)

573. <https://stackoverflow.com/questions/10560407/architectural-analysis-help-for-new-project>

T:Architectural analysis help for new project

Q: I could really use some help with my class model above. I'm ashamed to say that I have been one of "those" developers that learned object orientation at university, wrote the exams, aced them but then never set about implementing the principles in my real world code. I never truly sat down and considered my application design before beginning the codification of it. Thus my design and coding skills have been slowly dying and stagnating under the weight of monolithic legacy banking application development and maintenance. After years of this I've decided that it's definitely time for a change! I've been delving deep into the world of design patterns, DDD, NoSQL, DI, etc etc. The last 2 weeks have been a really intense experience for me, and at times I think I was nearly brought to tears at the sheer volume of best practices and tech that I had missed while working for large corporations and banks. I simply couldn't believe how far removed I had been from cutting edge tech and good design approaches for so long, and the sudden swathe of everything threatened to send me into a state of coding paralysis! I simply could not start coding, as I felt my design needed more tweaking, or I needed more studying

on a particular topic. Enough is enough though, and I need to crack on and at least make a first iteration on the project.

Anyway, enough of the drama, on to my issue:

I have begun work on the model creation for my golfing app. Wanting to adhere somewhat to DDD and also wanting to make use of NoSQL (RavenDB), I set about with the following requirements.

- My platform stack is Windows / IIS / MVC 3.0 / RavenDB
- I need to find my aggregate roots! I have set about defining them as the only elements in my system that are capable of persisting in their own right. Everything else I've simply deemed a "sub-component" of the aggregates. Note that no real behaviour has yet been defined.
- My aggregate roots will be the only classes to actually persist in my RavenDB doc store, and they will persist "as-is". Having large tree-like class structures would appear to be a best case scenario for RavenDB in terms of performance benefits realised.
- I don't feel the need for a repository layer (been following some of Ayende's posts), as the RavenDB API feels fluent and quite lightweight. I'll be simply opening and closing my sessions via Custom Action Attributes on my controllers where required. I've seen that without the repository layer testing might be tricky, but surely I should be able to simply mock some "in-memory" domain objects?
- Writes to the DB will happen in a separate service layer
- At one point I stopped and asked myself: "Where on earth am I going to put my domain behaviour!?". The general consensus from searching the web would seem to indicate I should leave my domain (entities) void of any behaviour (business logic) and have it all handled in my service layer. But after reading some Eric Evans, I'm convinced that as much of my domain behaviour should exist right there... in the domain!

Questions - As a bona fide noob in the area of DDD and architectural design, am I at least on the right track, or am I destined for destruction? - Any thoughts, admonishments, constructive criticism and insights into the above would be greatly appreciated!

A: To counter being overly academic about it all and be stuck in analysis too long: First make it work. Then make it pretty.

Put behavior near data as much as possible. Use services where you can't cleanly assign a responsibility to a class (e.g. should a 'transfer money' method be on an SavingsAccount class?). Services can be part of an aggregate.

Do use repositories (I don't agree with Ayende). You mention using a separate service layer for DB writes. Repository is a perfect interface to put that layer behind. It's also a perfect testing seam.

Didn't look at your class diagram thoroughly, but you may be overusing inheritance here and there. Favor composition over inheritance. Inheritance can rear its ugly head quite quickly.

When choosing aggregate roots, an important criteria is life cycle. When the aggregate root dies, everything else in the aggregate dies also. The aggregate root is also in control, everything outside the aggregate passes through it. When in doubt just create a lot of them (single entity aggregate). With a document database you would typically store a document per aggregate, so that does matches somewhat with how you choose them. Store IDs of references to different aggregates.

A2: So yeah, going down the rabbit hole will not increase your productivity in short term, but may help you mature as a developer in long term. There is so much to DDD, NoSQL, etc that you could spend years just learning.

If you want your next project to be successful, my advice would be to stick to what you know, and introduce new techniques gradually so that you can always feel in full control, and not depend on "best practices" someone has to put up for you.

A3: Firstly, may I congratulate you on deciding to take the steps to try and become more professional. I despair at the lack of profession in this industry and sometimes feel like I'm walking amongst 80% cowboys/hackers 20% professionals.

To your question:

- Have you read [this article](#) by Vaughn Veron? If not, you should. It provides an **excellent** guide to designing aggregates, which I think is underrated in its complexity.
- Looking at your model, I'm not sure if you actually have defined aggregates? I can see you have identified aggregate *roots*, but the aggregates should have clear boundaries and be separate from other aggregates (i.e. don't have entities referencing other aggregate roots, let them reference their ID). The property name *RefereeUserIDList* hints that you are in fact doing this, but the diagram shows it holding reference to the actual 'User' aggregate root?
- In terms of identifying aggregates & roots & the model design, I don't really think we can help you here as this is entirely circumstantial to the behavioural requirements. I will say though: try to base your design on *behaviour*, not data structure. It's a difficult mindset to shift to, but try not picturing the database structure.
- I haven't read what Ayende has said about repositories, but as long as you can mock the Raven API (which I assume you can given he made Rhino mocks) then it shouldn't be a problem.
- Possibly most importantly, **do not put all your domain logic into the service layer**. You'll end up with an [Anemic domain model](#), which is the DDD equivalent to the anti-christ.
- Personally when learning DDD I understood all of the principals but struggled when attempting to turn theory into practice. If I'm honest I'd say I've only really been successful with it since I understood the principals [CQRS](#) which compliments DDD. I'd really recommend watching some videos on the subject by [Greg Young](#).

574. <https://stackoverflow.com/questions/1113464/what-other-mvc-like-design-patterns-architectures-are-there-for-highly-flexible/1113582#1113582>

T: What other MVC-like design patterns/architectures are there for highly flexible applications?

Q: A while back i read somewhere about how to improve upon the MVC pattern to accomodate the highly flexible and layered (web)applications we see today. (and to my frustration, i can't seem to find that article again)

For example, some of the Google applications like GMail or even a browser like Firefox.

It consists of components that can be extended and completely replaced. Users can choose the user interface or theme they like, has some kind of plugin system, etc etc...

Owkay I know, this is how big/great applications are build. That's why i ask this question.

Could you provide me with resources or insight in what patterns are used or how these applications are build architecturally...

A1: I guess you are talking about software architecture (in contrast to hardware or system architecture).

Possibly the most important rule (I wouldn't call it pattern) is seperation of concerns. Meaning one component should handle exactly one task, only that task and the complete task. If you stick to that (which is harder than it seems). You'll have the basis for the plugability you mentioned, e.g. exchanging the UI. If your UI layer really does only UI, it can be replaced by something completely different.

If you are really talking big, like the mentioned GMail the concept of 'eventually consistent' becomes important. Classical applications are structured in a way that the user performs an action, say pressing a button. The application processes that action (e.g. saving data from a form in a database). And refreshes the GUI when it is done (e.g. replacing the 'save' button with an edit button. This linear processing has the benefit, that the user always sees a consistent state. If he turns around and searches the database he'll find his data right there. But this doesn't scale to well, when you have extremely high load on the system, because the optimum database for saving, is most of the time not the perfect database for searching. So some application do something like this:

When the user hits the save button, the store the data in the fastest way possible (e.g. a database optimised for updates), set a marker that further processing is needed and refresh the gui. Now a separate process comes along to process the saved data, e.g. by updating special indexes or by storing it in a separate database that is optimized for searching. This second process might gather changes for many actions in order to improve performance.

With this design you can scale further, because you are separating concerns: storing and searching data are two different tasks, so they are split in two different components, which can in this extreme case work in parallel. For the user this means he might not immediately find the stuff he just saved, but he eventually will. Hence 'eventual consistency'

Edit: I forgot about the resources. Great books about application architecture are: Martin Fowler's 'Patterns of Enterprise Application Architecture'. For Patterns in general of course: 'Design Patterns' for Patterns concerning Messaging Architecture

http://www.amazon.de/s/ref=nb_ss_eb?_mk_de_DE=%C5M%C5Z%D5%D1&url=search-alias%3Denglish-books&field-keywords=Enterprise+Integration&x=0&y=0. I can't recommend any books on scalability, but 'Building Scalable Web Sites' was recommended to me. The architecture of various big applications (e.g. Twitter) is a topic of talks, presentations and papers, so you'll get lots of resources when you google > architecture twitter.

A2: [Model View Presenter](#) (MVP), it is often confused with MVC, but I find it much more flexible, although it could possibly benefit from an additional controller component. I can't tell you if it's more beneficial in large-scale applications, but it's definitely a MVC-like pattern. Other MVC variants exist, such as the [Model View ViewModel](#) (MVVM), but that one's more specific to Microsoft's WPF.

575. <https://stackoverflow.com/questions/2664661/could-macruby-hotcocoa-supplant-the-need-to-know-objective-c/2664799#2664799>

T: Could MacRuby/HotCocoa supplant the need to know Objective-C?

Q: I just discovered [MacRuby](#) / HotCocoa and really like the sound of what they're doing.

I had essentially discounted the prospect of making Cocoa GUI applications myself because I have an aversion to spending time & effort learning yet another C-based language, Objective-C. I'm not saying it's bad, just not for me.

Is it the case now, or in the probable future, that one will be able to make Cocoa GUI applications of substantial and first-class nature with MacRuby / HotCocoa alone while ignoring Objective-C completely?

(Edit: Desktop Mac, not iPhone)

A: It will be extremely difficult to build first-class apps through a translation layer. It's hard enough to get the performance and behavior you need natively. I'm impressed with MacRuby's approach, and particularly impressed that they are able to manage things like Core Animation (a key piece of first-class Mac apps) and Core Data (which is tough stuff). I'm really impressed with their use of more idiomatic Ruby rather than the ugliness of RubyCocoa. But there are reasons that Apple has "deemphasized" (as they've called it) their multi-language dalliances in Java, Ruby, Python, etc. It's hard enough to write this stuff in one language. It's hard enough to get it right when you're not going through a semi-supported translation layer. In practice, you still have to learn the ObjC syntax to deal with the documentation and all the existing code. In practice, you still have to learn the ObjC patterns to develop decent Mac apps.

MacRuby is interesting. Even as a seasoned ObjC programmer, I might consider HotCocoa for hacking up prototypes and trying out interfaces. But it's not the kind of thing I'd use to build, as you say, "Cocoa GUI applications of substantial and first-class nature."

As developers, part of our job is to have a bag of tools. Like a good carpenter has several different hammers, plus pry bars, nail sets, several kinds of square and a dozen other tools, a programmer should be comfortable with a variety of languages, programming paradigms, platforms and environments. She then should be able to choose the correct tools for the job and employ them effectively. In the case of Mac programming, the correct tools for the job include Xcode, IB, ObjC and Cocoa. Avoiding them is like a carpenter avoiding a framing hammer and speed square. They're just part of the job.

A2: MacRuby isn't a 'translation layer' as Rob says. It's Ruby on the same object system that Cocoa is using. You can certainly build "first-class" applications with it, and also accomplish things that are inconvenient with Objective-C.

Be careful not to confuse MacRuby with RubyCocoa. Apple did not 'pull all the templates' for MacRuby, because they've never shipped by default.

Furthermore, LLVM's integration with Apple's platforms grows with each release. The next release of XCode will rely on LLVM for advanced code-completion, checking, and compilation. If Apple is deemphasizing anything it's the GCC.

One might also note that MacRuby has similar limitations in API coverage as Objective-C does: for instance, creating authenticated apps or accessing the keychain requires wrapper classes for both languages.

576. <https://stackoverflow.com/questions/34543283/is-document-view-architecture-in-mfc-basically-a-model-view-controller-pattern-b>

T: Is document/view architecture in MFC basically a Model/View/Controller pattern but without the controller?

Q: Is the document/view architecture in MFC really a Model/View/Controller pattern without the controller part?

I'm studying MFC and I simply love it to bits. I know it is somewhat outdated and somewhat bit more difficult to use, but I discovered that it gives me so much more power and performance gain when compared to QT.

Am I correct to think of the MFC doc/view model as simply MVC without the Controller part?

A1: The [Model/View/Controller](#) has the following components:

- Model
- View: responsible to show the model to the user
- Controller: responsible to get user input and translate it in operations on the model

MFC's [Document/View](#) has only 2 components:

- The document, which is in fact our model
- The View, which has the responsibility to show the Document AND [interpret the user's commands](#). So it is the view+controller (refer to section *Variants* in [this MSDN article](#))

A2: Let's look at it:

The view contains UI code, both for rendering the data and for taking input from the user.

The document contains the serialization code.

From that perspective, there's just a separation between UI and a backend. However, there's more, because you can have multiple different views on the same document. You could also use the document to just provide data storage and put any actual program logic into the view. In particular when you only effectively use a single view per document, it is easy to blur the separation in practice.

In summary, I wouldn't say the MVC controller part is missing but that it's merged with the MVC view parts into the MFC view.

577. <https://stackoverflow.com/questions/31786384/swift-integrate-pattern-mvc-and-facade-pattern>

T: Swift integrate pattern MVC and Façade pattern

Q: I am very confused and would like to have your suggestion about using a powerful architecture. 1) First question The pattern I am using are mvc end Facade. In my project all controllers called the Facade class. The facade class calls the Model (business logic) This process is considered performance from your experiences? 2) Second question The manual of the Facade pattern suggests using a single class centralized. Here I go crazy :) Imagine having a class (A) which contains 20 methods, and a class (B) which contains 20 other methods. The

Facade class instantiates class (A) end class (B) I'll have to call in the Facade class call 40 methods? Become a class very very big :(

From your experience what system you have adopted?

A: Before you go into "how do I implement it", you should really think about why to implement it.

Facade design pattern

The Facade pattern is used to make your life easier by creating simpler interface for otherwise complex system. Usually - as you already probably noticed, you use it for management of multiple classes (or even subsystems that you have interface for).

What it means in practice is that you will use facade pattern everywhere where you are doing tasks regularly with the same boilerplate code (which is quite often) so those can be replaced with something shorter or if the facade will provide you with cleaner code that is simpler to manage. Also, you can use it to shield internal implementation, so if some subsystem changes they way how they work, your higher-level function will still remain the same and fill the same role.

578. <https://stackoverflow.com/questions/21839783/more-layers-and-performance-issue>

T: More layers and performance issue

Q: in this kind of implementation, there is no need to go throw five layers to persist a contact, yeah!? I know for creating a contact and this kind of simple business the second imp is the best but for complex businesses it's impossible to have an action to handle everything. definitely calling A by B and B by C and ... is makes a kind of performance issue.

Now I'm just wanna to know that what is the ways of optimizing the layered architecture performance?

A: I blogged a post about it, although it's not the easy to optimize n-layered architectures but I've talked about some tips: <http://ehsanghanbari.com/Post/115/disadvantages-of-n-layered-architectures>.

579. <https://stackoverflow.com/questions/13350056/whats-the-best-architecture-for-a-medium-sized-high-traffic-web-site>

T: What's the best architecture for a medium-sized, high traffic web site?

Q: I'm starting a new project (non-corporative) and I want to know how would be a great architecture nowadays.

What I'm planning for now is to use:

- ASP.NET MVC 4.0
- SQL Server 2008 or 2012
- EF 5.0 under .NET 4.5, with Dapper
- Implementation of Repository pattern (this one <http://code.google.com/p/ef4prs/>)
- DI with [Autofac](#)
- Automapper
- WCF Service Layer (for future mobile implementation)

Checking the flow (correct me if something is wrong): **Controller** calls **ApplicationService**, that calls **a BusinessLayer**, that calls **DAL** with UnitWork/Repository, that execute queries over **EF** or **Dapper** (is it correct to query Dapper from a specific method at Repository?), then the result is automatically mapped to a **DTO** and returned to **Controller**, that copy what's needed to a **ViewModel** and returns a View.

The problem here is performance, as I said, the site is planned to have high traffic. In this case, any of the items listed above could reduce performance? Or this combination leaks something more? Should I discard the EF, and use just Dapper? I'm afraid the service layer could reduce the performance because of the traffic.

And finally, I don't know if this architecture is unnecessary, or just poor.

That's a lot of questions, but the focus is to know a great and not "over architected" solution for a medium-sized web site.

A1:

down
voteaccepted

Your question is fairly subjective as there are many possible configurations that can all work well. I can give you some recommendations though.

Mixing and matching EF with Dapper can be a bit of a minefield. In theory, you should be able to fetch objects with Dapper and then Attach them to the DbContext and update them. However, in my experience that often doesn't work. We started out with EF, then slowly moved to Dapper for fast querying and I figured we could continue to use EF for updates/inserts but I ended up rolling my own insert/update tracking (surprisingly easy) and thus we're slowly phasing out use of EF.

In hindsight, I would suggest picking one and sticking with it. EF should be pretty fast under .NET 4.5. Not as fast as Dapper though, so the pure Dapper route isn't a bad one to take.

Other technologies you could consider:

- ServiceStack (webservice) <http://www.servicestack.net/>. Highly recommended, low configuration, fast and easy to use.
- ASP.NET MVC Web-API (webservice) <http://www.asp.net/web-api>. I have no experience with it.
- ThisMember (mapper, *disclaimer: my own library*) <https://github.com/JulianR/ThisMember/wiki>. Quite a lot faster (10-100x) than AutoMapper and easier to use in my opinion.

580.<https://stackoverflow.com/questions/2613348/wcf-service-layer-in-n-layered-application-performance-considerations>

T: WCF Service layer in n-layered application: performance considerations

Q: When I went to University, teachers used to say that in good structured application you have presentation layer, business layer and data layer. This is what I heard for more than 5 years.

When I started working I discovered that this is true but sometimes is better to have more than just three layers. Two or three days ago I discovered [this article](#) by John Papa that explain how to use Entity Framework in layered application. According to that article you should have:

- UI Layer and Presentation Layer (Model View Pattern)
- Service Layer (WCF)
- Business Layer
- Data Access Layer

Service Layer is, to me, one of the best ideas I've ever heard since I work. Your UI is then completely "diconnected" from Business and Data Layer. Now when I went deeper by looking into provided source code, I began to have some questions. Can you help me in answering them?

Question #0: is this a good enterprise application template in your opinion?

Question #1: where should I host the service layer? Should it be a Windows Service or what else?

Question #2: in the source code provided the service layer expose just an endpoint with WSHttBinding. This is the most interoperable binding but (I think) the worst in terms of performances (due to serialization and deserializations of objects). Do you agree?

Question #3: if you agree with me at Question 2, which kind of binding would you use?

A: Question #0: is this a good enterprise application template in your opinion?

Yes, for most middle-of-the-road line-of-business applications, it's probably a good starting point.

Question #1: where should I host the service layer? Should it be a Windows Service or what else?

If you're serious about using WCF services, then yes, I would recommend self-hosting them in a Windows service. Why? You don't have to have IIS on the server, you don't have to rely on IIS to host your service, you can choose your service address as you wish, and you have complete control over your options.

Question #2: in the source code provided the service layer expose just an endpoint with WSHttpBinding. This is the most interoperable binding but (I think) the worst in terms of performances (due to serialization and deserializations of objects). Do you agree?

No, the most interoperable would be a basicHttpBinding with no security. Any SOAP stack will be able to connect to that. Or then a webHttpBinding for a RESTful service - for this, you don't even need SOAP - just a HTTP stack will do.

What do we use??

- internally, if Intranet-scenarios are in play (server and clients behind corporate firewall): always netTcp - it's the best, fastest, most versatile. Doesn't work well over internet though :-((need to open ports on firewalls - always a hassle)
- externally: webHttpBinding or basicHttpBinding, mostly because of their ease of integration with non-.NET platforms

A2: Did your teachers also tell you why you should create such an architecture ;-) ? What I am missing in your question are your requirements. Before any of us can tell you if this is a good architecture or template, we have to know the requirements of the application. The non functional requirements or -illities of an application should drive the design of an architecture.

I would like to know what is the most important non functional requirement of your application? (Maintainability, Portability, Reliability or ...). For example take a look at http://en.wikipedia.org/wiki/ISO/IEC_9126 or <http://www.serc.nl/quint-book/>

I think that we architects should create architectures based on requirements from the business. This means that we architects should make the business more aware of the importance of non functional requirements.

Question #0: is this a good enterprise application template in your opinion?

You use the layers architecture pattern, this means that layers could evolve independent of each other more easily. One of the most used architecture patterns, note that this pattern also has disadvantages (performance, traceability).

Question #1: where should I host the service layer? Should it be a Windows Service or what else?

Difficult to answer. Hosting a service in IIS has two advantages, it scales easier and traceability is easier (WCF in IIS has loads of monitor options). Hosting a service in a Windows Service gives you more binding options (Named Pipe binding/ TCP binding).

Question #2: in the source code provided the service layer expose just an endpoint with WSHttpBinding. This is the most interoperable binding but (I think) the worst in terms of performances (due to serialization and deserializations of objects). Do you agree?

Performance wise the WSHttpBinding costs more, but it scores high on interoperability. So the choice depends on your non-functional requirements.

Question #3: if you agree with me at Question 2, which kind of binding would you use?

Named Pipes and TCP binding are very fast. Name Pipe binding should only be used when communicating in a single machine. TCP binding could be an option but you have to open a special port in the firewall.

A3: Here are my 5 cents:

0: yes

1: I would start by hosting it in IIS because it's very easy and gets you somewhere fast.

2: If you need security then definitely yes, go with WSHtpBinding (or maybe even wsFederationHttpBinding if you want some more fance security). It performs quite fast in practice even though, as you say, it does have some overhead, and can be quite hard to call from other platforms (such as java).

3: N/A

Finally, remember to define your services' data-contract objects in a separate assembly that can be referenced both from the service dll *and* the consumer in your ui layer.

581. <https://stackoverflow.com/questions/20489018/which-dependency-injection-frameworks-are-best-for-asp-net-mvc-4>

T: Which dependency injection framework are best for ASP.NET MVC 4?

Q: I am new to Dependency Injection and working on a project developed in ASP.NET MVC 4. So, I came across with the use of Dependency Injection and curious to know which frameworks have good performance and support for ASP.NET MVC 4.

I am creating a multi-layered architecture using Repository Pattern, UnitOfWork, and Service Layer as a business logic. So, I want dependency injection. I don't have much idea as of now on other requirements, I think it should support MVC 4.

Proper Question : Which Dependency injection frameworks are best for ASP.NET MVC 4? I came across Simple Injector but somewhere it was mentioned that it does not support MVC 4.

A: [Simple Injector](#) definitely supports MVC4. They got a quick start package for MVC. It states that it's for MVC3, but it works just fine for MVC4 too.

I used it recently in a project and it works like a charm, I like it for it's simplicity. Don't expect tons of conventions and hidden configurations, you just have to create a container and register the dependencies explicitly.

A2: What would be the best framework is a matter of what requirements you and/or your project have.

Ninject supports MVC4. I'm using this in a couple of projects, both MVC and WebAPI.

[Ninject website](#)

[Using Ninject with WebAPI](#)

[Using Ninject with MVC4](#)

Google has a lot of hits for this.

582. <https://stackoverflow.com/questions/42859126/database-replication-why-and-how>

T: Database Replication –Why and How?

Q: I am struggling to understand how to implement database replication.

I have currently setup a master-slave replication of MySQL database.

I understand how transactional events are replicated to the slave with the binary log.

I have search everywhere for some proper information about the implementation, but everybody makes it sound like black magic!

I found this link: https://docs.oracle.com/cd/E17276_01/html/gsg_db_rep/Crepadvantage.html

It states all the good things that we all know about data replication, such as: Improved reliability, read performance, transactional commit performance etc.

However, nobody mentions how to actually achieve all of this good stuff. I cannot see how MySQL server can do all of this by itself, there must be some underlying implementation.

I am not looking for a specific implementation, I am just looking for some kind of design pattern for implementing replication properly.

My best guess is that you devide your database access into two categories, read and write. All writes goes to the master and all the reads goes to the slave.

But how do you improve the reliability if the master suddenly shutdown? Do you reroute all your trafic to the slave? And if so, is this rerouting done in a layer outside of the application? And can you write to the slave and syncronize it back to the master once it is back online?

583. <https://stackoverflow.com/questions/36456127/three-tier-architecture-using-wcf/36459681#36459681>

T: Three tier architecture using WCF

Q: I have an app structured in two tiers (presentation and business logic in the client (WPF using MVVM) and data in one SQL server), but I'm facing the problem that it uses too much RAM in the client due to the need of a large collection of objects to manipulate.

So I thought of changing into a three-tier architecture, adding a service in a server to process all the business logic and provide the clients only what they need to display using WCF in order to lower its requirements in memory.

My question is about how to properly do this. Communication between this server and the data (in SQL server) is pretty straight-forward, but what should I send from the server to the client?

For example, following a MVVM approach, should I send (from the server to the client) the models, the viewmodels, or what? If the.viewmodel's properties reference the model and I only send a List of ViewModels, would the client be able to read the info?

Can you provide me with some real world examples of this?

A: Consider adding a **service layer** in conjunction with **business objects** to carry data from the server to the client.

From Microsoft's [Microsoft Application Architecture Guide](#):

Custom Business Objects. These are common language runtime (CLR) objects that describe entities in your system. An object/relational mapping (O/RM) technology such as the ADO.NET Entity Framework (EF) or NHibernate can be used to create these objects

Your question, "*should I send (from the server to the client) the models, the viewmodels, or what*" is mixing the responsibility of the UI pattern (MVVM) with sending data from the server to the client.

By adding a service layer you can avoid the memory issues and manage the burden of carrying around objects. Consider using an Object Relational Mapper for these objects like Microsoft's Entity Framework or, for improved performance, a light weight ORM like [StackOverflow's own Dapper.net](#). Finally with [careful utilization of delayed query execution](#) with IEnumerable you should be able to solve your performance problems. A high-level discussion is helpful at this stage as there are many directions you can take this design. For further guidance in designing such a system, refer to Microsoft's Application Architecture Guide, [Chapter 5: Layered Application Guidelines](#). While the image below may describe more layers than you need, it is a helpful reference. The service layer can manage the business objects that are presented to the client:

584. <https://stackoverflow.com/questions/15435177/whats-the-better-practice-for-testing-code-which-relies-on-a-db-mocks-and-stub/15435746#15435746>

T: What's the better practice for testing code which relies on a DB? Mocks and Stubs? Or seeded data?

Q: Seems like forever I've read that, when testing, use a mock database object or repository. No reason to test someone else's DB code, right? No need to have your code actually mess with data in a database, right?

Now lately I see tests which set up a database (possibly in-memory) and seed it with test data, just for running tests against.

Is one approach better than the other? If tests with seeded data are worth running, should one even bother with mock databases connections? If so, why?

A1: There are a lot of ways to test code that interacts with a database.

The repository pattern is one method of creating a facade over the data access code. It makes it easy to stub/mock out the repository during test. This is useful when a piece of business logic needs tested in isolation and dummy values can help test different branches of the code.

Fake databases (in-memory or local files) are less common because there needs to be some "middle-ware" that knows how to read data from a real database and a fake database. It usually just makes sense to have a repository over the whole thing and mock out the repository. This approach is more feasible in some older systems where there is an existing infrastructure. For instance, you use a real database and then switch over to a fake database for test performance reasons.

Another option is using an actual database, populating it with bogus data. This approach is slower and requires writing a lot of scripts. However, this approach is fairly common as part of integration testing. I used to write a lot of "transactional" tests where I used a database transaction to rollback changes after running my tests. I'd write one large test that collectively performed all of my CRUD operations on a particular table.

The last approach makes sense when you are testing the code that converts SQL results into your objects. Your SQL could be invalid (or you use the wrong stored procedure name). It is also easy to forget to check for nulls, perform an invalid cast, etc. when mapping to objects. This code should be tested at some point. An ORM can help alleviate a lot of this testing.

I am typically pretty lazy these days. I use repositories. Most of my data layer code is touched when performing actual integration tests (hitting a real database with dummy data), so I don't bother testing individual database calls (no more transactional tests). I also use ORMs for doing most of my SELECT statements. I think a lot of the industry is moving towards this more lazy approach.

A2: You should use both.

The business services should rely on DAOs, and be tested by mocking the DAOs. This allows for fast, easy to implement, easy to maintain tests.

The DAOs unique responsibility is to contain database access code (queries, etc.), and should also be tested. So you should use a test database, with test data, and check that their queries return/save what they're support to return/save.

I'm not a big fan of using an in-memory database, different from the one used in production. The behavior of some queries, constraints, etc. will be different from database to database, and you'd better be sure that the code will work on the production database, and not in an in-memory database used only by tests.

585. <https://stackoverflow.com/questions/2246251/how-do-i-improve-asp-net-mvc-application-performance>

T: How do I improve ASP.NET MVC application performance?

Q: How do you improve your ASP.NET MVC application performance?

A: A compiled list of possible sources of improvement are below:

General

- Make use of a profiler to discover memory leaks and performance problems in your application. personally I suggest [dotTrace](#)
- Run your site in Release mode, not Debug mode, when in production, and also during performance profiling. Release mode is much faster. Debug mode can hide performance problems in your own code.

Caching

- Use `CompiledQuery.Compile()` recursively avoiding recompilation of your query expressions
- Cache not-prone-to-change content using `OutputCacheAttribute` to save unnecessary and action executions
- Use cookies for frequently accessed non sensitive information
- Utilize [ETags](#) and expiration - Write your custom `ActionResult` methods if necessary
- Consider using the `RouteName` to organize your routes and then use it to generate your links, and try not to use the expression tree based `ActionLink` method.
- Consider implementing a route resolution caching strategy
- Put repetitive code inside your `PartialViews`, avoid render it xxxx times: if you end up calling the same partial 300 times in the same view, probably there is something wrong with that. [Explanation And Benchmarks](#)

Routing

- Use `Url.RouteUrl("User", new { username = "joeuser" })` to specify routes. [ASP.NET MVC Perfomance by Rudi Benkovic](#)
- Cache route resolving using this helper `UrlHelperCached` [ASP.NET MVC Perfomance by Rudi Benkovic](#)

Security

- Use Forms Authentication, Keep your frequently accessed sensitive data in the authentication ticket

DAL

- When accessing data via LINQ [rely on IQueryable](#)
- [Leverage the Repository pattern](#)
- Profile your queries i.e. [Uber Profiler](#)
- Consider second level cache for your queries and add them an scope and a timeout i.e. [NHibernate Second Cache](#)

Load balancing

- Utilize reverse proxies, to spread the client load across your app instance. (Stack Overflow uses [HAProxy \(MSDN\)](#)).
- Use [Asynchronous Controllers](#) to implement actions that depend on external resources processing.

Client side

- Optimize your client side, use a tool like [YSlow](#) for suggestions to improve performance
- Use AJAX to update components of your UI, avoid a whole page update when possible.
- Consider implement a pub-sub architecture -i.e. Comet- for content delivery against reload based in timeouts.
- Move charting and graph generation logic to the client side if possible. Graph generation is a expensive activity. Deferring to the client side your server from an unnecessary burden, and allows you to work with graphs locally without make a new request (i.e. Flex charting, [jqbargraph](#), [MoreJqueryCharts](#)).
- Use CDN's for scripts and media content to improve loading on the client side (i.e. [Google CDN](#))
- Minify [-Compile-](#) your JavaScript in order to improve your script size
- Keep cookie size small, since cookies are sent to the server on every request.
- Consider using [DNS and Link Prefetching](#) when possible.

Global configuration

- If you use Razor, add the following code in your global.asax.cs, by default, Asp.Net MVC renders with an aspx engine and a razor engine. This only uses the RazorViewEngine.

- ```
ViewEngines.Engines.Clear(); ViewEngines.Engines.Add(new RazorViewEngine());
```
- Add gzip (HTTP compression) and static cache (images, css, ...) in your web.config<system.webServer>  
`<urlCompression doDynamicCompression="true" doStaticCompression="true"  
dynamicCompressionBeforeCache="true"/>` </system.webServer>
  - Remove unused HTTP Modules

A2: The basic suggestion is to follow [REST principles](#) and the following points ties some of these principals to the ASP.NET MVC framework:

9. Make your controllers [stateless](#) - this is more of a '*Web* performance / scalability' suggestion (as opposed to micro/machine level performance) and a major design decision that would affect your applications future - especially in case it becomes popular or if you need some fault tolerance for example.
  - Do not use Sessions
  - Do not use tempdata - which uses sessions
  - Do not try to 'cache' everything 'prematurely'.
10. Use [Forms Authentication](#)
  - Keep your frequently accessed sensitive data in the authentication ticket
11. Use cookies for frequently accessed non sensitive information
12. Make your [resources cachable](#) on the web
  - [Utilize ETags](#)
  - Use expiration
  - Write your custom ActionResult classes if necessary
  - Utilize [reverse proxies](#)
13. Compile your JavaScript. [There is Closure compiler library](#) to do it as well (sure [there are others, just search for 'JavaScript compiler'](#) too)
14. Use CDNs (Content Delivery Network) - especially for your large media files and so on.
15. Consider different types of storage for your data, for example, files, key/value stores, etc. - not only SQL Server
16. Last but not least, test your web site for performance

A3: [Code Climber](#) and [this blog entry](#) provide detailed ways of increasing application's performance. Compiled query will increase performance of your application, but it has nothing in common with ASP.NET MVC. It will speed up every db application, so it is not really about MVC.

A4: This may seem obvious, but run your site in Release mode, not Debug mode, when in production, and also during performance profiling. Release mode is *much* faster. Debug mode can hide performance problems in your own code.

A5: Not an earth-shattering optimization, but I thought I'd throw this out there - [Use CDN's for jQuery, etc..](#) Quote from ScottGu himself: The Microsoft Ajax [CDN](#) enables you to significantly improve the performance of ASP.NET Web Forms and ASP.NET MVC applications that use ASP.NET AJAX or jQuery. The service is available for free, does not require any registration, and can be used for both commercial and non-commercial purposes.

We even use the CDN for our webparts in Moss that use jQuery.

A6: In addition to all the great information on optimising your application on the server side I'd say you should take a look at [YSlow](#). It's a superb resource for improving site performance on the client side. This applies to all sites, not just ASP.NET MVC.

A7: One super easy thing to do is to think asynchronously when accessing the data you want for the page. Whether reading from a web service, file, data base or something else, use the async model as much as possible. While it won't necessarily help any one page be faster it will help your server perform better overall.

A8: 1: Get Timings. Until you know where the slowdown is, the question is too broad to answer. A project I'm working on has this precise problem; There's no logging to even know how long certain things take; we can only guess as to the slow parts of the app until we add timings to the project.

2: If you have sequential operations, Don't be afraid to lightly multithread. ESPECIALLY if blocking operations are involved. PLINQ is your friend here.

3: Pregenerate your MVC Views when Publishing... That will help with some of the 'first page hit'

4: Some argue for the stored procedure/ADO advantages of speed. Others argue for speed of development of EF and a more clear separation of tiers and their purpose. I've seen really slow designs when SQL and the workarounds to use Sprocs/Views for data retrieval and storage. Also, your difficulty to test goes up. Our current codebase that we are converting from ADO to EF is not performing any worse (and in some cases better) than the old Hand-Rolled model.

5: That said, Think about application Warmup. Part of what we do to help eliminate most of our EF performance woes was to add a special warmup method. It doesn't precompile any queries or anything, but it helps with much of the metadata loading/generation. This can be even more important when dealing with Code First models.

6: As others have said, Don't use Session state or ViewState if possible. They are not necessarily performance optimizations that developers think about, but once you start writing more complex web applications, you want responsiveness. Session state precludes this. Imagine a long running query. You decide to open a new window and try a less complex one. Well, you may as well have waited with session state on, because the server will wait until the first request is done before moving to the next one for that session.

7: Minimize round trips to the database. Save stuff that you frequently use but will not realistically change to your .Net Cache. Try to batch your inserts/updates where possible.

7.1: Avoid Data Access code in your Razor views without a damn good reason. I wouldn't be saying this if I hadn't seen it. They were already accessing their data when putting the model together, why the hell weren't they including it in the model?

9. A9: Implement Gzip.
10. Use asynchronous rendering for partial views.
11. Minimize database hits.
12. Use a compiled query.
13. Run a profiler and find out unnecessary hits. Optimize all stored procedures which are taking more than 1 second to return a response.
14. Use caching.
15. Use [bundling minification](#) optimization.
16. Use HTML 5 utilities like session cache and local storage for readonly contents.

586. <https://stackoverflow.com/questions/4808788/asp-net-mvc-performance>

T: ASP.NET MVC performance

Q: What aspects of MVC performance affect your web application performance the most? Database access is usually pointed out as the default culprit but are there other components that have an impact? Do you prioritize the number of concurrent clients, the memory used on the server, the response time, or something else?

This [answer](#) contains some very good general suggestions but I'm looking for specifics of where the framework falls short of your expectations.

A1: The ASP.NET MVC framework is great and sites like this one which is using it are obvious examples. There is nothing in it that affects my applications performance. It just works very nice. What affects performance is poor code or poor architecture conception but that's definitely not something we can blame the framework for. After spending years with ASP.NET webforms I cannot say that the performance of MVC is worst or better, what I can say is that it converted the painful experience of writing web applications into something that brings so much joy. I've been successfully running applications in production since ASP.NET MVC 1.0 and never had any problems.

In your question you mention database access => that's a problem that all web applications have and which is not inherent to the framework being used. Also in heavy traffic sites the usage of caching could improve performance and ASP.NET MVC have some really good caching mechanisms built-in.

So, all I can say is that you and the team delivering this great framework are doing a very good job.

A2: Now that I realize who is asking this question I understand the question better.

The biggest problem I've had with MVC is that RenderPartial can be very slow when you're using embedded resources as views. If I remember this was caused by the VirtualPathProvider not performing that well. We ended up trying to use memoization to speed some calls up but eventually had to start writing directly to the view output stream.

I think we ran into the same issue as the lostechies guys did with a similar take on their input builders only we used it to generate grids.

587. <https://stackoverflow.com/questions/31846988/does-lots-of-controllers-slow-the-performance-mvc>

T: Does lots of controllers slows the performance? MVC

Q: I want to ask a simple question about MVC controllers. I have googled a lot about controllers for "different controllers for each basic table", it cleared a lot of things but i have one question that i couldn't find answer for.

**My question is that if i create controller for each basic table, lets say i have 10 basic tables that would create 10 controllers. So does lots of controller slows the application performance?**

- In case, when going from view to controller.
- In case, when going from controller to another controller.

I am new so kindly be calm :)

A1: Usually, one request is processed by one controller. And if it (cotroller) is small and have a few dependencies - it's quick. When you have one huge controller with many dependencies of other classes that have their own dependencies and so on... it could be a problem.

A2: It depends on the number of calls to controller. If you make frequent call to a controller for 2 to 3 table so it may get slow. Instead group that 3 table in one controller and call that. If your application needs to work in individual table than its fine, You will get response quicker. But if your application needs content from 2 to 3 tables than you have to call that 3 controller. So here the better way is to group that in one controller. Hope you got the point

588. <https://stackoverflow.com/questions/18483760/performance-in-mvc-web-application>

T: Performance in MVC web application

Q: I am struggling to get some performance in my MVC application. I am loading a partial page (popup) which is taking hardly 500ms. But each time the popup loads it also downloads 2 jQuery files as well. Is it possible to use the jQuery from cache or from parent page?

I have attached the image in red which shows 2 additional request to server.

A1: In order to improve the performance you can try with the following approaches:

4. see if your application server supports GZip and configure the application/server to return the responses always archived in Gzip
5. Use minified version of JQuery
6. there are also Packing libraries where you can pack all the imported resources, such as CSS files and JS files, and the browser will do only 1 request per resource type. For instance, in Java we have a library called packtag.

In general, I recommend you using Google Chrome browser and its performance analyzer. It will give you good hints.

A2: Does the popup use an iframe or does its content just get added to the DOM of the current page?

If it gets added to the current page you could try just adding the script references to the parent page instead. It might not always be the best idea if the parent page has no need for those two files, but if the parent page also uses the jQuery validation then the popup will be able to use the parent's reference to the script file.

For an iframe I'd suggest looking at Gzip and minification to make the scripts load faster.

589. <https://stackoverflow.com/questions/3239727/spring-mvc-3-0-with-annotations-performance-tuning>

T: Spring MVC 3.0 with Annotations performance tuning

Q: Spring MVC 3.0 with Annotation seems like a great framework for the enterprise web development. However, the issue of performance tuning often comes up when you deal with any web applications, and I am wondering how the use of Annotations affects the strategy for improving performance. For example, would the Annotation-based validations slow down the system? Are the annotated classes, controllers, beans performing as well as those defined with the XML? Would the fact that the Annotations in Spring 3.0 MVC allow such dynamic and flexible request mappings can potentially make the performance measurement and tuning more difficult?

A: In my opinion annotation approach must have exactly the same performance as XML approach. In both cases Spring creates some BeanFactoryPostProcessor instances and another kinds of helper objects which use different sources of information (XML or annotations), but do exactly the same thing: update bean definitions, create proxies around beans, create some infrastructure objects and so on.

Anyway, @skaffman is right. You could try both approaches and do some profiling.

590. <https://stackoverflow.com/questions/30618599/mvc-application-performance>

T: MVC application performance

Q: I created an ASP.NET MVC 4 web application that running on my local machine(windows 8 64bit)and IIS 7.5, I need to measure the performance of the application (Memory usage, CPU usage,...) any help regarding tool or any way helps me to get my target? and whats is the normal values for Memory and CPU usage for good performance application?

591. <https://stackoverflow.com/questions/29817640/how-to-improve-the-performance-of-asp-net-mvc-web-application>

T: How to improve the performance of ASP.NET MVC web application?

Q: How to improve the performance of an ASP.NET MVC Web application?

Which are the fields I should take more care?

In my web application contains **Database connections, API and Image Parsing** etc.

A1: Find the bottleneck and remember to optimize a common use case instead of something that can be optimized but isn't used yet. If you don't know Amdahl's law you should have a look at it. Set your goal to run 1000 times faster, check loops in loops and/or if you fetch more data than needed. Caching can also drastically improve performance. A good book about this is called "Creating faster websites" and "Even faster websites" which tells you a lot of how to optimize for the web.

592. <https://stackoverflow.com/questions/221944/is-there-a-performance-difference-between-asp-net-mvc-and-web-forms>

T: Is there a performance difference between asp.net mvc and web forms?

**Q: Possible Duplicate:**

[ASP.NET MVC Performance](#)

I know there is a learning curve, but what about performance? It seems to me that web forms would be less performant, but I havent tried MVC yet to know for sure. What is everyone else experiencing?

A1: The thing about WebForms is that it's very easy to make a page that performs really bad, because it encourages you to do a lot of simple updates server-side that really should be done client-side. If you're paying attention to your postbacks and ViewState then WebForms isn't so bad. Also, MVC has the *potential* for better performance because it takes fewer steps during a page load, but *realizing that potential* can require a lot of discipline by the programmer, just like web forms.

A2: This is almost a duplicate question. Here are some similar discussions:

[ASP.NET MVC Performance](#)

[What are the key differences between ASP.NET webforms and MVC](#)

[Biggest advantage to using ASP.Net MVC vs web forms](#)

A3: This is debatable because both of them have different performance pros and cons, for example ASP.net MVC gives you control over the HTML/JS that gets to the browser, so you can minimize the amount of data on wire to make the whole application weight less, however ASP.net MVC routing have so much dependency on Reflection, which is relatively slower than fetching a file from the disk which Web Forms is doing.

<https://stackoverflow.com/questions/5169155/improving-asp-net-mvc-startup-performance>

T: Improving ASP.NET MVC startup performance

Q: I'm trying to improve the speed at which my MVC2 app is starting up.

I did a first round of performance sampling, and it appears that the

[MvcAreaRegistration.RegisterAllAreas](#)

is taking up most of the startup time.

I read [here](#) that you can manually register the area's as well, and I would like to try that out, but I'm not sure how the syntax works on that page.

So my (first) question woud be: how can I register my Area's manually?

A: Try [this super handy area registration utility](#). Not only does it make registration easier, but also way faster since it doesn't scan every loaded assembly for areas.

593. <https://stackoverflow.com/questions/9106377/improving-the-performance-for-the-asp-net-mvc-3-application>

T: Improving the performance for the asp.net MVC 3 application

Q: I am working on an asp.net MVC 3 web application, i have the following two questions about the performance of my mvc application:-

3. currently i am implementing all the business logic in one model repository class , expect that the repository implementation is quit huge (in regards to the number of lines of code), i am not having difficulties in maintaining this repository class. But my question is WILL having one repository class that implement all the business login for all entities can negatively affect the application performance comparing to having more than one repository?
4. currently i am adding the data annotation for the entities properties to implement client side validation and helper methods in partial classes and metadattypeof as i am using Db first approach

A: No, it will matter FAR more the type of activity in your methods. This can get quite difficult to deal with, why not transfer your business logic out to another class.

594. <https://stackoverflow.com/questions/6465204/performance-of-asp-net-mvc-routing>

T: Performance of ASP.NET MVC routing

Q: Does anyone know, is routing processing time valuable in a comparison with the total request time? Will there be a large performance difference between an application with 20 and 100 (probably more) routings? Will be grateful for a link with the routings mechanism description.

A1: Take a look [here](#). Please note that this is an old answer from 2008, but I would guess it still holds true. In particular note the bit about using named routes.

In other words, if you know which route you will be using, then you can jump straight to the correct route with code like this: RedirectToRoute("routeName", viewData); and it won't waste time trawling through routes until it finds the correct one. This may seem a bit cumbersome, but it's better than hardcoding the routes as, if you change the way of generating your routes, this code will still work, whereas a hard coded route would break.

A2: I would venture to say no, the time is insignificant compared to the overall processing time of the request in most scenarios.

There are a lot of variables that might be worth considering if you are going to benchmark this. For example, how simple/complex are those routes? Do they have constraints with regex on them? et cetera.

595. <https://stackoverflow.com/questions/7529362/how-to-improve-spring-mvc-performance>

T: How to improve Spring MVC performance?

Q: **Are there best practises how to improve the performance of spring webapps?**

I use ehcache for static content, try to load JavaScript at the end of my app but the app doesn't run smooth yet. For a simple registration only the GET-request to map the url and initialize session and bean lastet over 7 sec.

Sure you can optimize a lot for specific, but I'd like to know about general performance issues and how to handle those.

*Patterns, best practises and so on are very welcome here.*

A: In general, I recommend:

- build a test environment where you can execute the application and get at the inside
- Write repeatable performance testing scripts, focusing both on absolute performance (e.g. "how long does it take to render this page") and performance at scale (e.g. "how does performance degrade under load?")
- glue a profiler into your test environment. It's been a while since I worked on Java apps, but there are lots of them available.
- run performance test whilst running your profiler. Work out what the bottleneck is. Fix the bottleneck.  
Rinse. Repeat.

I generally recommend NOT to have the test rig be similarly specified to production, because it makes it very hard to create enough load to stress the system. It's also very expensive.

If you have a "production-like" environment to test on, do it now - ideally, you'll get similar results as on the test environment, but not always; if at all possible, install the profiler and see where the bottleneck is.

Once you've done that, you can deploy the optimized app to your production environment.

A2: Create performance-tests (like with [jmeter](#)). Profile your application, either with a full-blown profiler or by instrumentation. If you are using spring (and spring-configured datasources), I like [javamelody](#) a lot which is a simple plug-in that instruments and compiles performance-statistics of your application.

Run the test, check the profiling information, identify bottlenecks, optimize the worst offenders. Repeat until satisfied.

There is no inherent performance problem with Spring MVC. Performance issues comes from other areas. Bad SQL queries, slow external integrations, excessive JSTL crazyness in your views etc etc.

A3: VisualVM is very useful for analyzing. Can be downloaded from [link](#). Memory Pools and Visual GC plugins which are not installed by default, also useful to monitor memory usage and GC activity.

596. <https://stackoverflow.com/questions/28042317/will-performance-of-website-be-affected-due-to-having-no-mvc-architecture>

T: will performance of website be affected due to having no MVC architecture?

Q: I have a php web app. But i have kept all the program files(css, html, php, js) in a single folder. I have not given architecture like MVC. Will this affect the performance of the website, and slows down the application?? Little puzzled. It will be great if anyone can give an explanatory. Thanks!

A: if only talking about performance, most mvc frameworks like the one i am using yiiframework has caching mechanism and various plugins to compress js and css. So personally i dont think mvc structure impacts the performance, but the extra stuffs packed with mvc frameworks.

597. <https://stackoverflow.com/questions/1919743/performance-wise-is-mvc-better-than-web-forms-in-asp-net>

T: Performance wise is MVC better than web forms in ASP.NET

Q: We are going to develop a website in ASP.NET. So is it better to use MVC or web forms.

A1: It depends on what kind of site you want to build and your knowledge and experience creating websites.

If you know your stuff and are confident in your ability to work "close to the metal" (as it were) I would imagine that you could build a faster website using ASP.NET MVC since you would be able to optimize your site to have as little overhead as possible. However it is more than possible to build a very fast site using standard ASP.NET as well so it really depends on exactly on the requirements of your project.

A2: Personally, I don't think there are big performance gap between asp.net mvc and web form. Because they actually employ the same underlying engine. In most cases, what makes performance a problem is how developers write their code, and the structure of the application. Usually, people tend to compare mvc and web form on the elegance, maintainability. <http://weblogs.asp.net/shijuvarghese/archive/2008/07/09/asp-net-mvc-vs-asp-net-web-form.aspx>

A3: My completely unscientific opinion: Yes; ASP.NET MVC is faster than web forms.

ASP.NET MVC gives screen pops on the order of 1 to 2 seconds. Web forms is more like 3 to 5 seconds.

I don't know if they switched to ASP.NET MVC when they did the lightweight version of the MSDN library, but the speed improvement is similar to what I described. And let me tell you, the usability improvement is like night and day.

A4: Web Forms and MVC each have their strengths. Web Forms typically has the familiar code-behind style of coding where you hook up a handler for something like a button click and write the code to handle it. MVC has a more separations of concerns style of coding and is generally more unit testable.

It all depends on your coding preferences and time required to deliver the project with respect to learning curves.

I would imagine this question has been answered a million times on this site an many other blogs.

598. <https://stackoverflow.com/questions/4269955/best-practices-and-tools-for-improving-web-servers-performance-in-asp-net-mvc>

T: Best practices and tools for improving web server's performance in asp.net mvc?

Q: Before the question here is what we tried to test the performance website. We simulated 80 users simultaneously on the website using [JMeter](#). So, I am working on database issues and other problem. But one of the problems was the web server performance was not good and it was maxing out. So , I am in the process of improving the web server's performance and have downloaded [Redgate Performance profiler](#) and also [dottrace](#). I was going to get into using these but I before that I thought of asking all you guyz who have done this before since I am newbie in this area what steps should I take additionally. Any advice or steps to be taken or any other tools you can suggest will be of great help. Basically I am just trying to know the best practices and tools to be used when profiling an asp.net mvc application.

A: There can be a million reasons why you're experiencing slow performance. Maybe it's just some method/page that takes long time to execute or consumes too much memory or did you mean that the overall performance is not good. Maybe you just need to upgrade your hardware, who knows. I would definitely try to locate the bottleneck by running a few counters in Windows Performance Monitor for CPU, RAM, Network, disk system on web server and db server while running JMeter. This should give you some ideas what could be wrong.

599. <https://stackoverflow.com/questions/5074856/how-i-can-optimize-performance-in-asp-net-mvc-based-web-application>

T: How i can optimize Performance in asp.NET MVC based web application

Q: How i can improve the performance of my asp.net mvc application [built in 3 razor]

well i want to do something to enhance the performance of my website by doing following things.

the page have much image [small images] are i can optimize them then client browser easily download them and trying to get them after page load.

because all css are not use on every time. in IE i found that most of css is unusable for page. like various jQuery or css plugin framework file not used in every page.

well are i can merge all css or js file then browser never send request to get css or js from server.

what i do then performance can be improved. are i should use

A: You may consider trying the [CSS sprites](#) technique - combining all (or most) of your images in a single one and applying them as CSS background. This will reduce the number of HTTP requests for images to just one (the sprite image itself).

Also consider minifying and combining your CSS and JavaScript files. There are [lots](#) of tools on codeplex which do that. Most important thing here is to set up expiry headers so the browser will cache the resources and never ask for them again.

You might also want to get rid of some background images and replace them with CSS background gradients.

600. <https://stackoverflow.com/questions/294582/php-5-reflection-api-performance>

T: PHP 5 Reflection API performance

Q: I'm currently considering the use of Reflection classes (ReflectionClass and ReflectionMethod mainly) in my own MVC web framework, because I need to automatically instantiate controller classes and invoke their methods without any required configuration ("convention over configuration" approach).

I'm concerned about performance, even though I think that database requests are likely to be bigger bottlenecks than the actual PHP code.

So, I'm wondering if anyone has any good or bad experience with PHP 5 Reflection from a performance point of view.

Besides, I'd be curious to know if any one of the popular PHP frameworks (CI, Cake, Symfony, etc.) actually use Reflection.

A1: Don't be concerned. Install [Xdebug](#) and be sure where the bottleneck is.

There is cost to using reflection, but whether that matters depends on what you're doing. If you implement controller/request dispatcher using Reflection, then it's just one use per request. Absolutely negligible.

If you implement your ORM layer using reflection, use it for every object or even every access to a property, and create hundreds or thousands objects, then it might be costly

A2: Sometimes using something like `call_user_func_array()` can get you what you need. Don't know how the performance differs.

A3: CodeIgniter definitely uses Reflections. And I bet the others also do. Look into Controller class in the system/controller folder in ci installation.

601. <https://stackoverflow.com/questions/27631490/what-is-the-use-of-repository-and-why-do-mvc-developers-create-repository>

T: what is the use of repository and why do mvc developers create repository?

Q:

I have seen in many **MVC project** concept of **Repository** but I don't know why many mvc developers use **repository**.

What is the advantage of creating **repository** ?

What is the use of **repository**?

If it improves **performance** then how it improves **performance**?

Are there any **guidelines** to create **repository**??

A1: The concept of repositories is referred to [DDD](#).

It is best to read the [book](#) about DDD by Eric Evans.

In short, the repository allows you to hide details of loading objects from a database. This is especially useful for complex composite objects.

A2:

5. A: Advantage of using Repository : Clean code, strongly typed view.
6. Use of Repository: Repository class may expose DB Table structure or it may be view model that can be passed to view to render data.
7. No performance gain.
8. Guidelines
  - i. Create repository to represent table in database, columns will be properties of that repository.
  - ii. Create repository which to bind strongly typed view. Its properties will be all attribute you want to display using view.

602. <https://stackoverflow.com/questions/31622302/is-it-a-good-practice-and-can-it-improve-the-performance-when-we-use-the-model-d>

T: Is it a good practice and can it improve the performance when we use the Model directly in the view, following MVC structure, PHP?

Q: I am working with Yii framework 2.0. But this question is for MVC in general. I understand how MVC works, but I am wondering whether it is a good practice and can it improve the performance of a website when we use a Model directly inside a view without passing it through a controller. To me, I think it might improve the performance because the controller does not need to process the model and pass it to the view. But I am not sure about that. I have read some article related to this. But each has his own opinion. Hope some senior PHP developers can give me some advice to improve me.

A: MVC is not about performance. It's about architecture. Some kind of methodology. In your case improvement of performance will be scanty.

If you think in other way - you should forget about OOP and think about procedural.

My advice will be not to use models in views directly.

A2: The benefit of an architectural style is that it provides defined roles for different components of your application. There is a lot of debate on where the actual work is done in the "MVC" architecture on the web, should it be done in the controller or in the model (the right answer is the model) but I think everyone agrees that the role of the view layer should be only presentation.

603. <https://stackoverflow.com/questions/33088507/is-caching-thousands-of-user-ids-in-session-variables-bad-for-performance-in-as>

T: Is caching thousands of user id's in session variables bad for performance in ASP.NET MVC?

Q: If I want to cache say 2 ids in a session variable for each user and there will be a possibility of thousands or more users online at once, will this affect my performance of the site?

A: From a memory perspective that is 2 integers (8 bytes) with 50,000 active users. That is only 400KB. From a speed perspective, the session is a hash table with fast lookup. You will spend more time doing actual work than ASP.NET will spend retrieving the session.

A2: If the session state mode is InProc then there should be no negligible impact to performance. You will notice an impact to performance if you are using a session state mode of StateServer or SQLServer due to the creation of network requests to retrieve the ids from the remote state server or SQL server.

604. <https://stackoverflow.com/questions/42810200/asp-net-mvc-performance-implication-of-having-large-variable-names>

T: ASP.NET MVC Performance Implication of having large variable names

Q: While it is ideal to avoid large variable names, small ones do not capture the essence of maintainability.

Where is the tradeoff between variable sizing on a typical IIS/ASP.NET setup with code readability, maintainability & understandability.

A: As never said.... Variable name lengths have absolutely no impact on run time performance because they simply are not part of the runtime code.

605. <https://stackoverflow.com/questions/5195447/how-does-a-node-js-mvc-work>

T: How does a Node.js MVC work?

Q: I'm really interested in systems written in node.js. Specifically using it to create an MVC application.

I was thinking about the differences between designing a node.js MVC and doing the same in PHP. Since PHP is loaded and interpreted at runtime, a change to one of my controllers or views will be reflected in live server performance as soon as the file on the server changes.

I'm wondering though, since node.js is compiled, is an application restart required every time you push changes?

If not, does MVC effect server performance overall, since the server has to read the files at request-time versus having the whole application sitting in memory? Or do perhaps have it all wrong and I'm missing the point entirely? (if so please educate me 'cause I'm dying to know!)

A: A typical node.js MVC application would store the model data in memory and on some kind of saved database like mongoose.

Every time a model changes it goes through your js and saves to the database. It shouldn't need restarting at all.

If you change your code you do indeed have to restart the server. I presume there are various programs out there to stop this from happening.

Although it's not Recommended

These are also Relevant: EventedIO

A2: Check out Express for a take on Node framework development. You can see some MVC there. The HTTP url parsing available in Node really makes writing a router easy for tossing requests to 'controllers' and requiring in models is easy.

Node can use a variety of databases from SQL (Postgres, etc) to No-SQL (CouchDB, Mongo, etc)

Here is an example of an already available "restart-node-on-changes" add-on

Here is a list of plugins/modules for Node

606. <https://stackoverflow.com/questions/5874448/best-practices-for-incorporating-wcf-into-an-mvc-middle-tier>

T: Best practices for incorporating WCF into an MVC middle tier

Q: I was wondering if some one has implemented a 3 tier application using MVC and WCF as the middle tier? Were there any performance issues/drawbacks rather than implementing a typical middle tier using .dll's. I was envisioning a Middle tier of WCF which would access the DAL (linq to SQL), any advice/links are greatly appreciated!

A1: 3 tier application with MVC and WCF generally means:

- Front-end ASP.NET MVC where in simplest scenario controller calls proxies of WCF services.
- Back-end/middle-tier WCF exposing your business logic / data access
- Database server hosting your database

Where should you use this? Only when you really have to - you have strict requirement for that. This of course has huge performance impact because front-end uses remote call for every business operation. Remote call can be either between processes on the same machine but most often to the process on another server (in another network). It also requires better design of interactions to reduce number of calls to minimum as well as using asynchronous communication to invoke multiple calls in the same time if needed.

A2: If you develop the web site which intensive use AJAX (per jQuery.ajax for example) you can implement it in the following way:

- Front-end can be made with respect of ASP.NET MVC. The data for the corresponding Views will be requested per AJAX.
- WCF published on the same web site as the ASP.NET MVC (see here an example) can provide JSON data for all AJAX requests. WCF can be seen as middle tier component which implement the business logic and get the data needed from the database server.

At such architecture of the application the ASP.NET MVC will be reduced to V (Views) using master pages. It can be generated different views depend on the user roles. The Model and the most Controller actions will be

moved in the WCF. WFC methods could be tested with unit tests exactly so good as controller actions. If you will need some other data like dynamically generated pictures (Charts for example) or dynamically generated Excel or WinWord files you can return all the data from WFC methods exactly so easy like you can do this from the MVC controller actions.

At such design of your application I see no performance or other disadvantages. Both View of ASP.NET MVC and WFC have many caching possibilities which you can use on demand.

607. <https://stackoverflow.com/questions/15814384/performance-difference-between-client-side-jqgrid-vs-server-side-jqgrid>

T: Performance Difference between client side jqgrid vs server side jqGrid

Q: I am working on an MVC project where I use [jqGrid for ASP.NET MVC](#). However I am told by that the [pure-jquery-client-side version \(jqGrid\)](#) is better in performance. Is this true? To me they both seem to be doing the same stuff, just that the code is in different places- all the bulk work is still done using ajax. any advise would be appreciated.

EDIT- most places I use the grid has less than a 100 rows, page size 30, about 10-12 columns, mostly strings and dates. Only one page I use a grid with 500 rows but that will be used rarely.

A: I don't think that you should rewrite your existing code, but I can agree that in case of usage less than 1000 rows of data the usage of loadonce: true is real alternative.

The design of jqGrid is oriented on server side sorting, paging and filtering/searching. So most users who start to use jqGrid in version less than 3.7 have already good implementation of backend. SQL Server with native code should be sure more quickly as JavaScript code were originally designed as interpreter language. On the other side current versions of web browsers contain quickly JavaScript engine. Every new version improve more and more performance of JavaScript.

It could be important for the user *the total time* of the paring, sorting or filtering operation. It includes the round trip time to the web server. One can better do exact measure in productive environment to compare performance of local grids with grids with pure remote datatype ("json" or "xml" without usage of loadonce). The rough rule which I use myself is:

- if the number of rows under some 1000 rows I use loadonce: true and so client side paging, sorting and filtering of data
- if the total number of rows larger as 10000 I use always server side paging, sorting and filtering

Your environment (network, Round trip time to the server and so on) could be other. So the edge when you should better user client side holding of data and when server side holding could be other. Nevertheless *the usage of loadonce: true could be really very effective* in the practice.

I personally don't use commertial version of jqGrid which you referenced. So I have to write backend side myself. In case of usage of loadonce: true the server code is very simple. It's easy to debug and to maintain.

608. <https://stackoverflow.com/questions/46368174/how-do-i-reuse-generalize-similar-code-to-optimize-performance-net-mvc>

T: How do I reuse/generalize similar code to optimize performance (.NET MVC)

Q: I am working on 5 different projects which basically do the same things in the background. 90% of the server side code of all the projects is same (including method names, calls to database). I guess the person before me have copied and pasted the code to achieve the same functionality. Since majority of the code is similar for all 5 projects I am planning to optimize/reuse/generalize the code. For first I thought of creating DLL, but again including DLL in all projects will not make it generalized. I also thought of using WebAPI for the common functions but not sure whether I can achieve my goal. Can you please suggest the best thing that I can do in my scenario.

609. <https://stackoverflow.com/questions/1541964/how-can-i-profile-an-asp-net-mvc-view>

T: How can I profile an ASP.NET MVC View?

Q: I'm trying to improve the performance of an ASP.NET MVC app. Pages take about 700 msec to display, and I know that my controller takes about 200 msec. This means the View is taking 500 msec. How can I profile a View?

I don't know regular ASP.NET -- perhaps there are standard things everyone else is aware of?

My View iterates over my Model and displays a table of about 25 rows. I'm surprised it takes 500 msec.

A: If you are using the default view engine (the web forms view engine), you may be able to use the standard asp.net tracing to see what is happening in the page [http://msdn.microsoft.com/en-us/library/y13fw6we\(VS.85\).aspx](http://msdn.microsoft.com/en-us/library/y13fw6we(VS.85).aspx).

610. <https://stackoverflow.com/questions/24941468/can-spring-mvc-hibernate-validation-be-a-substitute-for-javascript-validation>

T: Can Spring MVC/Hibernate validation be a substitute for Javascript validation?

Q: I am new to Spring MVC. I came across the validations provided by hibernate-validator and Spring tag. I have done only a little bit of web programming (Perl) where I had done Javascript validations on the front-end combined with back-end validations to keep out invalid data.

Seems to me that with the validations provided by Spring MVC, one could do validations only on the back-end. What would be different is that all validations would have to wait until the user submits the form. Also, since there would be no front-end validations, performance could be an issue. What I am asking is what is the right approach to form validations while using Spring MVC.

A: Backend validation only does work. While validation only on the client does not work, because it is insecure.

But usability often becomes an issue with Backend validation due to the performance.

You can still validate on the fly on the backend, by calling your backend onBlur but now your application tightly couples frontend and backend together. Frameworks like JSF do this, and IMHO it is a really bad idea.

Some frameworks (also JSF) try to automate the validation on the frontend based on annotations in the backend. But this can only work as long as you stick to a limited set of prepared annotations, so again not a solution for the problem.

So I'd say: stick with the usual approach of having frontend validation based on javascript and backend validation with whatever tool you happen to use. Everything else is either severely limited or gets overly complicated fast.

A2: Sry, but the "right approach" here, as for **all** (client/server) Validations, regardless of the programming language, the framework etc., is to rely on frontend **and** backend-Validation, because frontend-only is simply insecure (read [here](#) or [here](#) for more).

e.g. use for Frontend some JS/jQuery-plugin, for Backend SpringMVC/hibernate @Valid-Annotation with the corresponding checks at your entity. Use Ajax-calls or something similar if you don't want to wait until submit is pressed. [Here](#) is an example (untested )

611. <https://stackoverflow.com/questions/20695202/does-long-polling-have-performance-issue>

T: Does long-polling have performance issue

Q: I'm going to use long-polling in my asp.net mvc application. Some of the connections will probably be pending for response for more than 10 minutes. I know the connections will be "hung up" so they won't occupy the connections in IIS connection pool for a long time(correct me if I'm wrong). But with the amount of user grows, the concurrent connections will be more and more, the web server will have more "background" threads. Will it cause performance issue? If yes, what's the approximate order of magnitude that the server can handle? And what other *better solutions* should I take? Thanks.

612.<https://stackoverflow.com/questions/9868271/bad-performance-in-a-99-read-only-nhibernate-web-application>

T: Bad performance in a 99% read-only NHibernate web application

Q: I am currently investigating a ASP.NET MVC web application which is reported to have poor performance under load. (But load is only a few requests per second).

We are using MySQL + NHibernate + Castle ActiveRecord for the mapping. A NHibernate session is opened at the beginning of every session and kept open in view.

I already optimized the data access pattern to avoid Select N+1 problems where possible.

Now what I'm thinking about is.. on each request a database transaction is opened and committed at the end. And in 99% of our requests (MVC actions) no data has to be written to the database.

3. Is it possible and do you see benefit in closing sessions/transactions earlier or even mark sessions as read-only?
4. Could database locking be a bottleneck and if so is it possible to explicitly avoid locking at least for the read-only transactions?

A1: You should verify that your application is not loading huge amount of data from DB. Even with all select n+1 resolved you can load millions of records and it is going to be very slow.

Verify your pages with [NHibernate profiler](#). It will come up with optimization suggestions. If not, probably NH is not your bottleneck.

A2: If you only have few requests per second, then the overhead of opening transactions is not the reason for the poor performance. Try to let NHibernate log all the SQL that is sent to the server. This can give you some idea of why the thing is slow. Probably it is sending a billion queries for each HTTP request or else some well-chosen indices on your tables could probably help you.

613.<https://stackoverflow.com/questions/32663623/performance-tuning-saving-records-exponentially-grows-every-500-records>

T: Performance Tuning: Saving records exponentially grows every 500 records?

Q: I wrote a class to read in a CSV file that houses 4k records, 72 col wide. The 'read()' into the List takes literally a second, maybe...

Once the loop executes successfully, I call db.dispose();

I haven't built too many classes outside of the MVC controller structure because I'm new to this so go easy on me ;). I'm assuming that I'm tying up precious resources using this approach which is causing the exponential processing time issue.

Any suggestions on how to improve performance? Thanks in advance!

A: This credit should really go to Atoms for pointing out the "AutoDetectChangesEnabled" reference. I found a great article by Rick Strahl here; <http://weblog.west-wind.com/posts/2013/Dec/22/Entity-Framework-and-slow-bulk-INSERTs> which explains it well!

My 15 min processing just got knocked down to 45 seconds wooot!!!

Thanks!

614.<https://stackoverflow.com/questions/16734271/should-i-use-custom-model-binder-to-bind-view-model-to-entity>

T: Should I use custom model binder to bind view model to entity?

Q: Just some idea to make more use of custom model binder. I am currently still using IMapper interface to do so, though wondering whether part of the purpose of custom binder is to mapping view model or input model to business entity? I can see there might be some limitations if i use MVC custom binder. What is the advantage to use the custom binder in MVC? Will my app gain better performance?

A: Short answer would be **No, you should not**

ModelBinder by itself is part of ASP.NET MVC infrastructure. If you would take a look at ASP.NET MVC pipeline ([PDF](#)) you would see that it's job is to convert a posted web form data (a string basically) or query string from URL to an instance of particular class.

ASP.NET MVC framework has a [DefaultModelBinder](#) that is suitable for 99% of cases. Custom model binders could be used in situations where standard data conversion fails e.g. mapping \$ 1,234.56 from a textbox to a decimal value of 1234.56

Moreover ModelBinder implements IModelBinder interface with a single [BindModel\(\)](#) method. This method expects parameters that would be hard to 'hand-craft' to make any use of them and are totally not relevant to your scenario.

What you are really looking for is

- either custom object mapping between viewmodels and business objects where you manually assign one object property values to another
- or taking advantage of libs/frameworks such as [Automapper](#) or [ValueInjecter](#) which take care of object mapping hassle away from you
- or a mix of both

615. <https://stackoverflow.com/questions/22131962/is-the-mvc-model-appropriate-for-a-basic-solitaire-game>

T: Is the MVC model appropriate for a basic solitaire game?

Q: I'm trying to write a basic solitaire app for Android, just for practice, but I want to use the best design I can. I've written code in Java, but nothing for Android yet. For the GUI, I figure I can either use the MVC model entirely and make view classes that are very similar to classes I've already written, or I can make some of those classes into view classes to avoid duplicating code and possibly improve performance. The plan I have that doesn't use MVC completely is to make the Card class, which just saves the rank and suit of the card as well as whether it's facing up or not and is mostly for data, into a subclass of the Android View class, just adding methods for drawing and other necessities. Either way, I'm going to make a custom view class for cards.

So, my question is whether it's worth the duplicate code and virtually identical data in order to use MVC. I'm also open to ideas for an alternative design; I just want to learn. Thanks in advance!

A: Just to answer your question:

So, my question is whether it's worth the duplicate code and virtually identical data in order to use MVC. It's all up to you, Google's Documentation recommends avoid object creation exactly like this kind if possible, so If you consider the benefits of having the MVC implementation worth you should go for it, but take on count that programming for mobile devices involve constraints in memory and performance, if the design starts impacting the performance of your application even when the code is "scalable, extendible, etc..." it might not be the way to go, in case of mobile designs I always go for a good programming advice I took from a Book "Make code usable before making it reusable" but always avoid to do a disaster, there's no hard rules in software, you could implement a light version of MVC that meets the balance between having readable code and good throughput code.

616. <https://stackoverflow.com/questions/194674/how-to-cache-images-in-memory-on-the-web-server-for-an-asp-net-mvc-web-app>

T: How to cache images in memory on the web server for an ASP.NET MVC web app?

Q: I am working on a web application with many images, using ASP.NET MVC. I want to be able to cache the images in memory to improve the performance, but I would like to hear what is the best way to do this.

- 1) The images are accessible from URL, like <http://www.site.com/album/1.jpg>. How are the images stored in memory? Are they going to be in a form of memory stream?
- 2) How to access the image from memory and send to the web page? Now the web pages will use the image URL to directly embed the image in a tag.

A1: Won't the webserver and downstream caches be handling this for static resources anyway? Not sure there's many performance gains to be had, but knowing nothing of the app or setup I could be wrong.

To implement I'd setup a page that took an image filename and served it either from disk or from the asp.net in memory cache.

A2: If the images are just static files on disk, then Beepcake is right that IIS will already be caching frequently used images and serving them from memory. Using separate caching servers shouldn't be any quicker than IIS serving an image from memory - it's got more to do with scalability. Once you have a large server farm, it means you have a group of servers just dealing with your code and a group of servers just dealing with static images. Also, if you have too much content for one server to cache it all then you can route requests so that each of your ten servers caches a different 10% of your content. This should be much better than just having each server cache the same most-used 10% of the content.

A3: If you want really good performance, I'd suggest Amazon CloudFront. Edge caching will give you better performance than memory caching, and CloudFront runs nginx, which is significantly better than IIS at static files (among other things).

Setting up edge caching is very easy - you log in, and get an domain to use instead of your own for image URLs.

A4: Thanks for the response. I think I was thinking the wrong direction. I just found out Flickr is using Squid to cache images.

617. <https://stackoverflow.com/questions/18838878/can-i-cache-https-resources-in-browser>

T: Can I cache https resources in browser?

Q: I am currently working on improving the performance of my asp.net mvc 4 application. The entire site is in https so all static resources such as javascript, css, images etc are supplied over https.

I have read different feedback in that its not possible to cache such resources in the clients browser - is this correct? Is there a way around it?

A: Yes

Default is yes for IE and Firefox. Believe same for Chrome.

To check settings.

IE : Options, Advanced, "do not save encrypted pages to disk"

Firefox : about:config, browser.cache.disk\_cache\_ssl

618. <https://stackoverflow.com/questions/2287961/curious-whats-currently-the-recommended-way-of-coding-rest-web-services-in-c>

T: Curious: What's currently the recommended way of coding REST web services in C#?

Q: So, what do the experts recommend? WCF Rest Toolkit? ADO.NET (now WCF) Data Services AKA Astoria? Hand rolling it using ASP.NET MVC? Other?

Requirements are fairly vanilla: HTTP GET/POST for a small number of resource types, XML and JSON output, needs to live in the same appdomain with a SOAP ASMX web service.

My criteria are:

- A) performance
- B) development complexity (including the learning curve)
- C) maintainability

A1: If you already have your data in a structured form in a database like SQL Server, and you want to expose those bits of data (e.g. your customers, their orders etc.), then the WCF Data Services is probably one of the most efficient and productive ways to expose your data. It handles a lot of the underlying goo for you and lets you concentrate on what you want to expose, and what to hide. And it even supports things like querying in the query strings, and inserts and updates quite easily.

If you have more non-structured data, both bare-bones WCF with the REST starter kit or ASP.NET MVC seem to be quite valuable choices. Haven't done much myself with either of the two, but both are quite current, quite productive for developers and should fit nicely in your environment.

So I guess in your position, I'd check out WCF Data Services first and use it, if it fits the bill - and if not, choose between WCF REST Starter Kit (which also works with classic ASP.NET webforms, or winforms, or console apps, or WPF, or Silverlight) - or check out ASP.NET MVC if you're going that way already in your project.

A2: The best framework for REST services I have seen is OpenRasta, which is built from the ground-up to enable REST simply. <http://trac.caffeine-it.com/openrasta>

Building RESTful services with OpenRasta is much simpler than with WCF in my experience. This is also then reflected in the ease of maintenance. I haven't tested performance, but have never noticed it to suffer in this area, and because of the clean architecture I would not be surprised if it were quicker.

Some other links for you:

<http://codebetter.com/blogs/kyle.baley/archive/2009/04/19/openrasta-or-how-to-speak-rest.aspx> <http://blog.huddle.net/we-love-openrasta> <http://www.vimeo.com/3385419>

I haven't used the Data Services, but from what I've read I don't think they count as truly RESTful, but they may meet your requirements. I don't know.

A3: If you use the .NET 4 framework REST has much better support using RouteHandlers. If you are looking to implement on earlier versions, I would just implement your own HTTP handler and use IIS6 wildcard routing (aspnet\_isapi.dll) to process your requests.

With the REST starter kit you are limited to having a .svc file, but if you implement your own handler you can parse the requests manually and have much more granular control over the restful service. There is some additional complexity but its mostly around deployment.

619. <https://stackoverflow.com/questions/44117115/what-are-the-cons-of-the-riblet-architecture-in-uber>

T: What are the cons of the riblet architecture in uber?

Q: I am studying the current architecture of uber rider app and I got to know the current rider app was evolved from mvc to a specific architecture called riblet, which is designed on top of viper by Uber themselves. As I understood reblets is independently testable pieces that each have a single purpose. I'm aware that the new architecture is capable of handling performance and the scalability. I am interested in knowing the cons of the riblet architecture

A: Okay. I found some **cons of the riblet architecture**. I will post them here to discuss with anyone who is interested. The main cons are as follows,

- Since there is a higher number of independent riblets communicating through their interfaces, there is a probability of failure of a particular interface compared to a system with fewer components.
- Yes testing a single riblet is easy yet it makes integrations and handling the requests among riblets more complicated.

- Changing the technology stack in the long run is difficult

620. <https://stackoverflow.com/search?page=32&tab=Relevance&q=performance%20MVC>

T: Profiling web app requests

Q: I am building a web app and one of the tasks is to improve performance. I want to know of any tool that can be used for timing web pages.

For example I need to be able to document to the managers that a particular page did take 5 seconds to load and now takes 1 second.

Are there any tools that can help with this? It is not a publicly accessible web site and is written in ASP.NET MVC.

A1: I handle this by logging response times in the access log. Apache supports this, so you could proxy through a proxy server. IIS may support the same in a custom log format. However, logging on the server side only covers how fast the page is delivered.

Perceived response time is highly dependent on proper HTML and CSS. Providing sizes for included content can speed rendering time for the page significantly. It can allow the visible portion of a page to render and stabilize before the page had finished downloading.

Download times for included content such as CSS, script libraries, and images can also have a significant impact on perceived response.

Client side web testing tools may provide a better solution for this kind of effort. Done correctly, they will also demonstrate that you haven't broken the web site.

A2: Chrome and Safari can measure the page load time with their development tools. Fiddler also can do this, albeit it does not give you as nicely aggregated picture. I suspect Firebug also can do this, but I never used it, so can't vouch for it.

Note that these are for manual measurement. There are more sophisticated tools, if you want to do automated perfect testing that will run multiple scenarios, aggregate the data and compare it to a baseline to give you a delta of the changes. If you live in Microsoft world, you can Use Visual Studio integrated test tools, or the standalone Web Capacity Analisys Tool. If you live in the open source world, take a look at Apache JMeter. There are also number of third-party tools, showing when you search for "web page performance testing".

621. <https://stackoverflow.com/questions/28320189/one-web-application-or-multiple-web-applications-when-using-multiple-databases>

### **T: One web application or multiple web applications when using multiple databases?**

Q: I'm developing an ASP.NET MVC 4 web application hosted on IIS which will be using multiple databases on a single SQL Server 2014 instance (each database for a different company). The web application will be used for analysing and summing large amounts of business data.

What is the best practice in this kind of situation? Will there be performance issues if only one web application and pool is used with multiple databases? One database may have 1-20 users.

Which one would be a better choice, A or B?

A) 1 web application and 10 databases

B) 10 web applications and 10 databases

A1: Your question doesn't belong to **MVC** at all.

If you have large amounts of data and you worry about performance, then you should think about how to store and query data at the database level. And you may interested in this kind of questions:

4. What provider use to query data? (pure ADO.NET or an ORM like Linq-to-SQL or EF)
5. Should I have all databases in one SQL Server instance, or can I use linked servers or even union data on web server side?
6. Should I have my databases files on different hard drives?

Answering these questions:

4. ADO.NET is always faster than ORMs just because they all use ADO.NET at their core. But it's harder to maintain ADO.NET queries in future
5. Linked servers are slower especially if you have your database on different machines (you will transfer your data by net and it is not fast if the is a large amount of data)
6. In the performance way it's better when your database files stored on different hard drives

Answer to your question now will be obvious, I think :)

Create one web application.

622. <https://stackoverflow.com/questions/23017233/should-we-build-our-signalr-solution-into-a-self-hosted-app-or-continue-to-use-i>

T: Should we build our SignalR solution into a self hosted app or continue to use it directly within our MVC app?

Q: We've currently got our SignalR 2.x Hub built directly into our MVC Web application. It basically works and now are thinking towards performance and scalability.

In terms of performance and scalability, is it better to have our SignalR hub be self hosted in its own app than be built into the MVC app directly?

What is the best strategy for building out a highly performant/scalable SignalR solution, especially as we scale out our application across a web farm?

A1: If you plan to scale signalR you will need to incorporate some sort of back-plane, this is needed if using a load balancer so if one client connects to one of the servers all of the other servers can send message to that particular client. The are server back plane support by SignalR sql,azure and redis. If performance is an issue i will suggest Redis see [here](#). and also [here](#) for more preformance oriented configurations.

That being said SignalR should be hosted in own app behind its own load balancer, that will give more control on its scalability.

623. <https://stackoverflow.com/questions/29127307/evaluating-differences-between-ejb-enterprise-application-and-spring-mvc-framework>

T: Evaluating differences between EJB Enterprise application and Spring MVC framework?

Q: Suppose I have to create a shopping cart website, it should accept lot of requests and process their request without any performance issue. Which method I can use EJB Enterprise application or Spring MVC framework..?

A1: I don't think the two are mutually exclusive. Here is a good discussion on coderanch that really helped me.

<http://www.coderanch.com/t/317507/EJB-JEE/java/EJB-MVC-pattern>  
Hope this helps.

A2: The well asked question IMHO would be Spring MVC vs JSF as the view part of the Java EE stack is currently JSF.

IMHO both are server centric (pages are built on server side) and quite obsolete now, I would personally go on a server part exposing a rest API consumed by a html5/javascript client.

Both Spring and Java EE stacks are well suited for building rest services (Using Jax-RS for Java EE or [one of these approaches](#) for Spring).

I would personally go with the Java EE stack as I prefer by far CDI to spring DI anyway just keep in mind that Java EE is the standard way but spring probably evolve faster.

Have a look to [this](#) before choosing.

624. <https://stackoverflow.com/questions/901920/advantages-and-disadvantages-of-using-mvc-design-pattern-model-view-controller>

T: Advantages and disadvantages of using MVC design pattern

Q: I am at the point in my design where I am contemplating dropping the MVC design for performance reasons, not sure if straight out PHP pages with header/footer includes would out perform my MVC setup (using PHP/Zend). I have a feeling it would.

Comments?

A1: What's the value of your time? Of your productivity? Of your code's maintainability?

vs. What's the cost of an additional server?

A2: I'm familiar with MVC from its original Smalltalk-80 context. The decision on whether to use MVC or something else is about clarity of the code, not performance. If there are particular problems with the performance of MVC in PHP, I don't know about them.

But again, the primary reason to move toward MVC is that separation of concerns is an important value in ensuring that software is supportable and maintainable over time.

A3: [This article](#) discusses MVC, and its inventor's new paradigm DCI that is possible going to be a challenger for traditional OO.

A4: It depends on what you're building. MVC can certainly be overkill for some things, and not even applicable to others. Weigh that against future maintenance, working with other developers, how much of the MVC design pattern are you going to be rewriting on your own, etc.

625. <https://stackoverflow.com/questions/21688196/mvc-folder-structure-structure-primarily-by-business-module-rather-than-m-v-c>

T: MVC folder structure - structure primarily by business module rather than M/V/C?

Q: I am designing a complex web based business solution. My Domain, Reports and Processes projects are structured around business modules (3-4 levels deep). Note that our domain models are held in Domain, and the WebUI need only contain ViewModels.

Aside from the problem of customizing the MVC routing/mapping, can you see any problems with this approach?

Given there will be many Views folders, could there be a performance concern with MVC having to search 500+ folders to find the relevant view?

A: Aside from the problem of customizing the MVC routing/mapping, can you see any problems with this approach?

Might lead to some pretty large project and it might be difficult to navigate for a newcomer. You could consider externalizing some of the logic in separate assemblies to avoid having a single monolith application. Consider ASP.NET MVC Areas.

Given there will be many Views folders, could there be a performance concern with MVC having to search 500+ folders to find the relevant view?

No, when running in release mode (debug="false"), ASP.NET MVC caches the location of the views and the lookup is pretty fast.

626.<https://stackoverflow.com/questions/13657457/reflection-and-performance-in-web>

T: Reflection and performance in web

Q: We know Reflection is a quite expensive engine. But nevertheless ASP.NET MVC is full of it. And there is so much ways to use and implement additional reflection-based practices like ORM, different mappings between DTO-entities-view models, DI frameworks, JSON-parsing and many many others. So I wonder do they all affect performance so much that it is strongly recommended to avoid using reflection as much as possible and find any another solutions like scaffolding etc? And what is the tool to perform server's load testing?

A: I have thought about this question myself, and come to the following conclusions:

- Most people don't spend their days resubmitting pages over and over again. The time the user spends reading and consuming pages which at worst contain a few Ajax calls is minimal when taken into context with the time spent visiting an actual website. Even if you have a million concurrent users of your application, you will generally not have to deal with a million requests at any given time.
- The web is naturally based on string comparisons... there are no types in an HTTP response, so any web application is forced to deal with these kinds of tasks as a fact of everyday life. The fewer string comparisons and dynamic objects the better, but they are at their core, unavoidable.
- Although things like mapping by string comparison or dynamic type checking are slow, a site built with a non-compiled, weakly-typed language like PHP will contain far more of these actions. Despite the number of possible performance hits in MVC compared to a C# console application, it is still a superior solution to many others in the web domain.
- The use of *any* framework will have a performance cost associated with it. An application built in C# with the .NET framework will for all intents and purposes not perform as well as an application written in C++. However, the benefits are better reliability, faster coding time and easier testing among others. Given how the speed of computers has exploded over the past decade or two, we have come to accept a few extra milliseconds here and there in exchange for these benefits (which are huge).

Given these points, in developing ASP.NET MVC applications I don't avoid things such as reflection like the plague, because it is clear that they can have quite a positive impact on how your application functions. They are tools, and when properly employed have great benefits for many applications.

As for performance, I like to build the best solution I can and then go back and run stress tests on it. Maybe the reflection I implemented in class X isn't a performance problem after all? In short, my first task is to build a great architecture, and my second is to optimise it to squeeze every last drop of performance from it.

627.<https://stackoverflow.com/questions/3298387/performance-improvement-for-insert-statement>

T: Performance Improvement for Insert Statement

Q: On my ASP.NET MVC application I'm running a couple of inserts at once that can insert 10000 or more lines and update a few others. This process is taking a long time but I can't escape the insert because that's exactly what I was asked to do. Right now I'm running Sql Server Profiler and it takes almost 20 minutes to insert this bunch of rows. How could I possibly improve the performance of this action?

(I'm using Linq-to-Sql to insert the data into the database.)

A1: Linq-to-sql really wasn't designed for inserting that many records to the database in one batch. It will do it insert statement by insert statement which is really slow. I'd recommend that anywhere where you know you'll

need to support this many inserts that you use the `SqlBulkCopy` object instead of your Linq-to-sql classes. You could even still use your same L2S classes if you need them for object validation, but then just dump them into a `DataTable` in 1000 row chunks and let `SqlBulkCopy` do your actual inserts. You could even google L2S and `SqlBulkCopy` and see what's out there as far as extension methods or other integration. You aren't the first one to run into this problem.

A2: What DAL do you use EF, L2S, ADO.net or something else? Insert shouldn't take so much time to complete. You can insert them to local cache, and submit changes later.

628. <https://stackoverflow.com/questions/4214413/best-option-to-custom-authentication-using-asp-net-mvc-cache-cookie>

T: best option to custom Authentication using ASP.NET MVC

Q: I am a bit lost using Authentication with MVC...

I'm looking for the best option to use in a big **E-Commerce** site, where the performance is top priority...  
The two options I'm looking until now are :

- Create a `FormsAuthenticationTicket` and encrypt it into a **cookie**, like implemented here : [Cookie implementation](#)

A: A more *MVCish* way to achieve this is to write a custom [AuthorizeAttribute](#) and perform this in an overriden [OnAuthorization](#) method instead of using Application `AuthenticateRequest`.  
This being said I think that your implementation is quite good. As an alternative of storing the additional information into the cache you could store it in the `userData` part of the authentication ticket if this information is not very large of course. Both approaches are viable. If you decide to go with caching I would recommend you offloading it to dedicated cache servers instead of storing it in the memory of the web servers.

629. <https://stackoverflow.com/questions/11129337/is-it-wise-to-make-every-class-loaded-automatically>

T: Is it wise to make every class loaded automatically

Q: i'm programming an MVC and i need an advice, is it wise to make every class loaded automatically including controllers,models ,core classes using `spl_autoload_register` or this may make issues or a slow performance.

A: In most cases - Yes, it is. Loading classes manually as you guess will increase performance, but a little and only in that cases where you have, for example, a library that consist from a lot of files (PHPExcel for example), but even in this cases it's more preferable to use Autoload.

In total: in most cases (especially for conventional sites) manual loading is micro-optimization.

The best way to deal with this feature - launch a benchmark if it seems that the performance drops a problem.  
The benchmark is the best way because all depends on the architecture framework

A2: This probably depends on many factors, but I have used frameworks where I load every class automatically (from a relatively large autoload function that looks in broad places) as well as a *lot* of nested includes. I have never noticed a performance problem with autoloading like that at all. It makes things significantly simpler since you don't have to worry about includes conflicting either.

As I said, though, it may depend. It's up to you to test out which method is faster with benchmarking. If you have a preferred method in terms of implementation that is slower, you will have to make the decision of whether or not the speed difference is enough to use an inferior but faster implementation.

630. <https://stackoverflow.com/questions/21059879/nhibernate-vs-entity-framework-6-performance-for-big-number-of-users>

T: NHibernate vs Entity Framework 6 performance for big number of users

Q: I'm building big web application that should communicate with the database very often. I'm wondering what library should I use for communication NHibernate or Entity Framework 6?

Here is my application specs:

- **Users:** The application built for big number of users, lets start with 100,000 users registered. 50,000 users online, every user can send up to 1 message at second. **15,000 messages got sent every second.**
- **Memory:** It's very important to keep memory in normal state so I suppose that I should use LazyLoad?
- **The database:** The database structure is very complicated.
- **Users engine:** Currently I'm using ASP.NET MVC 5 Identity with Entity Framework 6 UserStore.

Important things:

- **The comfort is very important to me!**
- **Code First:** I hate when code gets generated.
- **Performance:** The performance is the most important thing here!

A: As someone who is using NHibernate for several years I might not be the right person to help you choose between EF or NHibernate but here are some general pieces of advice that I've learned these years:

-**Be in control** : I mean choose an ORM that let you control every aspect of its functionality.Fortunately for us , NHibernate is one of them. You can call SPs and other Database objects and map their result to your objects.You can write interceptors to intercept NHibernate functionality and so on.

-**Avoid general ORM issues from the start**:one of them (which has a big impact on performance) is [SELECT N+1](#).

-**Use specific profiler to see how your ORM is working**: I think this is really important for us to be able to see how the ORM is working and what queries are actually running in the back.

-**Use cache whenever possible**: I don't know about EF but Nhibernate has a second level cache mechanism that you can use to cache ferequently read and static data in memory to gain a better performance

-**Have a plan for load testing and stress testing your application**: No matter which ORM you choose , there will be times that you should increase the performance of your application.I think the best way to see how an application is working on a large scale is to somehow simulate it and try to tweak it so that it works in its best condition.

-**Have a Plan B** : ORMs are designed to help us to solve the dilemma of storing data in tables and using them as objects in our application.Thus they are doing something extra for us and they tend to be slower than using data in tabular format.So there are times that it would be better to use a plain tabular format in our application instead of converting it to objects (Take showing a list of information for instance)

P.S. This might be off topic but have you consider using a NoSql database instead of a relational one ?

631.<https://stackoverflow.com/questions/9868271/bad-performance-in-a-99-read-only-nhibernate-web-application>

T: Bad performance in a 99% read-only NHibernate web application

Q: I am currently investigating a ASP.NET MVC web application which is reported to have poor performance under load. (But load is only a few requests per second).

We are using MySQL + NHibernate + Castle ActiveRecord for the mapping. A NHibernate session is opened at the beginning of every session and kept open in view.

I already optimized the data access pattern to avoid Select N+1 problems where possible.

Now what I'm thinking about is.. on each request a database transaction is opened and committed at the end. And in 99% of our requests (MVC actions) no data has to be written to the database.

3. Is it possible and do you see benefit in closing sessions/transactions earlier or even mark sessions as read-only?
4. Could database locking be a bottleneck and if so is it possible to explicitly avoid locking at least for the read-only transactions?

A1: You should verify that your application is not loading huge amount of data from DB. Even with all select n+1 resolved you can load millions of records and it is going to be very slow.

Verify your pages with [NHibernate profiler](#). It will come up with optimization suggestions. If not, probably NH is not your bottleneck.

A2: If you only have few requests per second, then the overhead of opening transactions is not the reason for the poor performance. Try to let NHibernate log all the SQL that is sent to the server. This can give you some idea of why the thing is slow. Probably it is sending a billion queries for each HTTP request or else some well-chosen indices on your tables could probably help you.

632. <https://stackoverflow.com/questions/7461187/profiling-slow-zend-framework-mvc-setup>

T: Profiling slow Zend Framework MVC setup

Q: I am struggling with poor performance in Zend MVC. I set up a single controller, which only does die(), and I enabled xdebug, and pulled up webgrind on my request which tells me: (The above pretty much tells me it's the bootstrap firing up classes defined in my application.ini - but I have no idea which ones are slow)

What's a good way to pinpoint exactly what step in the code which is taking the bulk of the processing time?

A1: You should be able to expand webgrind output to locate what is your slower function call. Alternatively you could use [function trace feature](#) of Xdebug during your profiling session to get more informations on your function calls.

Generally speaking you should use cache wherever is possible. Memcache is faster than APC as Zend\_Cache backend, but you still need APC extension installed (even in development mode) to get a great speedup of your code. I've benchmarked its impact on Zend Framework Quick Start [on my blog](#) (that post is in Italian, but benchmark data are in English) and the result is pretty impressive, a 3x speedup for the home page. I've applied the cache idea also for the Zend\_Application config file (which in your example take half of the profiling time). I discussed it [here](#) with Matthew Weier O'Phinney, Zend Framework project leader. What I've done is to override the default Zend\_Application\_loadConfig method with a custom one which caches the result of the parsed file. You can find my class which implement this strategy [here on github](#).

A2: After having stripped the require\_once of the library as explained in the official performance guide, you should install an opcode cache, like Zend Server CE, APC, or eAccelerator, even on your dev machine. Also, some resource plugins you may configure in your application.ini may require data caching in order to perform well, like Zend\_Db, Zend\_Loader, etc. (I won't explain the difference with opcode caching here) Don't forget that in production you will (and I really hope so) use opcode and memory caching, so you need to benchmark in close conditions.

In development you will certainly define a cache that invalidates very fast, so always refresh your page at least two times in a row before looking at the ms.

And then you can start to worry about your "real" bottlenecks.

Ok that was about ZF bootstrap performance. But your question was about profiling code. I use non-free tools for it, but **Xdebug** combined with **Kcachegrind** does it also quite well: <http://xdebug.org/docs/profiler>

633. <https://stackoverflow.com/questions/43390539/should-i-resize-the-images-at-server-side-or-use-css-for-the-mvc-application>

T: Should I resize the images at server side or use css for the MVC Application

Q: I develop a MVC + Angular js Ecommerce site with huge number of images been loaded. I have a few queries regarding the performance of the site.

3. There is huge number of images been loaded. Shall I create thumbnails of different size needs and then show them or should i resize with css or any other technique.
4. How can i cache the images for the site.

A: If you care about performance and load times, you should create thumbnails server side. Css will only scale the image to your desired width but will still load the bigger one.

I suggest to make your thumbnails and then use those different image sizes for your different needs (smaller ones for product lists, bigger ones for product pages...).

You could even make use of different image src's for the same place toggling them depending on device width so you go even further improving load times on mobile devices. You could achieve this via `ng-src` or even with css with `srcset`

634. <https://stackoverflow.com/questions/16448264/performance-improvement-of-page-where-million-records-are-present>

T: Performance improvement of page where million records are present

Q: I need some suggestion how to improve the performance of the application, I'm developing MVC 3 ASP.NET Application. From the controller , I'm pulling 50,000 records of type string, All the items i.e 50,000 are added to a HTML Div dynamically using Jquery.

I see there is considerable amount of time is taken while adding above radio button to parent control i.e HTML DIV

The parent HTML DIV has Check box, on checking that, all the child box must be selected. I see there is considerable amount of time for checking all items

All these items are in Scroll Viewer, Is there a way to improve user experience, Like loading data on Scroll basis some thing like Data Virtualization of **Silverlight** in HTML 5.

I Check all items and Drag on to another part of page, which make Browser to non responsive mode. Can anyone provide me best user experience of these many records with improve Query performance

A1: You should create a documentFragment and add the nodes there. And after you finish add the documentFragment to the DOM. Also, it's more efficient to use createElement than to use strings. There are a lot of jsperf tests to prove that and there you can also find ways to do it in the most efficient way.  
To prevent the browser from completely freezing for a long period of time, you should break your iteration in batches of...1000 item (pure guess). And call that function as many times as you need to finish the job. Keep a counter outside it. Call it with `setTimeout(renderMore, 0)`. At least this will keep the window from freezing.  
Depending on your UI and workflows, there might be some other improvements you can apply. But you didn't provide much info about that.

A2: Basically, to display large dataset, try this:

- 1) Store it in browser memory, use `sessionStorage()` or `localStorage()`
- 2) Minimize DOM, do not write ALL data to DOM, dynamically add & remove the elements.
- 3) Allow dataset to be searchable, this means a filter function that trims the dataset.

Another recommended way of resolving this is to use [Megalist](#), require jQuery and works well for tablet or mobile.

635. <https://stackoverflow.com/questions/3390716/how-do-i-improve-performance-of-wcf-web-service>

T: How do I Improve performance of WCF Web Service?

Q: I have an MVC application that calls several different web services. While running load tests on the application, I noticed that performance (both throughput and response times) degraded quickly as the concurrent users increased. By process of elimination, I stripped everything out except for a single dummy call to the web service which just returns an empty object and produces a tiny bit of html.

Hitting that test page from another server (using Pylot) with 100 concurrent users, I peak at around 9,000 requests per minute. By comparison, a static html (~70k) peaks at around 20,000 requests per minute. I also created another test page that calls another service (running Solr) and peak at 18,000 requests per minute for a simple query.

I know that it's hard to interpret much from these "results", so I'm looking for any information on how to tune a WCF Web Service for optimum performance under load.

A: I did a bunch of performance work on our WCF services a while back, mainly in terms of increasing the level of currency going through our app. I put the stuff I learnt in a blog post which hopefully you will find useful:

<http://theburningmonk.com/2010/05/wcf-improve-performance-with-greater-concurrency/>

Also, check out the links to Dan Rigsby and Scott Weinstein blog posts at the bottom of the page, they did some really good posts some time ago on improving WCF performance too which I found really useful.

A2: Unless you provide more detail I can't be sure, but are you running out of process space in MVC or in WCF? You could easily run out of processing space in MVC if you are not using an MVC AsyncController. Issuing an WCF request will consume the IO thread of the UI and block / queue other calls after thresholds have been met.

<https://stackoverflow.com/questions/25887623/analyse-c-sharp-method-call-bottle-neck-in-mvc-application>

T: analyse C# method call bottle neck in MVC application

Q: I have a performance issue with a method call on a dll I have written. The following line gets called

```
lineManage.GetEnquiryLines(ident,null);
```

When calling it from a unit test project the code executes in {00:00:00.5339113}, however when I call the same method from my MVC application it seems to add another two seconds to the time to execute. Both are being run on the same machine.

Does anyone know of any way of identifying what's causing the bottle neck. I've tried using the profiler in visual studio, but that hasn't helped.

636. <https://stackoverflow.com/questions/15036174/multiple-web-roles-inside-one-cloud-service>

T: Multiple web roles inside one cloud service?

Q: In my mvc application adding one web role(same project with another web role) in service definition file, but am getting an error like "No Project Associated with(webrole name)".

My query is,

1) Is there any chance to run the one project with two web roles?

2) Presently my application is working one web role with one instance and VMsize="small".but my application running with low performance.

3)Is there any chance to increase the application performance by increasing the number of instance in the role?

A: The error "No Project Associated with ..." means that you have specified the existence of another web role, but there is no project in your solution (ASP.NET webproject, MVC project) that should be deployed as that webrole. Make sure you have two web projects in your solution, when using two web roles.

As an alternative you can deploy to web projects in a single web role.

Increasing the VM size gives your web role more resources (CPU speed, RAM, ...) to perform, which might increase the performance experience for visitors.

Using more instances won't make the application faster, but since all requests are shared amongst the instances, you can serve more users at the same time.

637. <https://stackoverflow.com/questions/11790744/wcf-or-normal-bll-which-one-is-a-better-solution>

T: WCF or Normal BLL which one is a better solution?

Q: we are going to develop a big web application in MVC 3, and need to improve the Performance and speed of the application, so we have decided to use WCF. But is there a good way to write all our business logic in WCF ? What is a good way to use WCF effectively?

One more problem is that there are a large number of classes, so a large number of service references will need to be added to the project.

### How can i effectively implement WCF for good performance?

A1: No, it is not better performance to add distribution layer into your app, otherwise, it will slow down performance, more complicated. The first rule of distribution **is not distribution** because you have to deal with: serialization, security....

Think about why you need to make your app distributed, do your app need to be public as services and consume from iSO, Android or WPF. If not, don't use, go ahead with business layer as DLL.

A2: Having an extra physical tier will harm rather than increase raw performance of a request but it may increase scalability and can give you extra options in terms of security architecture. For raw throughput you should use an in memory DLL.

However, you can keep your options open by programming to an abstraction to get the data and then put an in-memory DLL or WCF proxy behind the abstraction if other requirements warrant it

638. <https://stackoverflow.com/questions/23506633/signalr-hub-self-host-or-not>

T: SignalR hub self-host or not?

Q: I'm working on a project where a SignalR hub starts up 12 short-running threads (new Thread()). Each thread reports to the client on completion using websockets. The threads are not CPU-intensive, instead they get some information from other web-services.

Now my dilemma is this: Should I create a stand-alone self-hosted signalR hub application that is run as a service or should I just include the hub in my asp.net MVC project?

What is best performance wise?

A1: The correct way to do this in .net 4.5 onwards is to do this **single threaded asynchronous**.

**ASP.Net should NEVER be creating new threads**. There are huge performance implications when explicitly using threads with ASP.Net.

Also you should know that *threads are an abstraction of limited CPU resources* (you noted as much by stating that your threads are not CPU intensive). In .net 4.5 onwards, that should tell you that you should NOT be using threads. [Instead, in this case you should be using a threadless I/O api to call your webservices](#). I would advise you use the TAP (aka async await)pattern, which is basically .net 4.5.

This should allow you to scale with a moderately powerful machine to thousands of concurrent request.

If you have all of this in place, using TAP, ASP.Net MVC/IIS will play well with massive parallelization and "threading". In this case I would **advise highly against using a windows service**, as you will have better stability with IIS as your bootstrapper (handling lifetime, and restarting your service if it dies).

A2: If performance is an issue I would use Thread Pool and not new Thread.

And i will host is a windows service , becuase that would give me more control in term of resources to allocate to the threads.

639. <https://stackoverflow.com/questions/16417054/nhibernate-should-have-only-one-work-query-inside-session-or-multiple-query>

T: Nhibernate should have only one work query inside session or multiple query?

Q: I am very confusing about design pattern with Nhibernate and worried about performance, scalability.

should we put one query inside Nhibernate session or multiple query both select and insert inside session.

I now using session per request in ASP.NET MVC, this design make the one session associate with select, insert,update delete.

I would be grad if you can give me some add vice or unit or work session.

A: Using only one query in each session would completely negate all features and meanings of a session. Take change tracking for example: NHibernate needs to flush the same session that loaded/inserted the entity to know what changed.

Using session per request is perfectly fine and most likely the most common pattern when using NHibernate in ASP.NET.

640. <https://stackoverflow.com/questions/39664595/mvc-website-on-azure-super-slow-on-first-load-of-each-page>

T: MVC website on Azure super slow on first load of each page

Q: I'm having a major issue with performance on an MVC site we are developing. When the site is hosted in Azure, the rendering phase of views takes a huge amount of time the first time a page is loaded, we're talking 15-60s per page. Subsequent loads of the same page thereafter are nice and fast, as one would expect. This is a trace from Glimpse for a hit on a page for the first time:

As you can see from the graph, the Razor rendering seems to be the main offender. I've read lots of things about pre-compilation of Razor views and I've tried implementing this but it made no difference for us at all. I'm also engaging with the Azure Web App devs who pointed fingers at Glimpse being an issue, but I've tried the app without Glimpse installed and it's still as slow as usual.

I'm getting pretty stuck here...any ideas?

A: I found a solution for faster startup time of MVC apps, most notable on Azure App services. The trick is to precompile the views, so App services doesn't have to do that for every view that is needed at the time of the request.

The summary of my findings:

Add this to the **MSBuild** arguments and you'll have a ASP.NET MVC 5 that will start up faster and every new page will load faster.

/p:PrecompileBeforePublish=true /p:UseMerge=true /p:SingleAssemblyName=AppCode

More information can be found here: <http://blog.deltacode.be/2017/01/08/fix-slow-startup-of-asp-net-mvc-5-on-azure-app-services/>

A2: Is it the first time loading each page, or the first time hitting the site after inactivity?

The IIS takes a while to boot up after you upload new files to the app container. So the first page hit after you've updated the app will be slower. Also Azure Web Apps get dehydrated after a period of inactivity. This also causes the first page hit to be very slow if the page hasn't been accessed in a while.

To combat this, in the **Application Settings** for the web app, you can find a setting called **Always On**, which basically pings your page every couple minutes to keep the app hydrated and responsive.

641.<https://stackoverflow.com/questions/25963795/issues-with-creating-application-as-a-web-service-vs-regular-mvc>

T: Issues with Creating application as a Web Service vs Regular MVC

Q: I am working on a web application. The requirement is that in the future the application may also be used by other web application and mobile application.

My idea was to build the whole business logic layer as rest web service and build web client to consume this.

Later I can use the same thing in case I want to build a mobile client or give it to external parties. This saves me from writing a separate api code.

4. Is this the correct way?
5. Will it have any performance impact?
6. What is the primary reason of not adopting such an approach.?

I am using Java ,spring MVC,spring,hibernate and Mysql as the development stack

A: This question as-is is too broad, but the pattern you're discussing is a very workable design. It does have some performance penalty, but it also makes your code more decoupled, easier to test, and easier to scale horizontally. If you look for resources on "microservices", you'll probably see the sort of design patterns you're looking for.

642.<https://stackoverflow.com/questions/20783009/portlet-development-performance-issue>

T: Portlet development performance issue

Q: I am creating a portal project on websphere portal server. This project will be developed with the feature of virtual portal. There will be 60-70 portlets deployed on virtual portals. I have decided to develop portlets using spring mvc framework. Please someone suggest me that would it be fine to use spring for portlet development as there will be 60-70 portlets on the portal server and as many spring context and associated beans? will there be performance overhead due to those many numbers of contexts and beans.

If there are issues then what can be other options. Any help will be highly appreciated.

A: In case of Spring, all Beans are loaded at application's first start only and after that they are reused...addition to it Spring is efficient in managing beans

643.<https://stackoverflow.com/questions/6292867/high-performance-middleware-communication-for-distributed-application>

T: High performance middleware communication for distributed application

Q: I am designing a distributed architecture where we will have a web front end (probably ASP.NET MVC and eventually ExtJS as well), then certain number of application modules as backend services, my idea is to be completely free to deploy these .NET services in one or two or 3 different servers so I can distribute work load among several machines.

Which technology should I use to write and communicate among those back end services?

for example, if I write .NET WCF wrappers for my business logic (.NET class libraries) I believe I can change the binding and use named pipes for high performances in the same box or when deploying in multiple servers I just change the bindings in the configuration file to use netTCP and everything should work hopefully.

About the WCF services in themselves, better to host them in IIS or in a custom written windows service?

My point is to really get the highest possible performances and design an architecture scalable and reliable with no compromises on network traffic or delays, that's why I am thinking about WCF vs xml web services, to use binary transfers instead of SOAP.

A: "Highest possible performances" is a nebulous target, you never really know what the highest possible target is for a system. All you can do is measure and test, to see if your system meets your performance requirements.

I recommend using WCF and IIS, to start with. Better still, try a fraction of your system, as a proof of concept for chosen technologies. Then profile to see where/what is too slow for your requirements. WCF/IIS approach gives the easiest implementation and maintainability. Then if you find that IIS is causing too many limits (and cannot be configured to remove those limits, IIS has a lot of config), then you can do self-hosting for your services. Also, if SOAP is using too much bandwidth for your requirements, then try binary transfers. If you can implement a fraction of your system upfront to do these tests, then you can avoid some rework.

A2: Do you want API to help you build service layer quickly, manage service layer, reconfigure service layer easily, etc. or do you need to build high performed service layer where everything unneeded must be avoided?

WCF is generic (unified), configurable and highly extensible API to build service layer. But these configuration, extensibility, unification have costs. The first cost is complexity of the API which is quite funny because when API is not extensible developers complain about it and when it is extensible developers complain about its complexity and performance impact.

Yes all these stuff has performance impact. There is a lot of layers in WCF and lot of things are sometimes handled less efficiently to maintain unified model, extensibility, configuration, etc.

If you really need high performed service layer where every single performance decrease matters then you must build your own hardcoded communication layer following exactly requirements and expectations your client have. Even that highest possible performance is nothing. If the client have a requirement for the performance he must specify the requirement in measurable way - for example:

- the system must be able to serve xxx concurrent requests
- the average time of serving the request must be xxx ms
- the highest time of serving the request must be xxx ms

There is also no need to optimize the application for requirements which haven't been defined

644. <https://stackoverflow.com/questions/8183590/clear-an-object-from-the-browsers-cache-in-mvc>

T: Clear an object from the browser's cache in mvc

Q: I have a MVC application in c#. I have a page which contains numbers of images. Once the page is loaded then all the images are being stored in the browser's cache. But when I change the image, it does replace the old images. Since the old and new image has the same name and the images are being fetched from the browser's caches. However, if I refresh the page with Ctrl+F5 then it renders the new images. Is there any way so that I can delete only that old image from the browser's cache? I can not delete all the cache of the browser, since its contains many images which should be cached. Only that images should be deleted from the cache which is getting changed.

---

Thank you very much for all of your replies. There are some point which I should mention here: 1. I can not use query string because that single page contains many section with different images and that particular image is rendering in the different sections. 2. I can not add the new guid or datetime with the image's url because if I do

this then every time whenever page is being refreshed a new server call will happen and images will come from the server and that page rendering the same image in many places.

So to reduce the server call and to make the performance fast, I have to remove only that image from the browser cache.

A1: Does the image have a unique value like a version or created datetime? If so you could add it to the filename or as a querystring. The browser would cache the images but a new value in the QueryString would request the new image.

A2: not possible without going through a whole lot of trouble, believe me, you really just want to hit ctrl+f5 here ;)

A3: If your saving a new image, say for example a new profile image for the user, you can use a Guid.NewGuid() as the file name (or part of the file name) in order to guarantee a unique image that will be reloaded in the browser.

645. <https://stackoverflow.com/questions/18081020/entity-framework-5-query-runs-slowly>

T: Entity Framework 5 query runs slowly

Q: The first time I run a query it takes about 10 seconds to execute, but when I refresh the page the second time it takes less than a second to execute.

I have run Visual Studio's Performance Analysis tool to see where is the problem and it seems that the GetExecutionPlan() method is consuming most of the time.

I guess the plan is being cached since the second time the query is run (on a page refresh) the query is executed really fast (less than a second).

I understand that the performance of first page load is limited since the query is really complicated (the SQL code dumped to DB is about 4k lines long). But the problem is that if I return to the page in an hour or so the query is slow again. It seems like the execution plan cache is cleared somehow? I've checked IIS settings and all application pool recycling setting are turned off.

Just to be clear, I'm not looking for methods to optimize my queries, I'm wondering why my query behaves strangely: first load slow, second load fast and load after one hour again slow.

Any ideas?

A: There's an internal class System.Data.Common.QueryCache.QueryCacheManager in EntityFramework.dll v5.0.0.0, which does what it says, but is a bit complex.

**Here's what I'm pretty sure about:** There is a timer which is started (if not already running) when a plan is added to the cache. The timer triggers a sweep of the cache every 60000 milliseconds (1 minute), and the cache is then actually swept if there are more than 800 plans cached. Plans which have not been re-used since the last sweep are evicted from the cache. If the cache has fewer than 800 plans in it, the sweep is skipped and the timer is stopped.

**Here's what I'm not so sure about:** There's part of the cache sweep I don't quite understand, but I assume it's clever. It looks like the algorithm makes it harder for a plan to stay in the cache the more sweeps it lives through, by bitwise shifting its hit count rightward by increasing amounts each sweep. On the first and second sweep it gets shifted 1, then 2, then 4, up to 16. I'm not sure what the reason for this is, and I'm having a hard time figuring out exactly how many times a plan needs to be used for it to stay in the cache more than 5 minutes. I'd appreciate it if anyone could give more information about 1) exactly what it's doing, and 2) what the rationale might be for doing this.

Anyway, that's why your plan isn't being cached forever.

646. <https://stackoverflow.com/questions/1035642/asp-net-mvc-vs-webforms-speed-and-architecture-comparison/1035854#1035854>

T: ASP.NET MVC vs WebForms: speed and architecture comparison

Q: I had an argument with one of my friends who is an architect at a pretty large internet company. Basically he was saying that ASP.NET MVC is not for large-scale enterprise applications, that it is not as flexible as WebForms, and that an MVC app will be slower than a web forms app.

From my own experience working with MVC, I can say that it is more flexible and it is lighter weight because there is no page life cycle, viewstate, etc.. It should thus load faster at the very least. As far as I know, MVC is designed for medium to large scale traffic.

What do you guys think? Has anyone compared speed and performance? And is ASP.NET MVC better for large scale apps than ASP.NET WebForms?

In short, between these two choices, which would you choose to use for a large scale enterprise application?

A1:

- A: Development Speed: WebForms
- Performance Speed: MVC
- Ease of Use: WebForms (Typically)
- Unit Testing: MVC (Typically)

A2: This site is a best example of ASP.net MVC's performance and scaling

Some features which I think which is necessary for Enterprise and which MVC provides are

4. **Unit testing** - even though it takes time to implement this initially it saves lots of time in the future
5. **Separation of Concerns** - this really improves development and modification speed
6. **Performance** - since both MVC and Webforms use the same ASP.net as the core framework and MVC is lighter and HTTP compliant it gives you better performance

A3: I think MVC is a lighter framework, and more performant because it doesn't do a lot of the things that the WebForms framework does out of the box, like viewstate for example. I don't think it would be fair to say that MVC is not for larger scale applications, as it probably scales better than WebForms would in terms of performance. In terms of out of the box features, WebForms does more for you because it handles state between posts for you, via viewstate, etc.

I don't have any links to performance comparisons with me, but I would be extremely surprised if there aren't any out there. Even microsoft probably has some.

A4: The groupthink and cargocult programming is strong in this thread. Your architect friend is both right (probably for the wrong reasons) and wrong at the same time.

that it is not as flexible as WebForms

This is just silly. You can do anything with anything. They are both incredibly flexible. In terms of flexibility MVC is likely the clear winner here as you can easily achieve Aspect Orientated Programming (AOP) using ActionFilters. Another reason MVC is likely the winner here is that dependency injection is thought of in MVC. You can have inversion of control and dependency injection in WebForms but it requires complex implementations involving the Model-View-Presenter pattern.

MVC app will be slower than a web forms app.

This is invalid to claim, as written. Any application can be written slower comparatively as it's a complex process involving many aspects to reach an end product. However, in terms of raw speed. **Webforms is substantially faster.** <https://stackoverflow.com/a/20253243/37055>

it is lighter weight because there is no page life cycle, viewstate, etc.. It should thus load faster at the very least. This is also an invalid statement to make. Page life cycle is irrelevant in all aspects because there are corollary life cycles in MVC in regards to controllers and action filters. View state is interesting... if you choose to stuff

100s and 1000s of kilobytes of data into view state requiring every postback to the server to have 1MB-5MB request, yes it will obviously be faster to do nearly anything differently. This isn't webforms fault, nevertheless webforms allows you to fall into the pit of failure very easily with viewstate.

is ASP.NET MVC better for large scale apps than ASP.NET WebForms?

No. Yet the answer to this question "is ASP.NET WebForms for large scale apps than ASP.NET WebForms ?" The answer is also **No**. The answer is no, because the answer is always **it depends**. Every framework has pros/cons and you need to measure those, there is not definitive answers.

If you're building a content driven site who's job is to have the fastest possible page load times such as [www.microsoft.com](http://www.microsoft.com) then you might very well choose webforms.

which would you choose to use for a large scale enterprise application?

First, you very likely don't have this problem. You would not be in a position to ask this question if you were truly responsible to architect a large scale enterprise application. (or the hiring process didn't actually require large scale development experience).

In terms of a large scale application the framework you choose is almost meaningless. Large scale applications are built on queuing. They will leverage tools such as MSMQ either directly or through a servicebus such as: Mass Transit, Azure Service Bus, or NServiceBus. Only with queuing can you reach the scale to handle millions of requests the way Amazon, Ebay and every other major player does.

647. <https://stackoverflow.com/questions/3304588/store-user-profile-pictures-on-disk-or-in-the-database>

T: Store user profile pictures on disk or in the database?

Q: I'm building an asp.net mvc application where users can attach a picture to their profile, but also in other areas of the system like a messaging gadget on the dashboard that displays recent messages etc.

When the user uploads these I am wondering whether it would be better to store them in the database or on disk.

### **Database advantages**

- easy to backup entire database and keep profile content/images with associated profile/user tables
- when I build web services later down the track, they can just pull all the profile related data from one spot(the database)

### **Filesystem advantages**

- loading files from disk is probably faster
- any other advantages?

Where do other sites store this sort of information. Am I right to be a little concerned about database performance for something like this?

Maybe there would be a way to cache images pulled out from the database for a period of time?

Alternatively, what about the idea of storing these images in the database, but shadow copying them to disk so the web server can load them from there? This would seem to give both the backup and convenience of a Db, whilst giving the speed advantages of files on disk.

### **Infrastructure in question**

- The website will be deployed to IIS on windows server 2003 running NTFS file system.
- The database will be sql server 2009

### **Summary**

Reading around on a lot of related threads here on SO, many people are now trending towards the SQL Server FileStream type. From what I could gather however (I may be wrong), there isn't much benefit when the files are quite small. FileStreaming however looks to greatly improve performance when files are multiple MB's or larger.

As my profile pictures tend to sit around ~5kb I decided to just leave them stored in a filestore in the database as varbinary(max).

In ASP.NET MVC I did see a bit of a performance issue returning FileContentResults for images pulled out of the database like this. So I ended up caching the file on disk when it is read if the location to this file is not found in my application cache.

So I guess I went for a hybrid; - Database storage to make baking up of data easier and files are linked directly to profiles - Shadow copying to disk to allow better caching

At any point I can delete the cache folder on disk, and as the images are re-requested they will be re-copied on first hit and served from the cache there after.

A1: Actually your datastore look up with the database may actually be faster depending on the number of images you have, unless you are using highly optimized filesystem engine. Databases are designed for fast lookups and use a LOT more interesting techniques than a file system does.

reiserfs (obsolete) really awesome for lookups, zfs, xfs and NTFS all have fantastic hashing algorithms, linux ext4 looks promising too.

The hit on the system is not going to be any different in terms of block reads. The question is what is faster a query lookup that returns the filename (may be a hash?) which in turn is accessed using a separate open, filesend close? or just dumping the blob out?

There are several things to consider, including network hit, processing hit, distributability etc. If you store stuff in the database, then you can move it. Then again, if you store images on a content delivery service that may be WAY faster since you are not doing any network hits on yourself.

Think about it, and remember bit of benchmarking never hurt nobody :-) so test it out with your typical dataset size and take into account things like simultaneous queries etc.

**A2: Store references to the files on a database and store the files themselves on disk.**

This approach is way more flexible and easier to scale.

You can have a single database and several servers serving static content. It will be much trickier to have several databases doing that work.

Flickr works this way.

Hope it helps.

648. <https://stackoverflow.com/questions/137755/how-is-a-real-world-simulation-designed>

T: How is a real-world simulation designed?

Q: I am fascinated by the performance of applications such as "Rollercoaster Tycoon" and "The Sims" and FPS games. I would like to know more about the basic application architecture. (Not so concerned with the UI - I assume MVC/MVP principles apply here. Nor am I concerned with the math and physics at this point.)

My main question deals with the tens or hundreds of individual objects in the simulation (people, vehicles, items, etc.) that all move, make decisions, and raise & respond to events - seeming all at the same time, and how they are designed for such good performance.

**Q: Primarily, are these objects being processed in a giant loop, one at a time - or is each object processing in its own thread?** How many threads are practical in a simulation like this? (Ballpark figure of course, 10, 100, 1000)

I'm not looking to write a game, I just want the design theory because I'm wondering if such design can apply to other applications where several decisions are being made seemingly at the same time.

A: There are two basic ways of doing this kind of simulation [Agent Based](#) and [System Dynamics](#). In an agent based simulation each entity in the game would be represented by an instance of a class with properties and

behaviors, all the interactions between the entities would have to be explicitly defined and when you want these entities to interact a function gets called the properties of the interacting entities gets changed. System Dynamics is completely different, it only deals with sums and totals, there is no representation of a single entity in the system. The easiest example of that is the Predator and Prey model.

Both of these have advantages and disadvantages, the System Dynamics approach scales better to large number of entities while keeping runtime short. While there are multiple formulas that you have to calculate, the time to calculate is independent of the values in the formula. But there is no way to look at an individual entity in this approach. The Agent based approach lets you put entities in specific locations and lets you interact with specific entities in your simulation.

FSMs and [Celular automata](#) are other ways in how to simulate systems in a game. E.g. in the agent based approach you might model the behavior of one agent with a FSM. [Simcity](#) used Celular automata to do some of the simulation work.

In general you will probably not have one big huge model that does everything but multiple systems that do specific tasks, some of these will not need to be updated very often e.g. something that determines the weather, others might need constant updates. Even if you put them in separate threads you will want to pause or start them when you need them. You might want to split work over multiple frames, e.g. calculate only updates on a certain number of agents.

A2: The source code to the original Simcity has been open sourced as [Micropolis](#). It might be an interesting study.

A3: Until very recently, the game's logic and management was in a single thread in a big finite state machine. Now, though, you tend to see the different pieces of the game (audio, graphics, physics, 'simulation' logic, etc) being split into their own FSMs in threads.

Edit: Btw, threads are a very bad way of having things in a simulation happening at the 'same time' -- it leads to race conditions. It's common that when you want to have things going on at the 'same time', you simply figure out what needs to happen as you iterate over your data and store it separately, then apply it once all the data is processed. Rince, repeat.

A4: In addition to the suggestions posted I would recommend browsing the simulation tag at sourceforge. There are a variety of simulation project at varying levels of complexity.

#### [Sourceforge](#)

Also I recommend the following book for a basic overview, While it is focused on physics it deals with issues of simulation.

#### [Physics for Game Developers](#)

649. <https://stackoverflow.com/questions/1114166/i-created-my-own-view-state-facility-for-mvc-good-or-weak-practice>

T: I created my own view state facility for MVC. Good or weak practice?

Q: Ok, I admit it - I wrote my own view state facility for ASP.NET MVC. I am interested in others' critique, especially given all the view state bashing associated with WebForms. On the other hand, in *Pro ASP.NET MVC Framework* (p405-406) Steven Sanderson says "I feel that as a general web design pattern, [ViewState] is completely sound: web developers have always preserved data in hidden form fields; this just takes it to the next level by formalizing that technique and providing a neat abstraction layer." Given my specific problem, it seemed like a reasonable approach to create such a lightweight abstraction layer while retaining MVC's strengths of transparency and testability.

In question form:

- Is using ViewData the best or at least a strong way to solve my problem?
- Are there serious weaknesses (e.g., performance, security) in my specific approach?

- How well does the approach fit with the MVC design esthetic?
- Is there a better solution? If so, what is it and why?

I am writing a secure interface to administer users/roles/accounts - that sort of thing. Data retrieved from the database has a identity token and a timestamp used for optimistic concurrency control. For operations like editing, the identity and timestamp have to be associated with the client operation, which calls for some sort of client-side persistence. The timestamp is a key driver of this client-side persistence, since updating a record requires checking the retrieval timestamp against the current timestamp to see if another user has updated it since it was originally retrieved. The integrity of the timestamp must be preserved since a malicious user could overwrite database records by manipulating it.

The usual persistence options are ViewData, TempData, and session state. I didn't seriously consider other options such as writing my own database facility. I chose ViewData since the data can be retained for more than a single round-trip (e.g., the state is retained even if a client jumps to another page and back) and because I wanted to avoid a lot of session data management. My thinking is that the approach will be fairly low overhead and secure, if only select data are stored in ViewData and if it is protected with a HMAC (hashing code message authentication) code.

In practice, I use a pair of functions Encode/Decode to serialize the data and calculate the HMAC code, and an Html helper Html.FormState() to store the serialized data on the form. (The Encode/Decode API is a little more involved than I show, enabling me to store multiple objects, etc.) I also pass the state back into the action method as an argument. This maintains a design with a functional flavor and thus promotes testability. Here's a sample (the inline assignment to ViewData is just for illustration):

A: The question is reasonable.

Web applications are going to need to store data between requests that's associated with either the user, or the specific request. The typical mechanisms -- hidden form values, server side state, and cookies -- all have their advantages and disadvantages.

When storing information specific to a given request, I tend to default towards hidden form values, because it offers the best scalability (no server-side information store). The downside is, of course, that the page can become bloated if you aren't careful about exactly how much information you store. You also need to ensure that the posted-back data is valid, since it could be tampered with by bad guys (digital signatures and encryption both being reasonable solutions).

So to me, your solution seems perfectly reasonable. I have done similar things in the past (with my Dynamic Data for MVC sample), even going so far as to build a custom model binder which allowed me to get access to the deserialized object directly in my action methods (which made unit testing them simpler, since they weren't relying on having encrypted data in form fields).

650. <https://stackoverflow.com/questions/4508690/scalability-of-a-php-application>

T: Scalability of a php application

Q: I built my application using cakephp. It works fine. My application still in beta with 3000 beta users(invites based). I am want to expand it for bigger end user base.

Few things about my app.

1) I am using mysql database table has around ~ 25000 records. 2) Multiple models and many multiple hasMany and belongsTo and HABTM relationships

First Question. 1) How I can I improve my site performance. 2) What is result limit from queries on the database(10s). 4) Should I move application to newer technology or framework.

The number of records and relationships are growing.

I started app in cakephp less than three months back with little (MVC) knowledge. It is amazing easy to build and test applications. I would recommend it to friends anyday.

I appreciate any help.

A: A quick google search resulted in the following sites, all dedicated to speeding CakePHP up considerably. In addition, here are my thoughts on Cake's speed:

4. Make sure you're using the latest Cake release. The update from Cake 1.2 to 1.3 yielded about a 20% speed boost for my biggest app.
5. Make sure you have caching turned on (for most read-intense applications, this will help massively).
6. If you have a LOT of models that are related, but infrequently used, try loading those models lazily. Remember that Cake isn't really built for speed. The other answers here are good for generic situations, but with CakePHP, the bottleneck is usually with the web layer. So one (fairly simple) way to scale out is to load your pages through a proxy server that passes requests to a backend processing farm.

Also, I highly recommend that you profile your code. This means using an IDE like Zend, where you can insert breakpoints to determine the slow sections of your code. At a minimum, install the Cake debug toolbar, which will show you execution times for major sections of your app (request handler loading, controller execution, view render time, etc.)

Results for google search on "optimizing CakePHP for speed":

- Good CakePHP specific tips: <http://www.endyourif.com/optimizing-cakephp-websites/>
- Lazy Load models: <http://bakery.cakephp.org/articles/Frank/2010/08/10/optimizing-model-loading-with-lazymodel>
- More Cake Tips: <http://www.pseudocoder.com/archives/2009/03/17/8-ways-to-speed-up-cakephp-apps/>

#### A2: How I can I improve my site performance?

Hard to say without knowing where the bottleneck is. One approach would be to:

6. Start by optimising your SQL queries, enable slow query logging and examine them, properly index columns, and change SQL server's configuration if needed.
7. Profile PHP execution, analyse report and make sure to refactor the code where needed.
8. Introduce caching, flat files, SQL caching, APC, Memcache etc. (just don't use all of them together :)
9. Optimize server configuration, including software and hardware.
10. Move to several servers.

#### What is result limit from queries on the database(10s)?

You mean execution time? As fast as possible :) But then again, depends on the query itself. If the query is executed once every day, it can be slower than if it is executed with every request. Time depends on first question/answer above.

#### Should I move application to newer technology or framework?

This one is hard to answer. Again, depends on what the problems are and whether you can identify and fix them. If you can solve them by optimizing queries and database, caching etc., then the problem is not in the framework. I strongly advise to think about it thoroughly before switching to another technology or rewriting the code.

651. <https://stackoverflow.com/questions/221944/is-there-a-performance-difference-between-asp-net-mvc-and-web-forms/221947#221947>

T: Is there a performance difference between asp.net mvc and web forms?

Q: I know there is a learning curve, but what about performance? It seems to me that web forms would be less performant, but I havent tried MVC yet to know for sure. What is everyone else experiencing?

A: This is almost a duplicate question. Here are some similar discussions:

[ASP.NET MVC Performance](#)

[What are the key differences between ASP.NET webforms and MVC](#)

## Biggest advantage to using ASP.Net MVC vs web forms

A2: This is debatable because both of them have different performance pros and cons, for example ASP.net MVC gives you control over the HTML/JS that gets to the browser, so you can minimize the amount of data on wire to make the whole application weight less, however ASP.net MVC routing have so much dependency on Reflection, which is relatively slower than fetching a file from the disk which Web Forms is doing.

652.<https://stackoverflow.com/questions/5242244/microsoft-enterprise-library-opinions>

T: Microsoft Enterprise Library Opinions

Q: Has any one used Microsoft's Enterprise Library, if so what parts of it did you use?

I am using building a website (I guess the client app type is not important, it can be a Windows app as well) with all the architectural layer, and I am specifically interested in the exception handling, logging and caching blocks for now. Any one used these, what were the good and bads of your experience with, any alternatives that you rather decided to use? Performance is a thing that I am also interested in.

I am looking for a decent exception handling framework which is how I came across the exception handling block. Anything other out there?

Is it a wise idea to use the data access block with an MVC application seeing that everybody is the repository pattern with an ORM framework?

I am still researching frameworks, so I would like to hear as many opinions.

A1: For Exception Handling we initially used ELMAH and Log4NET.. but later shifted to Enterprise Library as the client wished to use a more robust and enterprise ready solution. By no means I am saying that ELMAH or Log4NET is not enterprise ready however EntLib does gives you more power. You can read another post here for more details: [ELMAH vs Enterprise Library Exception Handling Block](#)

Is it a wise idea to use the data access block with an MVC application seeing that everybody is the repository pattern with an ORM framework? - I would not recommend using DAB if you are using repository pattern with an ORM framework.. Especially with EntityFramework the whole point of having a DAB goes for toss.

For Caching - I would recommend using Caching app block to start with and check if Velocity comes in by the time you plan to deploy...

653.<https://stackoverflow.com/questions/6716288/what-hosted-server-configuration-do-i-need-for-a-medium-scalable-web-application>

T: What hosted server configuration do I need for a medium-scalable web-application? I know this is off topic now and I will close

Q: I have a Microsoft ASP.NET MVC web application with SQL Server 2008. Currently running on a single server, performance is reasonable. However I now need to deploy the same application to support much higher volumes - 10,000 basic orders per week.

I believe that I will need a separate database server and one or two web-servers.

If I host at somewhere like 1&1 or Rackspace I presume they will advise. However I would like some idea before I start any discussions.

One area I'm not sure about is the windows server versions I should be using, CPU/memory requirements, whether these hosting providers offer load-balancing and kinds of costs involved.

Any help appreciated :-)

A: Hm, a final answer does not seem to be possible here. What I'd do:

4. understand and document your non-functional requirements. E.g. what does 10,000 orders per week mean? Think of transactions/second, concurrent/users, required uptime, storage
5. You are in the good position of having an application available. Perform a benchmark (load test) to define your current state baseline and to answer the question of how many orders you can accommodate today. If you gathered this information you can perform some analysis and see where your bottleneck is. Maybe you can increase throughput by e.g. optimizing some SQL queries, etc.
6. Verify that your application architecture supports scale-out. Maybe you have things like schedulers which you have to synchronize in a clustered environment. Another example is direct file system access from within your web server which may require you to have shared storage (SAN, etc.)

**Regarding versions/CPU/memory:** I really cannot answer this question. Performing your baseline test enables you to get an idea of what you need. Software versions really depend on what you do in detail and what your environment supports.

In general I cannot see a reason to not using W2K8R2 and SQL2008, but again, it depends mainly on your application architecture. Maybe you use certain components not available/supported any more on the newer MSFT software stack. If this is a Microsoft shop you could have a look at Microsoft Azure.

654.<https://stackoverflow.com/questions/20150378/should-i-use-hilo-with-nhibernate>

T: Should I use HiLo with NHibernate?

Q: I am creating a ASP.NET MVC website where people can save their bookmarks. There is no limit on the number of bookmarks each user can store so the database tables may grow quite large.

Many to many relationship:

- A bookmark can have many tags
- A tag can have many bookmarks

My tables use identity to generate ids in a MSSQL database. When I insert a bookmark with NHibernate this results in multiple requests to the database. Up to 10 requests. I know there are alternatives to generate ids like HiLo, but I am not sure if I really need it.

This article suggests using HiLo in case of a greenfield application:

<http://nhibernate.info/blog/2009/03/19/nhibernate-poid-generators-revealed.html>

Questions:

- Should I use HiLo in my situation?
- Are there any disadvantages of using HiLo?
- In what situations are these multiple requests to the database going to hurt performance?

A: I am creating a ASP.NET MVC website where people can save their bookmarks. There is no limit on the number of bookmarks each user can store so the database tables may grow quite large.

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Questions:

- Should I use HiLo in my situation?
- Are there any disadvantages of using HiLo?
- In what situations are these multiple requests to the database going to hurt performance?

655. <https://stackoverflow.com/questions/2979672/linq-to-sql-and-realtime-data>

T: Linq to SQL and Realtime Data

Q: I have an application that needs to constantly (every 50ms), call to an MVC action, and pickup/drop off data.

I am using Linq to SQL and MVC because of how simple they are to implement, and I know that they aren't perfect when it comes to performance, but it works relatively well, but the best speed I can get with my current approach is 200ms (without requests overlapping).

Each call to the site will create a new instance of the datacontext, query/insert it and return that data.

Is there a way to have the datacontext static, but submitchanges say every 5 seconds, so that i am pretty much hitting an in-memory version of the data?

**Edit:**

I built a completely disconnected architecture that contains all the same properties and objects of my context, and I statically declare that object on application\_start(), and on every X requests, a thread is spun to attach all the disconnected objects and store it to the database.

This has successfully reduced my round-trip time to only 100ms, a great improvement, but it is still lacking from what it needs to be for "real-time"

I'm getting to the level of micro-optimization, but I can't seem to push it any faster.

A1: `DataContext` is meant to be created each time you go to the database. That shouldn't be a bottleneck. If you're concerned about expensive creation of database connections, that might not be a problem. There is a small connection pool so the connections are reused by subsequent calls.

What you can do to improve performance (I haven't heard a word it is poor right now) is to replace the auto-generated SQL with stored procedures. You will save a little bit on recreation of an execution plan.

A2: I don't think that creating a LINQ context/querying is your bottleneck here. There is a slight overhead in using it (just like any ORM), but it shouldn't be significant to you unless you are creating a LOT of contexts and complex query trees.

My guess would probably be that LINQ is not generating the query that you are expecting. It may actually generate a bunch of queries if you are not careful, and try to fetch from several tables. If you want to find out what queries it is running you can use

```
context.Log = Console.Out; // Or some other stream
```

You can also use the excellent [LINQPad](#) to try out your queries. If this is not the problem you should profile your code using a profiler, I personally like [dotTrace](#).

A3: `CompiledQuery` may help with performance. But it will never be faster than classic ADO.NET. If performance is main concern, any ORM is very bad choice.

You can always mix them (Linq2SQL + ADO.NET) to achieve optimal performance.

656. <https://stackoverflow.com/questions/3831898/moving-c-sharp-in-process-functions-to-sql-server-clr-functions>

T: Moving C# in Process Functions to SQL Server CLR functions

Q: What are the limitations, unexpected pitfalls and performance traits of moving from in process C# code to SQL CLR Functions?

We currently have several data heavy processes that run very fast using in process C# Asp.net MVC project without using a db at all. Performance is very important. The application uses a static in memory cache and performs complex operations to arrive at a final result. Cache updating is a bit of a pain and we are considering moving some of these processes to SQL Server queries that would just output the final result so that less data caching is needed at the c# app level. The processes are complex and we know that moving to the database would require extensive use of SQL Server CLR functions.

We see a lot of advantages in leveraging the database, but the required use of CLR functions gives pause for a few reasons:

**No Azure:** SQL CLR functions are [not supported by Azure](#),

**High Testing Cost:** the SQL CLR functions could be slower and testing will take significant work

**Small User Base:** An hour of googling reveals that use of CLR functions is somewhat uncommon which makes community support (and possible MS support) a concern.

I would love to hear from someone who has moved a C# app from in process to CLR functions.

In your answers please assume that custom SQL CLR functions are required.

A: Your

- Compile
- Install
- Test
- Debug

Process is a lot harder with Sql Server CLR functions – I think you should automate as much of this as possible.

You may also need to get the agreement of a DBA every time you wished to update a function.

However after saying that “take your code to your data” can still be a very good option at times.

A2: You might be able to do it in Azure if you install SQLServer yourself and license it separately like it was on-premise, rather than taking their managed SQLServer environment options with the incremental upcharge for including SQLServer-as-a-service. But then configuring all the other infrastructure around supporting the database would be on you (backups, HA, etc.)

657.<https://stackoverflow.com/questions/7983270/azure-architecture-handling-security>

T: azure architecture - handling security

Q: Planning to migrate our existing application to Azure. Our existing architecture with security flow is as follows

- ASP MVC 3.0 UI layer that takes user name password from the user We are planning to migrate the UI layer onto a compute cloud. and will be accessible at say uilayerdomainname.com which would have a SSL cert.
- WCF REST webservices layer that amongst other things does authentication as well. This is currently on say servicename.cloudapp.net. (We could map it to servicelayername.com and get a SSL for that domain name as well).
- SQL Azure database

The UI layer sends the credentials to the service layer which authenticates it against the SQL azure database.

Question

- Both the WCF compute cloud and UI Layer are on the same region in Azure. Would the communication between these two be prone to man in the middle attacks? Does my WCF compute cloud need SSL as well? We do have two domain names with SSLs and so could just map the services to one.
- Is there any way I can restrict traffic between the UI layer and the WCF compute cloud - allow only the UI layer to access the services layer?
- Would the performance be better if I publish both the WCF services and UI layer on the same instance? It sort of shoots down the nice layered architecture but if it improves performance I could go with it. We don't want to jump through too many hoops to accomodate the app to Azure lest it becomes difficult to migrate out of it.

A: If you host your services in a Worker Role, then they can be available only to your Web Role. You can also host it elsewhere and monitor requests in code. Azure Roles in the same deployment can communicate with one another in a very specific way that is not available outside of the deployment.

In Azure deployments, you need to very specifically define your public endpoint because the roles are hosted behind a load-balancer. If you host your WCF service from within a worker-role it will not be accessible publicly.

Hope this helped

A2: If you configure the WCF service and UI layer to only communicate through internal endpoints then the communication is private. There is no need to purchase or configure an SSL certificate for the WCF service unless it is made public.

Further, the only traffic between these internal endpoints will be between your instances -- so, the traffic is already restricted between your UI layer and the WCF service.

This is the case for both Web roles and worker roles: you can configure a Web role hosting your WCF service to have a private internal endpoint.

Depending on the architecture of your system you *may* see better performance if you have the UI and WCF layer on the same machine.

If your interface is "chatty" and calls the WCF service several times for each UI request then you'll definitely see a performance improvement. If there's just one or two calls then the improvement is likely to be minimal compared to the latency of your database.

658.<https://stackoverflow.com/questions/2246251/how-do-i-improve-asp-net-mvc-application-performance/2246404#2246404>

T: How do I improve ASP.NET MVC application performance?

Q: How do you improve your ASP.NET MVC application performance?

A: A compiled list of possible sources of improvement are below:

#### **General**

- Make use of a profiler to discover memory leaks and performance problems in your application. personally I suggest [dotTrace](#)
- Run your site in Release mode, not Debug mode, when in production, and also during performance profiling. Release mode is much faster. Debug mode can hide performance problems in your own code.

#### **Caching**

- Use `CompiledQuery.Compile()` recursively avoiding recompilation of your query expressions
- Cache not-prone-to-change content using `OutputCacheAttribute` to save unnecessary and action executions
- Use cookies for frequently accessed non sensitive information
- Utilize [ETags](#) and expiration - Write your custom `ActionResult` methods if necessary
- Consider using the `RouteName` to organize your routes and then use it to generate your links, and try not to use the expression tree based `ActionLink` method.

- Consider implementing a route resolution caching strategy
- Put repetitive code inside your PartialViews, avoid render it xxxx times: if you end up calling the same partial 300 times in the same view, probably there is something wrong with that. [Explanation And Benchmarks](#)

## Routing

- Use Url.RouteUrl("User", new { username = "joeuser" }) to specify routes. [ASP.NET MVC Performance by Rudi Benkovic](#)
- Cache route resolving using this helper UrlHelperCached [ASP.NET MVC Performance by Rudi Benkovic](#)

## Security

- Use Forms Authentication, Keep your frequently accessed sensitive data in the authentication ticket

## DAL

- When accessing data via LINQ [rely on IQueryable](#)
- [Leverage the Repository pattern](#)
- Profile your queries i.e. [Uber Profiler](#)
- Consider second level cache for your queries and add them an scope and a timeout i.e. [NHibernate Second Cache](#)

## Load balancing

- Utilize reverse proxies, to spread the client load across your app instance. (Stack Overflow uses [HAProxy \(MSDN\)](#)).
- Use [Asynchronous Controllers](#) to implement actions that depend on external resources processing.

## Client side

- Optimize your client side, use a tool like [YSlow](#) for suggestions to improve performance
- Use AJAX to update components of your UI, avoid a whole page update when possible.
- Consider implement a pub-sub architecture -i.e. Comet- for content delivery against reload based in timeouts.
- Move charting and graph generation logic to the client side if possible. Graph generation is a expensive activity. Deferring to the client side your server from an unnecessary burden, and allows you to work with graphs locally without make a new request (i.e. Flex charting, [jqbargraph](#), [MoreJqueryCharts](#)).
- Use CDN's for scripts and media content to improve loading on the client side (i.e. [Google CDN](#))
- Minify [-Compile-](#) your JavaScript in order to improve your script size
- Keep cookie size small, since cookies are sent to the server on every request.
- Consider using [DNS and Link Prefetching](#) when possible.

## Global configuration

- If you use Razor, add the following code in your global.asax.cs, by default, Asp.Net MVC renders with an aspx engine and a razor engine. This only uses the RazorViewEngine.

```
ViewEngines.Engines.Clear(); ViewEngines.Engines.Add(new RazorViewEngine());
• Add gzip (HTTP compression) and static cache (images, css, ...) in your web.config<system.webServer>
<urlCompression doDynamicCompression="true" doStaticCompression="true"
dynamicCompressionBeforeCache="true"/> </system.webServer>
• Remove unused HTTP Modules
• Flush your HTML as soon as it is generated (in your web.config) and disable viewstate if you are not using it <pages buffer="true" enableViewState="false">
```

A2: [Code Climber](#) and [this blog entry](#) provide detailed ways of increasing application's performance. Compiled query will increase performance of your application, but it has nothing in common with ASP.NET MVC. It will speed up every db application, so it is not really about MVC.

A3: This may seem obvious, but run your site in Release mode, not Debug mode, when in production, and also during performance profiling. Release mode is *much* faster. Debug mode can hide performance problems in your own code.

A4: Not an earth-shattering optimization, but I thought I'd throw this out there - [Use CDN's for jQuery, etc..](#) Quote from ScottGu himself: The Microsoft Ajax [CDN](#) enables you to significantly improve the performance of ASP.NET Web Forms and ASP.NET MVC applications that use ASP.NET AJAX or jQuery. The service is

available for free, does not require any registration, and can be used for both commercial and non-commercial purposes.

We even use the CDN for our webparts in Moss that use jQuery.

659.<https://stackoverflow.com/questions/6421536/replacing-struts2-with-spring-mvc/6421631#6421631>

T: Replacing Struts2 with spring mvc

Q: I've seen plenty of questions about the difference between Struts2 and Spring MVC. But my question is the following:

I have a large-scale web app that needs reworking and its based on Struts2. What I want to do is integrate Hibernate + Spring + Spring Security + Potentially Spring DM ( since we want to make it as modular as possible).

Now as you can see its already a lot of reworking, so I am wondering IF in case I leave Struts2 (to reduce a tiny bit my rework) would this cause a significant performance issue in the future?

My question is mainly a continuation the [question](#) asked by others before. However what I am interested in is not if its possible, more like what would cost in terms of performance if I keep Struts2.

A: I don't see "performance" as a key factor in the decision of replacing Struts2 with Spring MVC.

If your application currently has performance issues, I doubt that the core Web framework being used (Struts2 or Spring MVC) are the cause of it.

Most likely it's going to be the usage of the framework, or something unrelated to it (backend processing, database queries,...).

If your application doesn't have performance issues, replacing a technical component like Struts with Spring MVC will not influence it. Neither frameworks have major issues and are used in production environments without known performance issues.

The decision to switching to another framework should be based on other factors (support model, community support, functionalities offered by the framework, strategic architectural alignment,...)

A2: I don't think that can be answered without making performance test and profiling, because any performance bottlenecks would likely be in your use of the frameworks rather than in the frameworks themselves.

I'd strongly recommend testing before making estimations about the performance.

Also if you're going to switch to Spring MVC only on performance grounds my advice would be: don't do it.

A3: My advice: *If the application is not broken, don't fix it.* Look at the cost to replace Struts2 to Spring MVC and the benefits (include the revenue generation too). If the ROI is less than expenses, then don't do it.

660.<https://stackoverflow.com/questions/19044234/how-to-improve-performance-of-asp-net-mvc-web-api/21774621#21774621>

T: How to improve performance of ASP.NET MVC WEB API?

Q: I am developing web api in Visual studio 2012 and returning JSON result for each api call.

How to improve performance of WEB API?

A: You should keep following things in your mind while designing a web API:

**HTTP Compression** — HTTP compression can be used both for response bodies (`Accept-Encoding: gzip`) and for request bodies (`Content-Encoding: gzip`) to improve the network performance of an HTTP API

**HTTP Caching** — Provide a `Cache-Control` header on your API responses. If they're not cacheable, "`Cache-Control: no-cache`" will make sure proxies and browsers understand that. If they are cacheable, there are a variety of factors to consider, such as whether the cache can be shared by a proxy, or how long a resource is "fresh".

**Cache Validation** — If you have cacheable API hits, you should provide `Last-Modified` or `ETag` headers on your responses, and then support `If-Modified-Since` or `If-None-Match` request headers for conditional requests. This will allow clients to check if their cached copy is still valid, and prevent a complete resource download when not required. If implemented properly, you can make your conditional requests more efficient than usual requests, and also save some server-side load.

**Conditional Modifications** — `ETag` headers can also be used to enable conditional modifications of your resources. By supplying an `ETag` header on your GETs, later POST, PATCH or DELETE requests can supply an `If-Match` header to check whether they're updating or deleting the resource in the same state they last saw it in.

**Chunked Transfer Encoding** — If you have large content responses, `Transfer-Encoding: Chunked` is a great way to stream responses to your client. It will reduce the memory usage requirements (especially for implementing HTTP Compression) of your server and intermediate servers, as well as provide for a faster time-to-first-byte response.

**Statelessness** — Always keep application servers state-free so that they can be easily and painlessly scaled.

**Bulk Operations** — Most clients will perform better if they can issue fewer requests to fetch or modify more data. It's a good idea to build bulk operations into your API to support this kind of use case.

A2: I just did a test, using the nuget package `WebApiContrib.Formatting.Protobuf` and the filesize decreased from 9,5 mb ( json ) to 3,35 mb ( protobuf ) for 25000 objects.

Also, you can use SQL instead of EntityFramework for large queryresults.

If you use AutoMapper to convert from your POCO to DTO, you could manually set the properties ( much faster serialization )

And minimize your Filters and HttpModules, the lighter it is, the faster it goes.. ( eg. Authentication filter, ... )

A3: Performance depends on what you are doing with the Web API framework. Maybe you should look at a MVC profiling tool : <http://msdn.microsoft.com/fr-fr/library/2s0xxa1d.aspx>

A4: First of all, your architecture matters. 80% root causes of the performance issues are architectural. We are not aware of your architecture.

From my point of view, reverse proxy can be used to facilitate load balancing over the application server clusture. On the application server layer, do you have clustering strategy? Do you have caching strategy to avoid visiting database?

.....

In general, you need to balance architecture scalability, reliability, extensibility, security, availability, and performance.

661. <https://stackoverflow.com/questions/1876696/when-is-the-mvc-pattern-appropriate/1883712#1883712>

T: When is the MVC Pattern appropriate?

Q: Note: I'm not referring to any particular framework's interpretation of MVC

If I'm designing a rich client Silverlight application for instance, that involves a relatively complex UI behavior such as dragging and dropping rows between two GridViews populated by a dynamic user-defined query, would this be an appropriate pattern to use?

Certain UI behaviors (such as dropping a row on another valid row) would also lead to business rules being applied and the model being updated accordingly. If MVC isn't a good fit for this type of application; what would be a good way to structure this?

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**EDIT:** Re-reading my original question, it seems a bit general; I'll break it down into a more directed question:

**Is there an upper-limit on granularity of user interaction where the MVC pattern is not appropriate?  
ie. A UI that would involve a controller action having to handle something on mouse\_move, mouse\_button\_up, etc...**

A1: One of the things that you'll find very early on in Silverlight development is the power of binding and you'll find yourself wanting to abstract your logic completely away from the view. While it's similar to MVC, there's a better way to handle it in Silverlight. It is for this reason that if you're building a Silverlight application, you'd be better off looking into the [MVVM Pattern](#). The [MVVM Light Toolkit](#) is one of my favorite implementations of this pattern. It's definitely worth checking out if you're building any Silverlight or WPF applications.

A2: The MVC framework is a good candidate when you want to separate the UI from the business rules from the underlying data. This allows for a very nice modular architecture wherein you can swap out the UI or Data layer without too much hassle.

Sounds like you are already thinking in terms of MVC therefore it should be a good fit. Have fun with it!

A3: MVC pattern is useful if your application model fits the MVC model... it's that simple. However, if your user interface is built using the usability models of Søren Lauesen or similar, you would usually have multiple controllers for a single GUI etc. Also, if your user interface is seriously simple, MVC may be overkill. Performance requirements or programmer productivity may in some cases also make MVC less useful.

There are some apps, for which MVC is a very good model, throughout. And there are some apps, where MVC doesn't make sense at all.

662. <https://stackoverflow.com/questions/21365021/layered-and-pipe-and-filter>

T: Layerd and Pipe-and-Filter

Q: I'm a bit confused in which situations these patterns should be used, because in some sense, they seem similar to me?

I understand that Layered is used when system is complex, and can be divided by its hierarchy, so each layer has a function on different level of hierarchy, and uses the functions on the lower level, while in the same time exposes its function to higher level.

On the other hand, Pipe-and-Filter is based on independent components that process data, and can be connected by pipes so they make a whole that executes the complete algorithm.

But if the hierarchy does not exist, it all comes to question if order of the modules can be changed?

And an example that confuses me is compiler. It is an example of pipe-and-filter architecture, but the order of some modules is relevant, if I'm not wrong?

Some example to clarify things would be nice, to remove my confusion. Thanks in advance...

A: Maybe it is too late to answer but I will try anyway. The main difference between the two architectural styles are the flow of data.

On one hand, for Pipe-and-Filter, the data are pushed from the first filter to the last one. And they WILL be pushed, otherwise, the process will not be deemed successful. For example, in a car manufacturing factory, each station is placed after one another. The car will be assembled from the first station to the last. If nothing goes wrong, you will get a complete car at the end. And this is also true for compiler examples. You get the binary code after the last compiling process.

On the other hand, Layered architecture dictates that the components are grouped in so-called layers. Typically, the client (the user or component that accesses the system) can access the system only from the top-most layer. He also does not care how many layers the system has. He cares only about the outcome from the layer that he is accessing (which is the top-most one). This is not the same as Pipe-and-Filter where the output comes from the last filter.

Also, as you said, the components in the same layer are using "services" from the lower layers. However, not all services from the lower layer must be accessed. Nor that the upper layer must access the lower layer at all. As long as the client gets what he wants, the system is said to work. Like TCP/IP architecture, the user is using a web browser from application layer without any knowledge how the web browser or any underlying protocols work.

To your question, the "hierarchy" in layered architecture is just a logical model. You can just say they are packages or some groups of components accessing each other in chain. The key point here is that the results must be returned in chain from the last component back to the first one (where the client is accessing) too. (In contrast to Pipe-and-Filter where the client gets the result from the last component.)

A2: 1.) *Layered Architecture* is **hierarchical architecture**, it views the entire system as -  
*hierarchy of structures*

The software system is decomposed into logical modules at different levels of hierarchy.

*where as*

2.) *Pipe and Filter* is a **Data-Flow architecture**, it views the entire system as -  
series of transformations on successive sets of data

where data and operations on it are independent of each other.

663. <https://stackoverflow.com/questions/3623172/why-is-mvc-so-popular>

T: Why is MVC so popular?

Q: I was originally going to make this a longer question, but I feel like the shorter I make it, the better you'll understand what I mean.

- The MVC architectural pattern has 3 dependencies. The View depends on the model. The Controller depends on the View and Model. The Model is independent.

• The Layers architectural pattern defines  $N - 1$  dependencies, where  $N$  is the number of Layers.

Given three Layers: Model, View, and Controller, there are only 2 dependencies, as opposed to 3 with traditional MVC. The structure looks like this:

View ---> Controller ---> Model  
[View depends on Controller, Controller depends on Model]

It seems to me that this style accomplishes the same goals *and* produces looser coupling. Why isn't this style more common? Does it truly accomplish the same goals?

**Edit:** Not ASP.NET MVC, just the pattern.

**With regard to griegs's post:**

- As far as mocking, Layers still allows you to use the Command Processor pattern to simulate button clicks, as well as any other range of events.
- UI changes are still very easy, perhaps even easier. In MVC, the Controller and View tend to mesh together. Layers creates a strict separation. Both Layers are black boxes, free to vary independently in implementation.

- The Controller has 0 dependencies on the View. The View can be written, and time can still be saved with loose coupling.

A1: Because you decouple the interface from the controller making changes easier.

Also consider the scenario where you need to get started on a project but the artwork won't be ready for weeks or months. Do you wait or do you write all the code required for the pages and simply then wire up the view to the controller.

At least that's what we did and we saved months.

Also it made UI changes easier to cope with because there wasn't any code in our aspx pages that did anything.

Our tests were also better as we could mock up anything including button clicks etc.

And if you're talking about the asp.net-mvc framework, there is no code in the aspx files and no viewstate etc.

A2: In proper MVC the controller doesn't depend on the view afaik. Or maybe I'm not understanding it correctly.

The model defines the data.

The view defines what the output looks like.

And the controller is a translator from a model-understood grammar to view-understood grammar.

So essentially the controller is independent. The view is independent. And the model is independent.

Yes? No?

A3: I think I'm understanding your point:

Yes you can make the View only depend on the Controller only by making the Controller transform (using PHP as an example) the Model objects to non-Model objects like simple arrays.

As we already know, performing this transformation can be more effort than it's worth if the decoupling isn't actually needed. If the View uses the Model objects then it has this dependency. However, this can be relieved a bit by having the View depend solely on the Controller for its required input, which can be Model objects.

The Symfony PHP framework promotes this style of skinny controller shuffling between Model and View. You can still directly call upon the Model layer to retrieve objects within the View layer but it's strongly urged against for the coupling issues you bring up. Within the View you can call `include_component()` which actually goes back up to the Controller if you need to query the Model.

A4: I'll be bold, and try to explain why your method didn't catch on.

The MVC pattern basically requires the view and model layers to agree on an API. Since one serves the other and there are no dependencies inside the code it leaves the controller to behave generically, all it needs to do is take a certain structure in the view layer and call the matching API on the model layer.

You'll note that agreeing on an API between the view and model isn't really such a big deal it has to happen anyway. And what you get is good separation between back-end front-end development.

In your proposed solution a lot of development is required on the controller side. The controller will be required to understand all the elements in the view and to map them to the specific calls required on the model layer. Since the controller is a single access point connecting many views to many models this can quickly get out of hand and end up being an incomprehensible controller module.

Look at some Struts2 examples to see what I mean...

A5: I haven't gotten back to this in a long time, mostly because I was still thinking. I was unsatisfied with the answers I received, they didn't really answer my question.

A professor, recently, did steer me in the right direction. Essentially, he told me this: Layers which separate Model, View, and Controller **is** MVC. In the vanilla MVC architectural pattern, the dependency between the View to the Model is often not used, and you effectively end up with Layers. The idea is the same, the naming is just poor.

A6: In my opinion ,you'd better try it in your programme , you can use ruby on rails ,or codeigniter( for php ),these great framework may be helpful to your understanding the MVC.

664.<https://stackoverflow.com/questions/1113464/what-other-mvc-like-design-patterns-architectures-are-there-for-highly-flexible>

T: What other MVC-like design patterns/architectures are there for highly flexible applications?

Q: A while back i read somewhere about how to improve upon the MVC pattern to accomodate the highly flexible and layered (web)applications we see today. (and to my frustration, i can't seem to find that article again)

For example, some of the Google applications like GMail or even a browser like Firefox.

It consists of components that can be extended and completely replaced. Users can choose the user interface or theme they like, has some kind of plugin system, etc etc...

Owokay I know, this is how big/great applications are build. That's why i ask this question.

Could you provide me with resources or insight in what patterns are used or how these applications are build architecturally...

A: guess you are talking about software architecture (in contrast to hardware or system architecture).

Possibly the most important rule (I wouldn't call it pattern) is seperation of concerns. Meaning one component should handle exactly one task, only that task and the complete task. If you stick to that (which is harder than it seems). You'll have the basis for the plugability you mentioned, e.g. exchanging the UI. If your UI layer really does only UI, it can be replaced by something completely different.

If you are really talking big, like the mentioned GMail the concept of 'eventually consistent' becomes important. Classical applications are structured in a way that the user performs an action, say pressing a button. The application processes that action (e.g. saving data from a form in a database). And refreshes the GUI when it is done (e.g. replacing the 'save' button with an edit button). This linear processing has the benefit, that the user always sees a consistent state. If he turns around and searches the database he'll find his data right there. But this doesn't scale to well, when you have extremely high load on the system, because the optimum database for saving, is most of the time not the perfect database for searching. So some application do something like this: When the user hits the save button, the store the data in the fastes way possible (e.g. a database optimised for updates), set a marker that further processing is needed and refresh the gui. Now a separate process comes along to process the saved data, e.g. by updating special indexes or by storing it in a separate database that is optimized for searching. This second process might gather changes for many actions in order to improve performance.

With this design you can scale further, because you are separating concerns: storing and searching data are two different tasks, so they are split in two different component, which can in this extrem case work in parallel. For the user this means he might not immediately find the stuff he just saved, but he eventually will. Hence 'eventual consistency'

Edit: I forgot about the resources. Great books about application architecture are: Martin Fowlers 'Patterns of Enterprise Application Architecture'. For Patterns in general of course: 'Design Patterns' for Patterns concerning Messaging Architecture

[http://www.amazon.de/s/ref=nb\\_ss\\_eb?\\_mk\\_de\\_DE=%C5M%C5Z%D5%D1&url=search-alias%3Denglish-](http://www.amazon.de/s/ref=nb_ss_eb?_mk_de_DE=%C5M%C5Z%D5%D1&url=search-alias%3Denglish-)

[books&field-keywords=Enterprise+Integration&x=0&y=0](#). I can't recommend any books on scalability, but 'Building Scalable Web Sites' was recommended to me. The architecture of various big applications (e.g. Twitter) is a topic of talks, presentations and papers, so you'll get lots of resources when you google > architecture twitter <.

A2: [Model View Presenter](#) (MVP), it is often confused with MVC, but I find it much more flexible, although it could possibly benefit from an additional controller component. I can't tell you if its more beneficial in large-scale applications, but its definitely a MVC-like pattern. Other MVC variants exist, such as the [Model View ViewModel](#) (MVVM), but that one's more specific to Microsoft's WPF.

665. <https://stackoverflow.com/questions/37227835/can-someone-explain-why-mvc-is-superior-to-three-tier-architecture/37244197#37244197>

T: Can someone explain why MVC is superior to Three Tier Architecture?

Q: Three tier... front-end, business logic, data backend. Clean What does MVC bring to the table?

A: MVC is a pattern used to make UI code easier to maintain. you can encapsulate business logic in Service Layer and data access to data layer.

In larger applications MVC is the presentation tier only of an N-tier architecture.

Conceptually the three-tier architecture is linear. However, the MVC architecture is triangular: the view sends updates to the controller, the controller updates the model, and the view gets updated directly from the model.

666. <https://stackoverflow.com/questions/15833202/which-layer-should-test-in-n-layer-architecture>

T: Which layer should test in n-layer architecture

Q: We use n-layer architecture in our application. Suppose we use 3 layer application and use MVC pattern for Presentation Layer, Which Layer should test? How can find testability point in my application?

5. Presentation Layer?
6. Business Layer
7. Data Layer
8. All of them?

A1: Only test the layers you want to be sure work. All 3 of the above seem to be things it would be important to have working. You wouldn't want to remove any of them.

Trying to find testability points in existing software where it hasn't been designed for can be a challenge. There's a good book, [Working Effectively with Legacy Code](#), where legacy is defined as code without tests, that talks about this issue. Basically, if you don't design for testability, it's can be hard to shoe-horn it in, you'll probably need to refactor.

The trick is going to be adding test infrastructure to the code: mocks, stubs, and other test components to allow you to isolate just the bits under test. This is helpful when you test a DB, you really don't want to run a real query, it'll just take too long and you want the tests to be FAST. Dependency Injection can be helpful for the more static languages, like C++/C and Java.

A2: What is a "unit", in the context of unit-testing? It is whatever you identify as a unit, as the smallest testable part of your code.

These days, most people choose the class or method as their unit. If you do the same, all your layers will contain units that you can unit test, so the answer to your question is to test all of them.

667. <https://stackoverflow.com/questions/1054603/patterns-for-non-layered-applications>

T: Patterns for non-layered applications

Q: In Patterns of Enterprise Application Architecture, Martin Fowler writes:

This book is thus about how you decompose an enterprise application into layers and how those layers work together. Most nontrivial enterprise applications use a layered architecture of some form, but in some situations other approaches, such as pipes and filters, are valuable. I don't go into those situations, focussing instead on the context of a layered architecture because it's the most widely useful.

What patterns exist for building non-layered applications/parts of an application? Take a statistical modelling engine for a financial institution. There might be a layer for data access, but I expect that most of the code would be in a single layer. Would you still expect to see Gang of Four patterns in such a layer? How about a domain model? Would you use OO at all, or would it be purely functional?

The quote mentions pipes and filters as alternate models to layers. I can easily imagine a such an engine using pipes as a way to break down the data processing. What other patterns exist? Are there common patterns for areas like task scheduling, results aggregation, or work distribution? What are some alternatives to MapReduce?

A: I think what Fowler means is that in a layered application the focus is on organizing "vertical" de-coupled communications between layers.

Another architecture is SOA (Services Oriented), where the focus it on organizing "horizontal" de-coupled communications between components. (Within a component the implementation may use either model). This is nothing new. Other instances of this horizontal pattern are COM/ COM+, CORBA, workflows, and now "messaging" or ESB architectures.

668. <https://stackoverflow.com/questions/14950917/n-tier-architecture-with-mvc4>

T: N-tier architecture with MVC4

Q: We are following N-Tier Architecture pattern for our ASP.NET web apps. We are using these layers DAL,BAL, Business Objects and Common. Now we are moving to ASP.NET MVC4.

3. Can we still use these N-Tier architecture with MVC?
4. Is that meaningful mixing together?

A: Yes you can still use this. Why wouldn't you? It is alway better to sepperate all you layers. Your business layer is only responsible for you business logic. So how would you otherwise share your business logic over two type of clients? Think in a MVC website and WCF service layer or a Mobile application.

We developing in MVC for a long time now and always use this approach.

669. <https://stackoverflow.com/questions/6173196/can-we-follow-multiple-design-patterns-in-one-application/6173399#6173399>

T: Can we follow multiple design patterns in one application

Q: I am just learning design patterns and I have few questions

- 1) Can I have multiple design patterns in the application?
- 2) What are good or advised design patterns for ASP.NET B2C applications?

A: Design patterns is used to solve specific programming problems. They are not used to architecture your applications.

1) Can I have multiple design patterns in the application?  
Yes. See above.

2) What are good or advised design patterns for ASP.NET B2C applications?

Guess you are asking if there are any existing frameworks available to create a website which is easy to extend and maintain?

Use [layered architecture](#) where you isolate each layer by using the [Separated Interface](#) pattern. For the database, use [Repository pattern](#) (easiest way to archive that is to use a ORM like [nhibernate](#)). As for the webSite, use [ASP.NET MVC](#).

670. <https://stackoverflow.com/questions/3390023/what-are-the-biggest-advantages-to-moving-from-n-tier-to-soa>

T: What are the biggest advantages to moving from n-tier to SOA?

Q: At my company we are currently using the classic n-tier architecture using NHibernate as our persistence layer with fat objects. Seeing many issues with this pattern, such as full hydration of the object graph when entities are retrieved from the database we have been looking in to other alternatives.

In this process we have moved to a more scalable Command and Query architecture, and now we are looking into the viability of SOA.

In your experiences, what are the biggest advantages of SOA over n-tier. Have you encountered any major hurdles?

And advice and reading material would be helpful.

A: Besides scalability, SOA offers architectural flexibility. If you decide at some point to move your application from WebForms to Silverlight, both can take equal advantage of a well-designed SOA interface.

You can also decide at some point down the road to offer a new service that takes advantage of some of the features and/or data in your current offering. You just build a new application that is authorized to access your existing interface and away you go.

671. <https://stackoverflow.com/questions/19517757/how-can-i-use-mvc-pattern-with-3-layer/19517911#19517911>

T: How can I use MVC pattern with 3-layer?

Q: I would like to separate my MVC (.Net) website in different projects following 3-layer architecture:

- Data Access: Model
- Business Logic: Repositories
- Presentation: Controller, View

Is my structure correct?

A: MVC and a layered architecture can be used in different ways, so it's not about right or wrong here. The common ground is that the view part is always in the presentation layer.

Then you can have your controllers either in the presentation layer or in the business layer. For simpler applications, there is sometimes no distinction between a business layer and the controllers.

There can be several model parts in a tiered application. The data access layer definitely needs a model. This model can be shared among the layers, or can be transformed into different models that may be better suited for the presentation layer.

Often the MVC pattern is used inside the presentation layer only, or rather the presentation layer is realized using the MVC pattern.

672. <https://stackoverflow.com/questions/7655088/three-tier-and-mvp-pattern-in-shopping-website/7655153#7655153>

T: three tier and MVP pattern in shopping website

Q: i'm creating a shopping website using c# and asp.net and i want to use MVP pattern inside of three tier architecture, specifically in the presentation layer. the reason i'm doing this is because i've been read and heard that MVP is a UI pattern however i came across a design problem! if MVP is a UI pattern and it should be used inside of presentaiton layer and so it's not a representation of a database table then what exactly would make up my model??

i suspect that the data from the business layer is making up my model but when i think about it the only thing that is coming to my presentation layer from my business layer is the requested data table. so what would make up the model?

for an example consider the amazon.com as the shopping site that i'm trying to create.

A1: I will probably be in the minority with this, but whenever I talk about the usage of any of the MV\* architectural patterns, I often do not apply it at a system wide level, but on a individual component level.

For example, Java Swing UI elements are built using MVC principles. That is to say that MVC is being applied on a component level in the presentation layer.

For your case (using MVP only in well-defined presentation layer), your MVP model could be a shell that interfaces with your business logic layer. Or it could be domain POCOs, that get instantiated by repositories.

A2: The Data Table is your model. Or the way I prefer to think about it is the *entire* business layer is the model, and the UI contains the View and Presenter.

673. <https://stackoverflow.com/questions/7258379/explaining-mvvm-mvc-mvp-for-a-database-developer/7258522#7258522>

T: Explaining MVVM, MVC, MVP for a Database Developer

Q: I am from Database Development / QA background. I have not exhaustively worked on UI projects, Althought I coded DB part of it. I would like to know some basic examples for differences between MVC, MVP, MVVM patters.

On a very high level know after few reads I know

- P - Presentation layer
  - M - Model
  - C - Controller - Interprets presentation layer and sends action to model on what to be presented
- This is on a very high level note. I have not tried creating a basic simple example using MVVM, MVC, MVP.

Would appreciate if you can provide some more clarity on how this is different from typical 3 layered architecture

- UI Layer - ASP / WPF
- Business Layer - Web Services (.NET 2.0/WCF..)
- DB Access Layer - EF, ADO.NET, Stored procedures

A: I think you're confusing Design Patterns with Software Architecture, they are related but different.

A 3-layer architecture consists of UI, Logic, and Persistence code. Using something like MVC or MVVM simply provide a nice way to separate these bits out.

In a 3-layer environment, you might have an MVVM App where the

- Model comes from a WCF
  - The views are all WPF
  - the View-Models are C# classes which translate UI Actions into calls to the WCF Service
- Those three things are simply the UI layer.

The WCF Service is your business logic layer, it exposes the Models that the UI will use, and it performs business logic on the data that it receives from the UI, then if appropriate, it invokes the persistence layer to save the changes into a database.

674. <https://stackoverflow.com/questions/45998405/oracle-soa-and-msa/46539990#46539990>

T: Oracle SOA and MSA

Q: Is it advisable to build the MSA based services on Oracle SOA or any other ESB suite for that matter? Is there any advantage or disadvantage?

If I am using Java, Spring and JPA over a message queue - say - RabbitMQ, I can achieve it in a more controlled environment with less recurring expenses. Of course will end up mixing tools like Drools or JBPM or similar to achieve things that may be OOTB (Out of the box) in the SOA Or ESB Suite. But scaling a specific service without paying licence fee for an additional environment should certainly be a good catch right?

A: Microservices architecture pattern applies to development of backend systems/services, whereas ESB (e.g. Oracle SOA Suite) is intended as an intermediary layer between consumers and backend services. Backend services contain rich application logic, whereas ESB services provide only intermediary functions like routing, transformation, orchestration etc.

ESB is not intended for rich application logic, though it's possible to do that.

Using ESB (e.g. Oracle SOA Suite) to host microservices is achievable, but you will get a big overhead comparing to limited functions and scalability. If you are looking for centralized API management (tracing, security etc.), you can put an API gateway into your architecture instead of full scale ESB.

675. <https://stackoverflow.com/questions/589488/mvp-mvc-vs-traditional-n-tier-approach-for-winform-apps>

T: **MVP/MVC vs traditional n-tier approach for winform apps**

Q: We have a large suite of apps, most are C# 1.1, but at least 10 major ones are in VB6. We are undertaking a project to bring up the VB6 apps to .NET 3.5.

All the c# 1.1 apps are written using a traditional n-Tier approach. There isn't really any architecture/separation to the UI layer. Most of the code just responds to events and goes from there. I would say that from the point of maintainability, it's been pretty good and it's easy to follow code and come up to speed on new apps.

As we are porting VB6 apps, the initial thinking was that we should stick to the existing pattern (e.g. n-Tier).

I am wondering, whether it's worth it breaking the pattern and doing VB6 apps using the MVP/MVC pattern? Are MVC/MVP winform apps really easier to maintain? I worked on a MVC-based project and did not feel that it was easier to maintain at all, but that's just one project.

What are some of the experiences and advice out there?

A1: Dude, if something works for you, you guys are comfortable with it, and your team is up to specs with it. Why do you need to change?

MVC/MVP sounds good... Then why am I still working on n-Tier myself?

I think before you commit resources to actual development on this new way of programming... You should consider if it works for YOUR team.

A2: If you are porting the VB6 apps vs. a full rewrite, I'd suggest to focus on your Pri 1 goal - to get asap to the .Net world. Just doing this would have quite a lot of benefits for your org.

Once you are there, you can evaluate whether it's beneficial to you to invest into rearchitecting these apps.

If you are doing full rewrite, I'd say take the plunge and go for MVP/MVVM patterned WPF apps. WPF will give you nicer visuals. The MVP/MVVM pattern will give you unit testability for all layers, including the visual. I also assume that these apps are related, so chances are you might be able to actually reuse your models and views. (though, I might be wrong here)

A3: MVC in particular does not exclude n-Tier architecture.

We also have ASP.NET 1.1 business application, and I find it a real nightmare to maintain. When event handlers do whatever they like, maybe tweak other controls, maybe call something in business logic, maybe talk directly to the database, it is only by chance that software works at all.

With MVC if used correctly you can see the way the data flows from the database to your UI and backwards. It makes it easier to track the errors if you got the unexpected behaviour.

At least, it is so with my own little project.

I'll make the point once again: whatever pattern you use, stick to the clear n-Tier architecture. 2-Tier or 3-Tier, just don't mess everything into a big interconnected ball.

676. <https://stackoverflow.com/questions/39003006/what-is-the-appropriate-project-architecture-for-large-scale-servicestack-net-p>

T: What is the appropriate project architecture for large scale ServiceStack/.NET projects?

Q: We are in the design phase of setting up an internal enterprise API layer for our company. We are hoping to realize an API that can serve our internal apps as well as our external clients. Our environment is MS heavy, IIS, ASP.NET MVC apps, etc.

We have an existing service layer that was not designed well, so we are trying to do it right this time.

[This question](#) indicated a project breakdown for larger ServiceStack projects that is no longer present in the main documentation. Primarily the inclusion of a separate "Logic" project. We are trying to align this with a lot of what Martin Fowler outlines in Patterns of Enterprise Application Architecture.

Here is what we are considering:

Fowler and others suggest that DTOs and Business Logic should be independent of each other, with Assembly/Factory classes that convert between.

First question: Where do the assemblers live? In the Service Interfaces project? In their own project? Are they necessary for every conversion?

Secondly: Does the client need to convert back to Domain Objects, or does the client just use DTOs to populate screens and send data back to the service? We only want clients dependent on the Service Models class, right?

Thirdly: How do we design the DTOs? Previously, they were pocos that represent one resource (trying to be restful, OrderDTO, CustomerDTO, etc). In practice the data required is complex. We initially thought the clients request whatever they need individually and piece it back together. Fowler indicates that we want to minimize requests to the service, and have dtos that are almost aggregates of the business objects, to try and send it all down at once. So if I have an order and a want the customer tied to it, should I send down a CustomerOrderDTO with everything populated? Or do I send down an order object, and force the client to make another request for the order?

Fourth: Where is it appropriate to use actual C# interfaces? Do we have one for every repository to make them switchable and testable? One for every service interface?

Fifth: Is there no choice but to map at every layer? i.e. SQL to Data layer using ORM. Data Layer to Domain Layer using AutoMapper or ServiceStack mapper. Domain layer to DTO. DTO to ViewModel. ViewModel to Javascript model (e.g. Knockout) It seems like a lot of repetition and boilerplate. Is there a better way?

I'm trying not to make this subjective - but there are very little guidelines for some of the details here - our assumption is there are best practices or intentions that we are missing in the ServiceStack framework to account for these things. Thanks in advance for answering any of these questions.

A: This contains too many broad questions to be able to answer in any depth, Questions should not have multiple disjointed questions covering different topics, you should split this up into multiple focused questions so it's clear what the question is and the answer that it's expecting.

I'd first recommend going through the [Designing APIs](#) section in ServiceStack's documentation which walks through designing APIs with ServiceStack.

Pay special attention to [Software complexity, goals of Services and important role of DTOs](#) as it covers a lot of what you should be thinking about when creating Services. E.g. If you use a [code-first POCO Micro ORM like OrmLite](#) you can re-use the Data Models in your DTOs, ViewModels, Caching Providers, etc. But when you need to you can use ServiceStack's [built-in AutoMapping](#) to easily map between models <-> DTOs. Either way try to avoid having multiple artificial layers and different models in each layer which is a large source of unnecessary friction.

It also highlights that you should be looking to reduce any unnecessary layers/patterns/etc when possible as each time you add a layer you're adding artificial friction so make sure every Layer you add serves a purpose and you can see the value they each add. E.g. I'd recommend against having multiple fine-grained repositories, I'll generally have a repository to cover an entire sub-system of related functionality and would highly recommend against mechanically creating fine-grained repositories based on some arbitrary rule that's not related to your domain, e.g. per Table.

You only need C# interfaces if you have multiple implementations or want to write tests mocking them.

ServiceStack encourages [coarse-grained Message-based Services](#) so instead of client-specific fine-grained RPC Services, try to design generic, reusable, batchful Services that minimize forcing clients to perform multiple, dependent I/O Services and send data clients need in a single Service response when it's cohesive to that request. ServiceStack's [Physical Project Structure](#) is already implemented in most of [ServiceStackVS VS.NET Templates](#) so I'd recommend starting a new project using the most appropriate ServiceStackVS template.

E.g. `{Project}.ServiceInterface` holds the Service Implementation whereas `{Project}.ServiceModel` holds the DTO's in a impl-free Project so the types can be reused.

By just maintaining DTOs in a separate **ServiceModel** project, it eliminates the friction for clients which can reuse the Typed DTOs with any [ServiceStack C#/.NET Client](#) to enable an end-to-end Typed API without effort. Instead of sharing your **ServiceModel** project, clients can also use ServiceStack's [Add ServiceStack Reference](#) feature to import all Types for a remote Service which it can use with the C# Clients to enable a Typed API. To see how and why this works live checkout [Add ServiceStack Reference on Gistlyn](#) which lets you call any remote ServiceStack Service from a browser.

677. <https://stackoverflow.com/questions/24946812/how-to-implement-n-layer-architecture-in-mvc/24977801#24977801>

T: How to implement n-layer architecture in MVC?

Q: I know this question has been asked before. I am only asking so that I can get a better explanation. In my webforms applications, this is how I implemented my projects. The solution had two projects. The first project contains Data Access and Business Logic. The first project is referenced in the second project. The aspx.cs files call the business logic class and the business logic class calls the data access class.

I am trying to follow the same approach in my MVC applicaiton. How would I implement that? Controller calls Model which in turn calls Business logic? This approach would add overhead right?

A: Have your architecture with following things

Data access project - add ORM/ADO.net with repository and unit of work pattern. Repositories can be generated using T4 template from ORM

ViewModel project - have a separate project for Viewmodels (containing properties to be used by view).

Business layer - have classes which contains functions that access repositories from data access layer, join them if needed using LINQ and populate in Viewmodel and return view model object or view model collection to controller.

WEB Project - Controller - access business layer functions using dependency injection and return view model to view View - Access view mode returned by controller

678. <https://stackoverflow.com/questions/13001114/blackboard-or-another-architecture-thoughts-please>

T: Blackboard or another architecture - thoughts please

Q: I have some uni coursework that I am unsure of and seeing as you people all know your stuff, I thought I'd pick your brains once again!

I have to choose a suitable architecture to develop a system that models an emergency call/dispatch service..

- Calls come in from a person in need.
- Telephone operator records details (Name, location etc).
- System dispatches ambulance from nearest hospital.
- System checks medical database
- System passes medical history and patient info onto a PDA/Smartphone within the dispatched Ambulance.
- Paramedics send update with location and actions taken.

I was thinking that a Blackboard architecture would suit this - but the dispatching of data / client request made, when sending info to the ambulance, would contradict the BB architecture.

I can use both classic, hybrid, emerging or experimental architecture patterns - so long as they work and fit the problem..

Can anyone give me some advice, please?

A: Observer, possibly chain-of-responsibility as well.

All entities observe the call. If there's any element of a chain of responders who have to decide on wheter to handle or forward a request, you need chain-of-responsibility.

679. <https://stackoverflow.com/questions/29059372/which-architectural-style-and-patterns-would-be-suitable-for-this-system/29061995#29061995>

T: Which architectural style and pattern(s) would be suitable for this system?

Q: Consider the following situation. There is a group of people working on a task (for example, editing a map). Any person is allowed to see the whole map. Every person is considered to be the owner of a certain piece of map they created. If person A created piece of map MA, and person B wants to change that piece, they can edit it locally and then can offer their changes to A. If A accepts the changes, the new MA is distributed to the whole team. B is not allowed to submit changes to MA themselves by definition.

As you can see, it's some sort of collaborative or distributed editing, where every bit of the task has an owner, and others may offer changes, which then should be propagated.

Since I have 0 knowledge about how to properly design a system and which rules should be applied (and our course has 0 material on that as well, which is weird indeed, but that's how it is - meaning, "go figure out yourself"), I would like to ask your opinion on the subject:

- what is the general class of such systems called in software design?
- which styles and patterns should be used in systems like this?

I'm 100% sure that this has been designed before, and that there is a correct implementation that one should use.

P.S. I sincerely hope that this is not going to be closed as homework, since a) I'm not asking you to do it for me, only advice or opinion and b) this is about the only place where I can ask for advice on this topic.

P.P.S. I strongly believe that there are strict rules in OO analysis and design and strict criteria to measure design correctness, hence why I don't want to just make up some random "design" with 0 knowledge, but rather to know how to approach things correctly in the first place. Thank you for understanding.

A: The general architectural pattern for this type of problem is called "blackboard". You can read about it [here](#)

680. <https://stackoverflow.com/questions/5609727/books-specifically-on-software-architecture-and-not-software-design/5609874#5609874>

T: Books specifically on Software Architecture and not Software Design

Q: Can you please suggest some books on Software Architecture, which should talk about how to design software at module level and how those modules will interact. There are numerous books which talks about design patterns which are mostly low level details. I know low level details are also important, but I want list of good design architecture book.

Please also suggest some books which talks about case studies of software architecture.

A1: Where can you get knowledge about software architecture? One place is your experience building systems. Another is conversations with other developers or reading their code. Yet another place is books. I am the author of a book on software architecture ([Just Enough Software Architecture](#)) but let me instead point you to some classics:

- [Software Architecture in Practice \(Bass, Clements, Kazman\)](#). This book from the Software Engineering Institute (SEI) describes how architects should think about problems. It describes the importance of quality attributes (performance, security, modifiability, etc.) and how to make tradeoffs between them, since you cannot maximize all of them.
- [Documenting Software Architectures \(lots of SEI/CMU authors\)](#). The title of this book is a bit scary, because many people are trying to avoid writing shelfware documents. But the wonderful thing about the book is that it describes the standard architectural styles / patterns, notations for describing structure and behavior, and a conceptual model of understanding architectures. All these are valuable even if you only ever sketch on a whiteboard.
- [Software Systems Architecture \(Rosanski and Woods\)](#). Goes into detail about how to think about a system from multiple perspectives (views). What I like particularly is that it gives checklists for ensuring that a particular concern (say security) has been handled.
- [Essential Software Architecture \(Gorton\)](#). Small, straightforward book on IT architecture. Covers the different kinds of things you'll see (databases, event busses, app servers, etc.)

That's just a short list and just because I didn't list something doesn't mean it's a bad book. If you are looking something free to read immediately, I have [three chapters of my book](#) available for download on my website.

A2: I *think* this is the book that came to mind when I first read this question. It talks about various architectural styles like pipes-and-filters, blackboard systems, etc. It's an oldie, and I'll let you judge whether it's a 'goodie'. [Pattern Oriented Software Architecture](#)

I also particularly like these two, especially the first. The second starts to dig into lower level design patterns, but it's still awesome in various spots:

[Enterprise Integration Patterns](#)  
[Patterns of Enterprise Application Architecture](#)

I hope these are what you had in mind.

A3: I'm not familiar with books that detail architectures and not design pattern. I mostly use the design books to get an understanding of how I would build such a system and I use sources such as [highscalability](#) to learn about the architecture of various companies, just look at the "all time favorites" tab on the right and you will see posts regarding the architecture of youtube, twitter, google, amazon, flickr and even [this site](#)...

681.<https://stackoverflow.com/questions/11864839/design-patterns-to-make-a-component-extensible-pluggable-without-making-changes/11866223#11866223>

T: Design patterns to make a component extendible, pluggable without making changes to the system that it is attached to

Q: *What are the best **Design Patterns** that can be used here to address the business requirements mentioned below?*

Lets say we have a business requirement to create a single dashboard that can be easily used for different Vehicles such as **Car** , **Boat** and a **Plane** with minimal changes, hence we will need a centralized interface that can be easily customized to communicate both ways with the underlying system ( e.g to gather the info on speed, battery, depth, altitude, heat and functionalities like, turn, accelerate, start, stop, brake etc). Dashboard should come with Gauges etc which talk to **something** that again talks to the underlying hardware  
Obvious solution is to break down the problem into components (see below), such that minimal changes are required when switching vehicles. in the following solution only the concrete implementation of CentralController needs to be different per vehicle, however what if you have hunders of components to communicate with in a car and then you map all those types to our Application related types, such as HeatInfo used by the HeatGauge might contain info coming from inside, outside and from the engine, hence we are talking to different components in a vehicle and that might differ per vehicle, what are the best practices to go about addressing data mapping here?

- Panel with gauges
- CentralController{ get /set }. CentralControllerImpl
- Vehicle and its components

So it boils down to:

### What are the Design patterns out there for creating a simplified API on top of multiple complex API's

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Since some of you think the question is vague i will post the real problem here

i have worked on a app that talks to very complex peace of hardware that controls hunders of varieties of sensors and controls, the app i am working on only exposes a few functionalities relevant for some human role responsible for that part.

you should see the hardware being a very complex and large database of information that you manipulate, and the app i am working on only exposes a little information, however that information might need to read hunderds of tables and compile all that information into my view related domain objects, the component that actually does the mapping has been made generic such that the future applications can leverage from it.

and i want to know from you guys what are the best Design patterns out there which can be used to create that generic component easy to work with and extended if required ?

e.g. Visitor + MVC is the most obvious

A: If classes has no differences in data and behavior, why do you need to create different classes? Maybe will be enogh to create single class: **Vehicle**? There no complex problem in requirements, so it seems you do not need patterns.

682.<https://stackoverflow.com/questions/7542424/how-to-organization-javascript-code-in-project-for-maintainability/7542457#7542457>

T: How to organization JavaScript code in project for maintainability?

Q: Am primarily a PHP developer, but of late I've been playing with a lot of JavaScript, mostly in jQuery.

The problem is that the code is getting harder to debug and this made harder because I have event listeners littered across the HTML.

The code handles AJAX calls and DOM manipulation.

A: Separation of concerns

This means you have three types of files, HTML, CSS and JS.

You do not mix any HTML, CSS or JS. Each one of them is in its own file.

Merely by keeping everything separate and *never* using inline javascript or inline CSS you can solve most your code organization problems.

Another technique is packagers and minifiers.

My packagers of choice are [browserify](#) (js) and [less](#) (css)

Packagers mean you have all your code in many files/modules split by good design. Then because sending many small files is expensive you use a build-time packager to turn all your js into one js file and all your css into one css file.

As for JS itself, I tend to go further and use a module loader. Browserify is both a packager and a module loader.

Module loaders mean you define small modules and load/require them when you need to and where you need to.

I also implement event driven architecture and the [mediator](#) pattern to keep my code highly loosely coupled. One could go further and implement something like the [blackboard system](#) but I haven't tried this personally.

A2: Separation of concerns

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683.<https://stackoverflow.com/questions/169713/whats-the-toughest-bug-you-ever-found-and-fixed/860583#860583>

T: What's the toughest bug you ever found and fixed?

Q: What made it hard to find? How did you track it down?

Not close enough to close but see also

<https://stackoverflow.com/questions/175854/what-is-the-funniest-bug-youve-ever-experienced>

A1: A jpeg parser, running on a surveillance camera, which crashed every time the company's CEO came into the room.

100% reproducible error.

I kid you not!

This is why:

For you who doesn't know much about JPEG compression - the image is kind of broken down into a matrix of small blocks which then are encoded using magic etc.

The parser choked when the CEO came into the room, because he always had a shirt with a square pattern on it, which triggered some special case of contrast and block boundary algorithms.

Truly classic.

A2:

This didn't happen to me, but a friend told me about it.

He had to debug a app which would crash very rarely. It would only fail on Wednesdays -- in September -- after the 9th. Yes, 362 days of the year, it was fine, and three days out of the year it would crash immediately.

It would format a date as "Wednesday, September 22 2008", but the buffer was one character too short -- so it would only cause a problem when you had a 2 digit DOM on a day with the longest name in the month with the longest name.

A3:

Mine was a hardware problem...

Back in the day, I used a DEC VaxStation with a big 21" CRT monitor. We moved to a lab in our new building, and installed two VaxStations in opposite corners of the room. Upon power-up, my monitor flickered like a disco (yeah, it was the 80's), but the other monitor didn't.

Okay, swap the monitors. The other monitor (now connected to my VaxStation) flickered, and my former monitor (moved across the room) didn't.

I remembered that CRT-based monitors were susceptable to magnetic fields. In fact, they were -very- susceptable to 60 Hz alternating magnetic fields. I immediately suspected that something in my work area was generating a 60 Hz altering magnetic field.

At first, I suspected something in my work area. Unfortunately, the monitor still flickered, even when all other equipment was turned off and unplugged. At that point, I began to suspect something in the building.

To test this theory, we converted the VaxStation and its 85 lb monitor into a portable system. We placed the entire system on a rollarround cart, and connected it to a 100 foot orange construction extension cord. The plan was to use this setup as a portable field strength meter, in order to locate the offending piece of equipment.

Rolling the monitor around confused us totally. The monitor flickered in exactly one half of the room, but not the other side. The room was in the shape of a square, with doors in opposite corners, and the monitor flickered on one side of a diagonal line connecting the doors, but not on the other side. The room was surrounded on all

four sides by hallways. We pushed the monitor out into the hallways, and the flickering stopped. In fact, we discovered that the flicker only occurred in one triangular-shaped half of the room, and nowhere else.

After a period of total confusion, I remembered that the room had a two-way ceiling lighting system, with light switches at each door. At that moment, I realized what was wrong.

I moved the monitor into the half of the room with the problem, and turned the ceiling lights off. The flicker stopped. When I turned the lights on, the flicker resumed. Turning the lights on or off from either light switch, turned the flicker on or off within half of the room.

The problem was caused by somebody cutting corners when they wired the ceiling lights. When wiring up a two-way switch on a lighting circuit, you run a pair of wires between the SPDT switch contacts, and a single wire from the common on one switch, through the lights, and over to the common on the other switch.

Normally, these wires are bundled together. They leave as a group from one switchbox, run to the overhead ceiling fixture, and on to the other box. The key idea, is that all of the current-carrying wires are bundled together.

When the building was wired, the single wire between the switches and the light was routed through the ceiling, but the wires travelling between the switches were routed through the walls.

If all of the wires ran close and parallel to each other, then the magnetic field generated by the current in one wire was cancelled out by the magnetic field generated by the equal and opposite current in a nearby wire. Unfortunately, the way that the lights were actually wired meant that one half of the room was basically inside a large, single-turn transformer primary. When the lights were on, the current flowed in a loop, and the poor monitor was basically sitting inside of a large electromagnet.

Moral of the story: The hot and neutral lines in your AC power wiring are next to each other for a good reason.

Now, all I had to do was to explain to management why they had to rewire part of their new building...

A4:

A bug where you come across some code, and after studying it you conclude, "There's no way this could have ever worked!" and suddenly it stops working though it always did work before.

A5: One of the products I helped build at my work was running on a customer site for several months, collecting and happily recording each event it received to a SQL Server database. It ran very well for about 6 months, collecting about 35 million records or so.

Then one day our customer asked us why the database hadn't updated for almost two weeks. Upon further investigation we found that the database connection that was doing the inserts had failed to return from the ODBC call. Thankfully the thread that does the recording was separated from the rest of the threads, allowing everything but the recording thread to continue functioning correctly for almost two weeks!

We tried for several weeks on end to reproduce the problem on any machine other than this one. We never could reproduce the problem. Unfortunately, several of our other products then began to fail in about the same manner, none of which have their database threads separated from the rest of their functionality, causing the entire application to hang, which then had to be restarted by hand each time they crashed.

Weeks of investigation turned into several months and we still had the same symptoms: full ODBC deadlocks in any application that we used a database. By this time our products are riddled with debugging information and ways to determine what went wrong and where, even to the point that some of the products will detect the deadlock, collect information, email us the results, and then restart itself.

While working on the server one day, still collecting debugging information from the applications as they crashed, trying to figure out what was going on, the server BSOD on me. When the server came back online, I opened the minidump in WinDbg to figure out what the offending driver was. I got the file name and traced it back to the actual file. After examining the version information in the file, I figured out it was part of the McAfee anti-virus suite installed on the computer.

We disabled the anti-virus and haven't had a single problem since!!

684. <https://stackoverflow.com/questions/40151216/using-queues-to-create-loosely-coupled-and-higher-reliability-applications-are>

T: Using queues to create loosely coupled and higher reliability applications - are local queues required for reliability?

Q: I read [Queue-Centric Work Pattern \(Building Real-World Cloud Apps with Azure\)](#) which among other things speaks about using queues to increase reliability of applications. First, a tightly coupled application is shown:

The benefit is stated as:

If any of the backend services – such as the SQL database or the queue listener -- go offline, users can still submit new Fix It tasks. The messages will just queue up until the backend services are available again.

**My question is - unless the queue exists *local* (and maybe just exist as a set of file system directories w/o a separate queue application running) to the application submitting the queue messages, don't we still have the same reliability issue?** Queues can break like database servers can break and the network connecting them can break the same.

(Granted, the article speaks of Microsoft's quoted reliabilities for their various services and shows queues as having slightly better uptime given their SLA's. However, in this example I consider the fact that the application is on Azure and using Azure services to be an implementation detail. I've certainly seen this pattern/architecture generalized.) That's why I get back to my question about the locality of the queues.

A: This is really a discussion question, not a programming question, and it has no real answer. If you can't reach the queue service endpoint, then you'd have to come up with an alternative store for your messages (or drop messages). But just remember that the queue service has an SLA and runs independent of any single VM. Your app will have to provide adequate durability for your local storage, should the queue service be unreachable (and how you accomplish this is entirely up to you and your app)

685. <https://stackoverflow.com/questions/45361739/asp-net-web-api-with-a-message-bus-queue/45584898#45584898>

T: Asp.Net Web API with a message bus/queue

Q: I am currently experimenting with implementing the micro service architecture on a REST service that I will be developing. The REST service will communicate with a third party SOAP service and also another component that I will be creating to perform additional business rules validation. I plan to split the application into three distinct components: the Web API to which clients will send requests, a windows service that will call a third party SOAP service and a windows service to perform business rules validation. I am planning on using a combination of the actor model (Akka.net) along with a message bus (NServicebus or RabbitMQ + Mass Transit).

From what i understand, messaging is meant for fire and forget commands, so it cannot be used by the Web API project as the clients will be expecting a response from the call to the API and I am not sure how I would await receiving the message from the Bus/Queue in the client request to the Web API as there would need to be away for the Web API to listen for an event from the bus in the request.

My question is, Am I correct in my understanding of how messaging queues operate? And, I will have to use an Akka.net based micro service to accept calls from the Web API and return the response to the API?

A1: Technically you can use request-response, see [example here](#). However, that approach should be used with caution, in legacy apps or in specific situations where the situation really requires it. Generally though to fully benefit from messaging, its reliability and scalability, you should redesign your solution to be asynchronous. If you need response then use request-response pattern (i.e. send two one-way messages instead of using callbacks), or look into technologies such as SignalR. [Here](#) and [here](#) are webinars talking about connecting front-end apps with messaging in more detail, I hope you'll find them helpful.

686. <https://stackoverflow.com/questions/5188871/aws-amazon-ec2-spot-pricing/19074676#19074676>

T: AWS Amazon EC2 Spot pricing

Q: I'd like a non-amazon answer to this quandry...

It looks like, via spot instance pricing, you could run an instance for 22 or 23 cents an hour, for as many hours as you want, because the historical charts for hours/days/months show the spot price never goes over 21 (22?) cents per hour. That's like half of the non-reserved instance cost for the same sized instance and its even less than a reserved instance would ever work out to be per hour. With no commitment.

Am I missing something, do I have a complete and total misunderstanding of the spot/bid/ask instance mechanism? Or is this a cheap way to get an 24/7 instance while Amazon has a bunch of extra capacity?

A: **No, you are not missing anything.** I asked the same question many times when I first looked at Spot, followed by "*why doesn't everyone use this all the time?*"

**So what's the downside?** Amazon reserves the right to terminate a Spot instance at any time for any reason. Now, a normal "on-demand" instance might die at any time too, but Amazon goes to great efforts to keep them online and to serve customers with warnings well in advance (days / weeks) if the host server needs to be powered down for maintenance. If you have a Spot instance running on a server they want to reboot ... they will just shut it off. In practice, both are pretty reliable (but NOT 100%!!), and many roles can run 24/7 on spot without issues. Just don't go whining to Amazon that your Spot instance got shut off and your entire database was stored on the ephemeral drive... of course if you do that on ANY instance, you are taking a HUGE (and very stupid) risk.

**Some companies are saving tons of money with Spot.** Here's a writeup on [Vimeo](#) saving 50%, and one on [Pinterest](#) saving 60%+ (\$54/hr => \$20/hr).

**Why don't more companies use Spot for their instances?** Many of the companies buying EC2 instance hours aren't very price sensitive and are very very risk-adverse, especially when it comes to outages and to operational events that sap engineering effort. They don't want to deal with the hassle to save a few bucks, especially if AWS fees aren't a significant cost-center versus personnel. And for 24/7 instances, they already pay 1/2 price via "reserved instances", so the savings aren't as dramatic as they seem versus full-priced "on-demand" instances. Spot isn't fully relevant to large customers. You can be nearly certain that when a customer gets to be the size of a Netflix, they 1) need to coordinate with Amazon on capacity planning because you can't just spin up 1/2 a datacenter on a whim, and 2) getting significant volume discounts that bring their usage costs down into the Spot price range anyways. Plus, the first tier of cost cutting is to reclaim hardware that isn't really needed; at my last company, one guy found a bug where as we cycled through boxes we would "forget" about some of them and shutting that down saved \$100+k / month (yikes). Once companies burn through that fat, they start looking at Spot.

There's a second, less discussed reason Spot doesn't get used... *It's a different API.* Think about how this interacts with "organizational inertia" .... Working at a company that continuously spends \$XX / hr on EC2 (and coming from a company that spent \$XXXX / hr), engineers start instances with the tools they are given. Our Chef deployment doesn't know how to talk to spot. Rightscale (prev place) defaulted to launching on-demand instances. With some quantity of work, I could probably figure out how to make a spot instance, but why bother if my priority is to get role XYZ up and running by tomorrow? I'm not about to engineer a spot-based solution just for my one role and then evangelize why that was a good idea; it's gotta be an org-wide decision. If you read the Pinterest case-study I linked above, you'll notice they talk about migrating their whole deployment over from \$54/hr to \$20/hr on spot. Reading between the lines, they didn't choose to launch Spot instances 1-by-1; one day, they woke up and made a company-wide decision to "solve the spot problem" and 'migrate' their deployment tools to using Spot by default (probably with support for a flag that keeps their DB instances off Spot). I can't imagine how much money Amazon has made by making Spot a different API instead of being a flag on the normal EC2 API; Hint: it's boatloads .. as in, you could buy a boat and then fill it with cash until it sinks.

So if you are willing to tolerate slightly higher risk and / or you are somewhat price-sensitive ... then, yes, **you absolutely can save a crapton of money by running your service under Spot 24/7.**

Just make sure you are double-prepared to unexpectedly lose your instance (ie, take backups) .... something you ALREADY need to be prepared for with an "on-demand" instance that doesn't have 100.0% uptime either.

*Think of it this way:*

**Instead of getting something 99.9% reliable, you are getting something 99.5% reliable and paying half-price**

A2: So long as your bid price is above the spot instance market price, you can continue to run whatever spot instances you want, and only pay the market price.

However, when the market price goes above your bid price, you lose your instances. Without any warning. They just terminate. While the spot price rarely spikes, and when it does it tends to come back down again quickly, for many applications the possibility of losing all your instances without warming is unacceptable. You can insulate yourself against that possibility by bidding higher, but then you risk having to pay that much.

TL;DR: If your application is tolerant to sudden termination, then spot instances are great. But there is a risk involved in using them.

A3: Spot on, if your bid price always remains above the spot price.

I couldn't find any other explicit mention of when they will terminate your instance.

I would have assumed it would be when they would require that capacity for customers willing to pay full charges for the instance, but then again, the spot price could technically go above the on-demand price.

687. <https://stackoverflow.com/questions/5237943/creating-a-json-store-for-iphone/5249674#5249674>

T: Creating a JSON Store For iPhone

Q: We have loads of apps where we fetch data from remote web services as JSON and then use a parser to translate that into a Core-Data model.

**For one of our apps, I'm thinking we should do something different.**

This app has **read-only data**, which is **volatile** and therefore **not cached locally for very long**. The JSON is **deeply hierarchical** with **tons of nested "objects"**. Documents usually contain no more than 20 top level items, but could be up to 100K.

I don't think I want to create a Core Data model with 100's of entities, and then use a mapper to import the JSON into it. It's seems like such a song and dance. I think I just want to persist the JSON somewhere easy, and have the ability to query it. MongoDB would be fine, if it ran on iPhone.

Is there a JSON document store on the iPhone that supports querying?

Or, can I use some JSON parser to convert the data to some kind of persistent NSDictionary and query that using predicates?

Or perhaps use SQLite as a BLOB store with manually created indexes on the JSON structures?

Or, should I stop whining, and use Core Data? :)

A: When deciding what persistence to use, it's important to remember that Core Data is first and foremost an object graph management system. Its true function is to create the runtime model layer of Model-View-Controller design patterned apps. Persistence is actually a secondary and even optional function of Core Data.

The major modeling/persistence concerns are the size of the data and the complexity of the data. So, the relative strengths and weaknesses of each type of persistence would break down like this:

To which we could add a third lessor dimension, volatility i.e. how often the data changes

(1) If the size, complexity and volatility of the data are low, then using a collection e.g. NSArray, NSDictionary, NSSet of a serialized custom object would be the best option. Collections must be read entirely into memory so that limits their effective persistence size. They have no complexity management and all changes require rewriting the entire persistence file.

(2) If the size is very large but the complexity is low then SQL or other database API can give superior performance. E.g. an old fashion library index card system. Each card is identical, the cards have no relationships between themselves and the cards have no behaviors. SQL or other procedural DBs are very good at processing large amounts of low complexity information. If the data is simple, then SQL can handle even highly volatile data efficiently. If the UI is equally simple, then there is little overhead in integrating the UI into the object oriented design of an iOS/MacOS app.

(3) As the data grows more complex Core Data quickly becomes superior. The "managed" part of "managed objects" manages complexity in relationships and behaviors. With collections or SQL, you have manually manage complexity and can find yourself quickly swamped. In fact, I have seen people trying manage complex data with SQL who end up writing their own miniature Core Data stack. Needless to say, when you combine complexity with volatility Core Data is even better because it handles the side effects of insertions and deletion automatically.

(Complexity of the interface is also a concern. SQL can handle a large, static singular table but when you add in hierarchies of tables in which can change on the fly, SQL becomes a nightmare. Core Data, NSFetchedResultsController and UITableViewDelegate make it trivial.)

(4) With high complexity and high size, Core Data is clearly the superior choice. Core Data is highly optimized so that increase in graph size don't bog things down as much as they do with SQL. You also get highly intelligent caching.

Also, don't confuse, "I understand SQL thoroughly but not Core Data," with "Core Data has a high overhead." It really doesn't. Even when Core Data isn't the cheapest way to get data in and out of persistence, its integration with the rest of the API usually produces superior results when you factor in speed of development and reliability.

In this particular case, I can't tell from the description whether you are in case (2) or case (4). It depends on the internal complexity of the data AND the complexity of the UI. You say:

688. <https://stackoverflow.com/questions/13708707/a-lightweight-php-frameworks-that-provides-http-router-and-access-control>

T: A lightweight PHP frameworks that provides HTTP router and access control

Q: As you know some well-known PHP frameworks have provide front-controller pattern and access control mechanism. Also there are some micro framework that provide front-controller pattern.

I have surveyed some such frameworks and yet could not make a decision, My concerns is:

- Stability
- Stability
- Stability
- Performance
- Security

I do not expect any thing more form my core framework, I will use pure PHP or I may use specific module from various frameworks.

Currently I have experience in ZF 1.x, ZF 2.x, Phalcon frameworks. And I also read Lithium docs, but I found no one suitable for my project.

Also as per [this](#), [this](#), [this](#) and [this](#) pages ZF, Symfony, CakePHP, FuelPHP are not efficient frameworks (fat frameworks).

A1: In my opinion (because that's all that any answer could be here) the best, lightest weight framework is [Kohana](#). It is very minimal and can integrate with whatever third party libraries you use (including ZF).

A2: I always recommend [the Yii framework](#). It has great performance -  
<http://www.yiiframework.com/performance/>

689. <https://stackoverflow.com/questions/8833232/performace-of-php-page-after-url-rewriting/8833266#8833266>

T: Performance of PHP page after URL Rewriting

Q: I have written a rewrite rule for my page

```
http://localhost/project/new.php?action=login like
RewriteRule ^([a-z]+)/([a-z]+) $1.php?action=$2
```

Now my file is can be accessed at <http://localhost/project/new/login> which is the exactly the same thing i wanted, but the problem is that the page is loading too slowly despite of the fact that i am running the application on local server. As soon as i remove the .htaccess file it loads quickly...

A: If you dont modify the PHP page, than is not the performance of the PHP page that you should worry, but the performance of the server or of the rewrite rule. The main "classical" way to do this is called **front controller** where you create a redirect rule to a unique point of entry from where you distribute the calls accordingly using a Router class in PHP. this is more maintainable and extendable.

[The front controller pattern](#) by Martin Fowler, a design pattern in more programming languages, PHP is quite new at this. [Zend Framework](#) is implementing it as well.

690. <https://stackoverflow.com/questions/11964578/repository-iqueryable-query-object/11980291#11980291>

T: Repository / IQueryable / Query Object

Q: I am building a repository and I've seen in many places 2 reasons not to expose IQueryable outside the repository.

- 1) The first is because different LINQ providers could behave differently, and this difference should be contained within the repository.
- 2) The second is to prevent service level developers from modifying the database query such that it accidentally causes performance issues.

I guess issue 2 can only be prevented by keeping all query logic within the repository and not allowing any form of external query building? But that does seem a bit impractical to me.

Issue 1 would seem to be resolved by using the Data Object Pattern.

e.g. public IEnumerable<T> FindBy(Query query)

My question is, why would I not just pass a lambda expression in, as that is provider independent, would appear to provide me with the same functionality as a query object, and the same level of separation?

e.g. public IEnumerable<T> FindBy(Expression<Func<T,bool>> predicate)

Is there any reason not to do this? Does it break some rules? Best-practises? that I should know about?

A: Your approach is, without a doubt, adding significant unnecessary complexity.

All of the code from the other question at [Generic List of OrderBy Lambda](#) fails to do anything other than mask an existing effective API with an unnecessary and unfamiliar abstraction.

**Regarding your two concerns,**

3. LINQ providers do behave differently but as long as the predicates that you are passing can be processed by the LINQ provider, this is irrelevant. Otherwise, you will still encounter the same issue, because you are passing in an Expression, which gets passed to the IQueryable eventually anyway. If the IQueryable implementation can't handle your predicate, then it can't handle your predicate. (You can always call a `ToList()` if you need to evaluate prior to further filtering that cannot be translated).
4. Modifying a query can cause performance issues, but it is more likely to expose much needed functionality. Furthermore, the performance issues incurred by a sub-optimal LINQ query are likely to be significantly less detrimental than the performance issues incurred by pulling a lot more records than you need in order to avoid exposing an IQueryable or by systematically filtering any data access logic through bloated levels

of abstractions that don't actually do anything (the first threat is more significant). In general, this won't be an issue because most leading LINQ providers will optimize your query logic in the translation process. If you want to hide your query logic from the front end, then don't try making a generic repository. Encapsulate the queries with actual business specific methods. Now, I may be mistaken, but I am assuming your use of the repository pattern is inspired by Domain Driven Design. If this is the case, then the reason for using a repository is to allow you to create a persistence-ignorant domain with a primary focus on the domain model. However, using this kind of a generic repository doesn't do much more than change your semantics from Create Read Update Delete to Find Add Remove Save. There isn't any real business knowledge embedded there.

Consider the meaningfulness (and usability) of an

691. <https://stackoverflow.com/questions/3177733/how-to-avoid-java-code-in-jsp-files/3180202#3180202>

T: How to avoid Java code in JSP files?

Q: I'm new to Java EE and I know that something like the following three lines

```
<%= x+1 %>
<%= request.getParameter("name") %>
<%! counter++; %>
```

is an old school way of coding and in JSP version 2 there exists a method to avoid Java code in JSP files. Can someone please tell me the alternative JSP 2 lines, and what this technique is called?

A: The use of *scriptlets* (those `<% %>` things) in [JSP](#) is indeed highly discouraged since the birth of *taglibs* (like [JSTL](#)) and [EL \(Expression Language\)](#), those `${}`  things) over a decade ago.

The major disadvantages of *scriptlets* are:

7. **Reusability:** you can't reuse scriptlets.
8. **Replaceability:** you can't make scriptlets abstract.
9. **OO-ability:** you can't make use of inheritance/composition.
10. **Debuggability:** if scriptlet throws an exception halfway, all you get is a blank page.
11. **Testability:** scriptlets are not unit-testable.
12. **Maintainability:** per saldo more time is needed to maintain mingled/cluttered/duplicated code logic.

A2: In the MVC Architectural pattern, JSPs represent the View layer. Embedding java code in JSPs is considered a bad practice. You can use [JSTL](#), [freeMarker](#), [velocity](#) with JSP as "template engine". The data provider to those tags **depends on frameworks** that you are dealing with. Struts 2 and webwork as an implementation for MVC Pattern uses [OGNL](#) "very interesting technique to expose Beans Properties to JSP".

A3: Experience has shown that JSP's have some shortcomings, one of them being hard to avoid mixing markup with actual code.

If you can, then consider using a specialized technology for what you need to do. In Java EE 6 there is JSF 2.0, which provides a lot of nice features including gluing Java beans together with JSF pages through the `#{{bean.method(argument)}}`  approach.

A4: Wicket is also an alternative which completely separates java from html, so a designer and programmer can work together and on different sets of code with little understanding of each other.

Look at Wicket.

A5: You raised a good question and although you got good answers, I would suggest that you get rid of JSP. It is outdated technology which eventually will die. Use a modern approach, like template engines. You will have very clear separation of business and presentation layers, and certainly no Java code in templates, so you can generate templates directly from web presentation editing software, in most cases leveraging WYSIWYG.

And certainly stay away of filters and pre and post processing, otherwise you may deal with support/debugging difficulties since you always do not know where the variable gets the value.

A6: If somebody is really against programming in more languages than one, I suggest GWT, theoretically you can avoid all the JS and HTML elements, because Google Toolkit transforms all the client and shared code to JS, you won't have problem with them, so you have a webservice without coding in any other languages. Even you can use some default CSS from somewhere as it is given by extensions (smartGWT or Vaadin). You don't need to learn dozens of annotations.

Of course if you want, you can hack yourself into the depths of the code and inject JS and enrich your HTML page, but really you can avoid it if you want, and the result will be good as it was written in any other frameworks. I say worths a try, and the basic GWT is well-documented.

And of course many fellow programmers hereby described or recommended several other solutions. GWT is for people who really don't want to deal with the web part or to minimalize it.

692. <https://stackoverflow.com/questions/22068911/how-and-why-index-php-is-executing-on-every-request-in-zf2/22069080#22069080>

T: how and why index.php is executing on every request in ZF2?

Q: In Zend framework 2 ( Or generally any framework), when we requesting some url with **module\_name/action\_name**  
*i.e.* /album/list  
how and why index.php is executing on every request?

A: What is a Front-Controller?

It's the single entry point of your application. The front controller (index.php) takes the request data and passes it to the appropriate services simply spoken.

---

Why should a Front-Controller be used?

In a web application you basically don't want to add overhead to every of your scripts. Instead you have one centralized point that delegates tasks.

For example a complex web application has a routing layer normally, a database layer, maybe caching, sessions and input handling are important.

When you had to provide these components in every standalone script (login.php, user.php, contact.php), you had to make all of the services available first. If you then needed to swap components it would be a pain to edit all of your files to apply your changes.

---

## Example Workflow

That's where a front controller comes in handy. It takes the request and says: "*Hey! I want to bootstrap my application. So load my bootstrapping class and pass in the necessary data of the request*".

The bootstrapping class says: "*Mayday. I received orders from the front-controller. Need some routing here*". Then my routing service provider is loaded.

"*Oh and please give me a bit of sessions*". Now I want my session service to be made available. And once all the background work is done, the front controller or one of its delegated services can load the resource you actually requested.

---

## Wrapping it up

In a middle- or large scale application you will not get around using a front controller. If you need to tie together a tiny application which doesn't depend on many service layers you can just drop the front-controller.

Otherwise you should absolutely use one. Once your application grows it automatically becomes harder to maintain. You will need a central point where your request is delegated to the services that are appropriate for handling that certain task.

693. <https://stackoverflow.com/questions/194584/how-do-you-write-good-php-code-without-the-use-of-a-framework/194595#194595>

T: How do you write good PHP code without the use of a framework?

Q: Other than standard OO concepts, what are some other strategies that allow for producing good, clean PHP code when a framework is not being used?

A: Remember: MVC, OOP and tiers are design concepts, not language constructs, nor file-structuring.

For me, this means that when not using a framework, and when there's not different teams for programming and designing; there's no value in using *another* template system on top of PHP (which is a template language). Also, separating code from layout doesn't necessarily mean doing it on different files.

This is how i used to do for one-off, seldom expanded, PHP web apps:

2. write a 'general utilities' file, there i put some formatting/sanitising functions, as well as a few DB access functions:
  1. getquery(): given a SQL, returns a result object
    - getrecord(): given a SQL, returns a record object (and closes the query)
    - getdatum(): given a SQL, returns a single field (and closes the query)
    - put all configurations (DB access, some URL prefixes, etc) on a 'config.php' file
    - write a model layer, either one file, or one for each object you store on DB. There, will be all the SQL constants, present a higher-level API, based on your conceptual objects, not on DB records.

that's your 'framework', then you write the 'presentation' layer:

5. one PHP file for each page, starts with some *simple* code to fetch the objects needed, followed by HTML with interspersed PHP code, just to 'fill in the holes'. with very few exceptions, the most complex code there should be for loops. I make a rule to use only one-liners, the ?>should be in the same line as the opening <?php
  - each data-entry form should point to a small PHP without any HTML, that simply gets the POST data, enters into the DB, and forwards to the calling page.

and that's it. If working alone, it has all the separation of intents you need, without drowning in a lot of files for a single user action. Each page as seen by the user is managed by a single PHP file.

It's even easy to maintain, after a few months without looking at the code, since it's easy to test the app, taking note of the filenames in the URL field of the browser. This guides you directly to the relevant code.

(nowadays, of course, i'm using Django for almost everything...)

A2: I'd say pretty much the same as for any other language:

- Don't optimise prematurely
- Keep methods small
- Practise DRY
- Practise data-driven programming
- Use sensible shortcuts (e.g. ternary operator)
- Format your code well so that it can be understood by others

- Don't use OO blindly
- Always check return codes for errors
- Enable the highest warning level and ensure your code doesn't produce any warnings
- Be *very* careful when it comes to typing issues (this goes for all weakly-typed languages). The '===' operator is your friend.

A3: Really this question is quite language agnostic, as it applies to most languages where you choose to "roll your own". Two suggestions I would make would be :

Firstly, just because you aren't using a framework doesn't mean you can't adopt the patterns for segregating code. The MVC pattern is the minimum you should consider when arranging your source code - it makes for a much cleaner and easier to maintain collection of source code, even if the application doesn't entirely follow the routing processes associated with frameworks, having code that "does" things separated out from that which "represents" things is very beneficial.

Secondly, just because you've chosen not to use a full framework, doesn't mean you need to reinvent the wheel. Utilise pre-packaged libraries sensibly in order to solve a specific problem. Two good examples would be a logging framework (log4php) and a front-end rendering/template solution (Smarty).

A4: If you really do follow OO concepts, like separation of concerns, your code will be pretty good, but here are a few suggestions:

- Framework or not, use MVC.
- I can't stress enough how important it is to never mix your logic with your HTML. In an HTML file, PHP should be used only as a template language and nothing more.
- Use a DBAL.
- Separate your design from your content. A common method for doing this is using CSS heavily and having header and footer files containing the bulk of site layout.
- Have a single file for option constants, like DB credentials, FTP credentials, etc.

694. <https://stackoverflow.com/questions/27816397/whats-a-good-mechanism-to-move-from-global-state-to-patterns-like-dependency-in>

T: What's a good mechanism to move from global state to patterns like dependency injection?

Q: I'm in the process of reworking and refactoring a huge codebase which was written with neither testability nor maintainability in mind. There is a lot of global/static state going on. A function needs a database connection, so it just conjures one up using a global static method: \$conn = DatabaseManager::getConnection(\$connName); Or it wants to load a file, so it does it using \$fileContents = file\_get\_contents(\$hardCodedFilename); Much of this code does not have proper tests and has only ever been tested directly in production. So the first thing I am intending on doing is write unit tests, to ensure the functionality is correct after refactoring. Now sadly code like the examples above is barely unit testable, because none of the external dependencies (database connections, file handles, ...) can be properly mocked.

A: I think You've made first good step. Last year I was on DutchPHP and there was a lecture about refactoring, lecturer described 3 major steps of extracting responsibility from god class:

4. Extract code to private method (it should be simple copy paste since \$this is the same)
5. Extract code to separate class and pull dependency
6. Push dependency

I think you are somewhere between 1st and 2nd step. You have a backdoor for unit tests. Next thing according to above algorithm is to create some static factory (lecturer named it ApplicationFactory) which will be used instead of creation of instance in TimeUser. ApplicationFactory is some kind of ServiceLocator pattern. This way you will inverse dependency (according to SOLID principle). If you are happy with that you should remove passing Time instance into constructor and use ServiceLocator only (without backdoor for unit tests, You should stub service locator) If you are not, then You have to find all places where TimeUser is being instantiated and inject Time implemenation:

```
new TimeUser(ApplicationFactory::getTime());
```

After some time yours ApplicationFactory will become very big. Then You have to made a decision:

3. Split it into smaller factories

4. Use some dependency injection container (Symfony DI, AurynDI or something like that)

Currently my team is doing something similar. We are extracting responsibilities to seperate classes and inject them. We have an ApplicationFactory but we use it as service locator at as hight level as possible so classes bellow gets all dependencies injected and don't know anything about ApplicationFactory. Our application factory is big and now we are preparing to replace it with SymfonyDI.

695. <https://stackoverflow.com/questions/789536/is-it-possible-to-use-a-web-framework-but-not-be-dependant-on-that-framework>

T: Is it possible to use a web framework but not be dependant on that framework?

Q: I am investigating the use of web frameworks with my Java web-app. My basic requirements are pretty much easy maintainability, testability and no repetition.

I have explored writing my own MVC-type app using some sort of front controller pattern and JSP's for the views. The benefit of this is that I have complete control of all aspects of my web-app and if I design it properly it should not be hard to move it over to a more tested framework in the future if I so choose. However, the con is that I have to reinvent the wheel so to speak.

I hear good things about the currently available web frameworks. Some technologies that I have been looking at are Spring, Wicket, Struts, Guice, Hibernate and Tapestry.

I am a bit wary of Tapestry and Wicket. I dont know TOO much about them but they seem to deviate from the servlet->model jsp->view formula. I am not sure if I am comfortable with that. Although, I hear that Wicket is actually the best fit with Guice and is extremely testable.

Spring seems like it could be a nice fit, but I am very wary of frameworks which attempt to do everything. I would love to use spring-MVC, but can I swap in other components? Can I for example use Guice as my DI engine while using Spring-MVC as my framework?

I have briefly looked at Struts but it seems overly complex for my needs and again seems to be a complete package.

I've never used Hibernate, but it seems to be the standard for ORM and if it's anything like ActiveRecord (which I have only been exposed to a little bit) I am sure it fits my needs.

I also have never really used Guice but people really seem to like it, and I am a fan of DI in general even though I am not sure how it is used in an actual application.

Basically, I am only really confident with writing Servlets / JSP's. I am not opposed to learning alternate technologies but I am looking for advice as to which ones would REALLY benefit me.

If I can make an MVC app using Servlets and JSP's is it worth it to incorporate Spring? Or should I just use Servlets / JSP's and incorporate a DI engine like Guice?

I am pretty sure I would like to use Hibernate for ORM, but I hear it can be pretty complex. All I am really looking for is a way to map my POJO's to a database, so if there is something better/easier to use I am willing to look it up.

I am feeling lost and am looking for a bit of direction from people knowledgeable in the area, any opinions on any of these issues would be hugely appreciated. Thanks!

A: "Spring seems like it could be a nice fit, but I am very wary of frameworks which attempt to do everything. I would love to use spring-MVC, but can I swap in other components? Can I for example use Guice as my DI engine while using Spring-MVC as my framework?"

Agreed Spring provides a lot of stuff, but it's totally modular. You can use DI with or without AOP and so forth. And yes you can use Spring MVC and Guice for DI together.

"I have briefly looked at Struts but it seems overly complex for my needs and again seems to be a complete package."

I have used Struts for quite some time now, but even when I started using it, I found it easy as a breeze. The controller might seem overwhelming at first, but you will have real fun when you get the hang of it. The best way would be taking a look at some real world examples using Struts.

"I've never used Hibernate, but it seems to be the standard for ORM and if it's anything like ActiveRecord (which I have only been exposed to a little bit) I am sure it fits my needs."

Oh then if you found Struts to tough, Hibernate is huge. It requires a big learning curve. It pays at the end, but if you know ActiveRecord, I will suggest you to stick to it before you get a good amount of knowledge of Hibernate.

"I am pretty sure I would like to use Hibernate for ORM, but I hear it can be pretty complex."

IMHO, very true...at least for beginners. (Anyone suggesting a change here?)

"If I can make an MVC app using Servlets and JSP's is it worth it to incorporate Spring?"

You mean without Struts or any other framework? How?

Seems like you are trying to take on too much too fast. Try considering one thing at a time. DI itself is a tricky thing to implement in real world. Oh yes conceptually it's great, but what I mean is you need to first get a hang of things one by one.

A2: Very simply, if you are comfortable with JSPs and Servlets, then if you want to save some of the drudgery of web programming, I would look at Stripes or Struts 2.

I am very familiar with Stripes, and only am aware that Struts 2 is similar, so I will focus this entry on Stripes.

As an aside, Struts 1 is worthless. It offers no value (frankly).

Stripes has several features, but I will focus on only a few.

The primary value of Stripes, and if this were its only feature it would still be very valuable, is its binding framework.

Binding is the process of converting the requests string values in to the actions values. Stripes does this amazingly well. Specifically, Stripes binding does very well on nested and indexed parameters, as well as type conversions. You can easily have a form field named "currentDate" and then have a "Date currentDate" in your Action, and Stripes will "do the right thing".

If you have a form field named "mainMap['bob'].listOfThings[3].customer.birthDate", Stripes will make the map, create the list, create the customer, convert the string to a date, populate the birthDate, put the customer in the 3 slot of the list, and put that list in the 'bob' spot of the map. (I do stuff like this all the time.)

The binding of requests to Action variables is just wonderful.

On top of that you get, if you use their form tags, you get nice behaviors when, for example, they put "Fred" in your date field. You easily get the form back, with Fred in the field, and a nice error message.

Finally, I really like their Resolutions as a result from their Actions. For example, a ForwardResolution to forward to a page, RedirectResolution to redirect to a page, StreamingResolution if you want to pump data down the socket, etc. It's a very elegant feature.

Stripes has all sorts of power and does all sorts of things, but those 3 pieces are what make it best for me, and what I use 99% of the time.

Simply, it really stays out of the way and readily handles the "plumbing" without completely obscuring the HTTP request nature of the system.

For someone who is content with JSP/Servlets, Stripes I think is an excellent step up as it adds good, solid value with very little cost (it's simple to set up) and without having to toss out everything you already know, since it works just great with JSPs and JSTL. Learn the simple mechanism it uses to map Actions to URLs, and how simple it is to map requests to your actions, and you'll be flying in no time.

Works great with Ajax and the like as well.

A3: The question illustrates some confusion. I think the definitive answer is "no, it is not possible to use a web framework but not be dependent on it".

But your instinct is good. You want to maximize the general benefit a framework provides by helping to properly layer and modularize your code and minimize its invasiveness.

With that said, I think Spring is the winner on both counts.

If you follow the Spring idiom, the structure of your code will be better by the use of interfaces, layering, and aspects. Some of the attention they pay to design is bound to rub off on you. That's as helpful as the good plumbing code they provide.

Your code base does not have to be 100% Spring. I've seen Spring used in enhancements to legacy Java apps that weren't rewritten from front to back.

Struts tends to not be a good choice because it is JUST a web framework. It encourages you to put all your processing in Action subclasses, never to come out. Spring injects the idea of a service interface that decouples the web tier from the back end. It's easier to swap out web tiers and expose the service as SOAP, RMI, EJB, or remote HTTP call.

Hibernate is far more complex than Struts. If you choose Spring, use persistence interfaces and start with Spring JDBC. When you're ready for Hibernate, you can always write a new implementation and simply inject it into the place where your JDBC version used to be.

696. <https://stackoverflow.com/questions/20314098/spring-mvc-without-servlets/20314490#20314490>

T: Spring MVC Without Servlets

Q: I'm new to Spring MVC (previously used Rails and ASP.NET MVC). I noticed that I still have to use servlets. From what I can see, Spring requires you to work with servlets--you can't swap it for a different view engine (like Apache Velocity).

Is it possible to use Spring MVC with a different view engine? There doesn't seem to be any material about this that I can find.

A: There's some confusion.

3. You can't have Spring MVC without servlets, simply because Spring MVC is built on top of the Servlet technology. (But that is not a problem, because you **can** have other view technologies.)
4. You are confusing view technologies with servlets.
  - There are several possible view technologies.
  - If something, servlets are controllers, not views (actually, Spring MVC follows a [Model 2 MVC](#), so servlets are not controllers in the same sense as used in the standard MVC pattern).

The Spring Framework has a chapter dedicated to view technologies: <http://docs.spring.io/spring/docs/3.2.x/spring-framework-reference/html/view.html>

There you can find **info and how to configure** several views technologies, such as:

- [JSP & JSTL](#)
- [Tiles](#)
- [Velocity & FreeMarker](#)
- XSLT, Document views (PDF/Excel), JasperReports and others.

But don't be limited to that guide. There are other view technologies not listed there (as the view mechanism is very flexible and extensible). A very good example of one that is not listed there is [Thymeleaf](#).

697. <https://stackoverflow.com/questions/482804/what-are-the-known-gotchas-with-regards-to-the-chain-of-responsibility-pattern/482894#482894>

T: What are the known “gotchas” with regards to the Chain of Responsibility pattern?

Q: I have been finding myself using the [Chain of Responsibility](#) pattern often (3 times is often for me) in my current project and I'm wondering if I have become a little over-enthusiastic about the solution. Specifically, I have been using the Apache Commons [chain project](#). So, far I have been quite impressed by how it has simplified a number of complex interchangeable pieces of app logic into a more cohesive and organized whole. However, a few of the newer people on the project seem to have difficulty "getting it." What are your experiences with it? What problems have you encountered in its implementation?

So far, the only problem I have noticed that it is when you are trying to deal with objects that need to be closed. Having those objects stored in your Context class makes for a pain when you have completed the execution of your chain. I was able to work around this using Filters instead of Commands, but it seems a little unintuitive because your close statements are often very far away from where the object was instantiated.

Anyways, I would love to hear the thoughts from some developers who have more experience than I with this pattern.

A1: I'm tempted to say it works well for an *unspecific* problem (eg framework mode), but works less well for a lot of *specific* problem. Frameworks are written for other people to use, and you want to give the client total freedom of implementation. Once you know exactly what you are going to do to solve the problem, I think other solutions are better.

The danger of the chain of responsibility pattern is much the same as those for the blackboard pattern; it's really easy to end up creating a lot of abstractions that mostly have don't provide value in delivering your end goal. The command objects and processing objects really just form the logic of your application, and you are hiding it behind a processing chain instead of putting it right up front where your most important code is. It is much easier to understand and maintain this if you just program a method (or several methods) that represents the full processing chain without the abstractions of the processing chain. The processing chain can really hide the business logic of your application really well, and I think you prioritize the technical artifact over the business code.

So basically you replace what *could* have been very straight-forward application code that *reads* very easily with much more abstract processing chains. You are doing meta-programming. Personally I never do any meta-programming any more, so I'd tend to agree with those colleagues that dislike it ;)

A2: I think it is fair to say that in general it is worth using a given design pattern if it gives you more benefits than costs. Every pattern introduces extra level of indirection in the code, so it is more difficult to follow, especially for junior members of the team. Having said that I think that the *Chain of Responsibility* pattern is definitely useful if you don't know upfront what are the classes going to be that are going to do the processing (so being in the chain), or you reuse these classes in different contexts, create different chains in different scenarios, etc.

In general I think it is pretty bad to over-engineer your solutions (because as you said new people struggle with understanding it), but there are some cases where the design patterns are very useful.

698. <https://stackoverflow.com/questions/308539/when-to-use-domain-driven-development-and-database-driven-development/308647#308647>

T: When to use domain driven development and database driven development?

Q: Can anybody have good answer when should be database driven development be used and when should domain driven development be used. These both development approach have their importance in their respected areas. But I am not so clear which approach is appropriate in what type of situation. Any recommendation?

A: First for some background, Martin Fowler actually described three different "patterns" in his book Patterns of Enterprise Architecture. Transaction Script, Active Record and Domain Model. DDD uses the domain model pattern for the overall architecture and describes a lot of practices and patterns to implement and design this model.

Transaction script is an architecture where you don't have any layering. The same piece of code reads/writes the database, processes the data and handles the user interface.

Active Record is one step up from that. You split off your UI, your business logic and data layer still live together in active record objects that are modeled after the database.

A domain model decouples the business logic that lives in your model from your data-layer. The model knows nothing about the database.

And now we come to the interesting part:

The cost of this added separation is of course extra work. The benefits are better maintainability and flexibility. Transaction script is good when you have few or no business rules, you just want to do data-entry and have no verification steps or all the verification is implemented in the database.

Active record adds some flexibility to that. Because you decouple your UI you can for example reuse the layer beneath it between applications, you can easily add some business rules and verification logic to the business objects. But because these are still tightly coupled to the database changes in the datamodel can be very expensive.

You use a domain model when you want to decouple your business logic from the database. This enables you to handle changing requirements easier. Domain Driven Design is a method to optimally use this added flexibility to implement complex solutions without being tied to a database implementation.

Lots of tooling makes data-driven solutions easier. In the microsoft space it is very easy to visually design websites where all the code lives right behind the web-page. This is a typical transaction script solution and this is great to easily create simple applications. Ruby on rails has tools that make working with active record objects easier. This might be a reason to go data-driven when you need to develop simpler solutions. For applications where behaviour is more important than data and it's hard to define all the behaviour up front DDD is the way to go.

A2: Think of it this way.

The problem domain exists forever. Your class definitions will reflect the eternal features of the domain.

The relational database is today's preferred persistence mechanism. At some point, we'll move past this to something "newer", "better", "different". The database design is merely one implementation; it reflects a solution architecture more than the problem domain.

Consequently, it's domain first. Classes reflect the problem domain and the universal truths. Relational database and ORM come second and third. Finally, fill in other stuff around the model.

A3: I've asked a similar question: [Where do I start designing when using O/R mapping? Objects or database tables?](#)

From the answers I got I would say: Unless you have concrete reason to use database driven development, use domain driven development.

A4: As a side-note to mendelt's post, I feel there is a fourth pattern: one that is layered, separates business logic from persistence and storage, yet uses no "entities", or "business objects". A half way point, if you will, between Transaction/Action script and DDD.

In a good deal of the systems I've worked on, the persistence layer (repositories) used SqlClient directly and returned datasets to a calling service. The services performed decisions and compiled views which were sent to the user, through the controller. You might consider the service layer a business model, and you'd be right, but it wasn't a "domain" model in the DDD sense. Still, ALL business logic occurred in that one layer, period. Each layer had its job. The views displayed data, the controllers determined views, the persistence layer handled storage, and the services worked in-between controllers and persistence.

The point is this: DDD is an approach to defining a business through UI, tests, and code. It is not about entities, value objects and aggregates. Those things are just by-products of the OOP purists approach to DDD.

Just more thoughts for your consideration.

A4: For complex business models, I prefer a mix of ActiveRecord and DDD. The domain objects know how to save themselves and data actions are done against a repository (nHibernate can act as a generic repository, if you look at a repository as something that exposes data to the model as a collection). The business logic resides in the domain entities, and even some encapsulation of value types can be accomplished, although only when there is a business need. Some implementations of DDD favor removing all public setters and only modifying entities through methods. I'm not a fan of that implementation unless there is a very good business need.

It seems to me that this implementation gives you the ease of use of ActiveRecord and the business logic encapsulation of DDD.

A5: Domain Driven Development is surely the way to go. It makes more sense and adds flexibility.

699. <https://stackoverflow.com/questions/24778876/could-i-save-postgres-transaction-and-continue-work-with-db-within-it-later/24779574#24779574>

T: Could I save Postgres transaction and continue work with db within it later

Q: I know about prepared transaction in Postgres, but seems you can just commit or rollback it later. You cannot even view the transaction's db state before you've committed it. Is any way to save transaction for later use?

What I want to achieve actually is a preview (and correcting) of some changes in db (changes are imports from csv file, so user need to see preview before apply it). I want to make changes, add some changes later, see full state of db and apply it (certainly, commit transaction)

A: I cannot find a very good reference in docs, but I have a very strong feeling that the answer is: **No, you cannot do that.**

It would mean that when you "save" the transaction, the database would basically have to maintain all of its locks in place for an indefinite amount of time. Even if it was possible, it would mean horrible failure modes and trouble on all fronts.

For the pattern that you are describing, I would use two separate transactions. Import to a staging table and show that to user (or import to the main table but mark rows as "unapproved"). If user approves, in another transaction move or update these rows.

You can always end up in a situation where user can simply leave or crash without clicking "OK" or "Cancel". If what you're describing was possible, you would end up with a hung transaction holding all these resources. In my proposed solution you end up with wasteful rows in "staging" table that you may still show to user later or remove.

You may want to read up on persistence saga. This is actually a very simple example of a well known and researched problem.

To make the long story short, this pattern breaks down a long-running process like yours into smaller operations that are applied and persisted in some way in separate transactions. If any of them happens to fail (or does not occur as expected), you have compensating actions that usually undo what the steps executed so far have done (e.g. by throwing away stale/irrelevant data).

Here's a decent introduction:

- <http://kellabyte.com/2012/05/30/clarifying-the-saga-pattern/>
- <http://vasters.com/clemensv/2012/09/01/Sagas.aspx>

This concept was formally introduced in the 80s, but is well alive and relevant today.

700. <https://stackoverflow.com/questions/4706448/java-desktop-application-to-client-server-web/4706602#4706602>

T: Java desktop application to Client/Server (Web)

Q: We have a desktop java application (image-processing) that is working great, now we have to add a client/server architecture using Java EE plateform.

We must use also MVC, and interacting with many other libraries like JDOM, JMatlink(MATLAB), and calling some exe files.

Based on your experience what is the best choice to do that (framworks, ... )

A1: Correct, you must use an MVC framework to design a flexible and reusable web application on the Java EE platform.

I suggest the following design:

3. Use JSF (Java Server Faces) to design the front end. As you are migrating your desktop application then it will better suit you becuase it's Component and Event driven framework.
4. Middlware: EJB 3(or EJB3.1) This will provide best available flexibility, performance and security to call your Business components directly from JSF Beans or any other remote application.

Over here you can use various design pattern to encapsulate Library and database access i.e. DAO (Data Access Object).

Use DTO (Data Transfer Objects) to transfer your request/response.

Hope it will give base to start your research.

A2: If you can abstract the layers that talk to the backends such that your frontend (Swing?) doesn't need to know where those service are located, you are half-way there.

The key should be a good module concept. Frameworks like the NetBeans platform help you with that, and they can easily integrate non-visual modules that handle the backend code.

I'm not sure what you mean with "*We must use also MVC*"

MVC is a design pattern not a library or framework.

But if you use something like the NetBeans platform, you'll be applying that pattern anyway, because it forces you to think in modules. Each module will have a defined responsibility and during startup it registers itself with the application.

Take an application that allows you to manage people (e.g. for a human resource department). One module is responsible for displaying a form where the user can look at a single employee. That module in turn looks for a provider that can load or list all employees. How that provider gets the data is invisible to the front end. It could use a flat file, a relational database or a call to a remote EJB server (this is where you could plug your JavaEE stuff in)

The application could even download the modules from the server if correctly configured.

The key is to make the modules independent from each other. This is true for any large scale application regardless of the technology used (web application, a server side daemon or a desktop application)

701. <https://stackoverflow.com/questions/2019042/seam-application-architecture/2044717#2044717>

#### T: Seam application Architecture

Q: I need to implement quite big system in Seam. I'm considering the way of designing the architecture. If it's good to use page controllers or application controllers or front controller or every each of them. If it's helpful to use backend bean or maybe there's no need to do that. If you have any suggestion or link to helpful article I will appreciate it.

A: Daniel,

It is good practice to use a front controller, most people aren't aware of that design pattern.

It is a really good design pattern to use because it ensures you are accessing the application through a single entry point. You can monitor everything that comes and goes easily with less configuration. You reduce the amount of possible code duplication because there is a single entry point. In addition to having less code to maintain, the code should be easier to follow since there is only one way in. You can then easily follow the execution flow of the application.

Unfortunately for Seam, there isn't really a front controller pattern. I haven't spent as much time as I would like to develop my own, but security and auditability are my number one focus.

As far as page / application controllers go, in Seam, you have more contexts or scopes available. Event, Page, Conversation, Session, Application, to name most of them.

If you're developing a controller or in Seam, a page action, most of the time, it will be event based. That is the shortest lived scope. If you have page flows, you would then use conversational-scoped components.

Take a look at the examples in the source code. You can do a lot with very little code, it is amazing, but at the same time, there is a lot going on that may take a while to pick up on.

The n-tier design that most places follow doesn't necessarily apply here. For most of my pages, I define a query that I'll use in XML (entity query), then I'll inject it into my page action and call it there. So instead of having a controller, service, dao, and entity classes, you end up with simply a page action, the queries, and entity classes. You can cut out the service and dao layers in most cases.

Your whole definition of a service might change too. For me, a service is a service provider such as notification, security (auditing), exception handling, etc. all of these services run in the background and are not tied to a particular http request.

A2: If you need to learn a lot about Seam for a project, I recommend you get the [Seam In Action](#) book, which is the best on the subject.

To answer your question, personally I prefer to use the pull-MVC style in Seam, where you refer to data in your view templates that Seam takes care of initialising, as needed, using @Factorymethods. However, there is more than one way to do it in Seam, so it is worth reading about the alternatives first, hence the book recommendation. Alternatively, build a few Seam applications first to throw away before you try to build one 'right' :)

702. <https://stackoverflow.com/questions/18739425/how-to-refactor-large-if-else-block-in-javax-servlet-front-controller>

T: How to refactor large if else block in java servlet front controller

Q: I am currently using a front controller pattern for my servlet and utilize a large if-else if structure in the doGet() and doPost() methods; however, my application is starting to add more and more functionality and as result the if-else blocks are getting out of control. I was wondering what are some popular strategies for handling this type of situation (while maintaining a front controller).

All I could think to do was maybe use a hashtable that maps paths (from the request url) to helper methods that determines the appropriate JSP (and sets attributes).

I liked the look of the Spring framework; however, I am currently not able to port to a framework, how does something like Spring avoid the problem I am facing?

A: Independently of the framework or technology, I've faced several times your case and what I always do is to use a command pattern:

[https://en.wikipedia.org/wiki/Command\\_pattern](https://en.wikipedia.org/wiki/Command_pattern)

and in the command handler I use a Factory pattern that instantiates the appropriate class to handle the request with the information of the command object.

With this architecture you are veery flexible and it is quite easy to implement :)

703. <https://stackoverflow.com/questions/4757418/pattern-one-activity-multiple-views-advantages-and-disadvantages>

T: Pattern “One activity, multiple views”: Advantages and disadvantages

Q: This pattern is similar to the pattern *Main Servlet* (the Front Controller) that is used for developing web applications.

The main idea of this pattern: we have one Activity that manages multiple views and this activity is responsible for representing current content. Not all views need functional of activity (e.g. life-cycle methods) so the main question is: **if I can go without activity why do I have to use it?**

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I have found the following disadvantages of using this pattern:

5. Official source doesn't recommend to [Overload a Single Activity Screen](#) but they don't explain why.
6. We cannot use TabActivity, ListActivity, MapActivity. But there are some tricks to go without them.
7. If different screens have different menu it's a problem to make that without activities.
8. It is necessary to keep history by ourselves. But it's not so difficult to develop.

I have found the following advantages of using this pattern:

4. It's faster to change the content of current activity than to start another activity
5. We are free to manage history as we want
6. If we have only one activity-context it's simpler to find and solve problems with memory leaks

What do you think about this pattern ? Could you provide any other advantages/disadvantages ?

A: We cannot use TabActivity, ListActivity, MapActivity. But there are some tricks to go without them.

You have to use MapActivity if you want to use MapView. You have to use PreferenceActivity if you want to use preference XML.

It is necessary to keep history by ourselves. But it's not so difficult to develop.

The difficulty in managing your own history will depend greatly on what the history needs to be. Implementing history for a simple wizard will be fairly easy. However, that is a particularly simple scenario. There is a fair amount of history management code in Android that you would have to rewrite for arbitrary other cases.

You also forgot:

#5. You will be prone to leak memory, because you will forget to clean up stuff, and Android will not clean up stuff (since it assumes that you will be using many small activities, the way they recommend).

#6. Your state management for configuration changes (rotation, dock, SIM change, locale change, multiple displays, font scale) will be more complicated because now you also have to figure out what extra stuff (e.g., history) need to be part of the state, and you have deal with all of them at once rather than activity-at-a-time.

#7. Having multiple entry points for your application becomes more challenging (e.g., multiple icons in launcher, app widget linking to some activity other than the main one, responding to etc.).

It's faster to change the content of current activity than to start another activity

For most modern Android devices, the speed difference will not be significant to most users, IMHO.

If we have only one activity-context it's simpler to find and solve problems with memory leaks

Except that you still have more than "one activity-context". Remember: your activity, large or small, is still destroyed and recreated on configuration changes.

What do you think about this pattern ?

Coase's "[nature of the firm](#)" theory says that businesses expand until the transaction costs for doing things internally become higher than the transaction costs for having other firms do the same things.

Murphy's "nature of the activity" theory says that the activity expands until the transaction costs of doing things internally become higher than the transaction costs for having other activities do the same things. Android developers will tend towards a "user transaction" model for activities -- things that are tightly coupled (e.g., steps in a wizard) will tend to be handled in single activity, and things that have little relationship (e.g., browse vs. search vs. settings vs. help vs. about) will tend to be handled in distinct activities.

704. <https://stackoverflow.com/questions/45412924/umbrella-project-with-multiple-apps-containing-front-end-logic>

T: Umbrella project with multiple apps containing front end logic.

Q: I have 2 applications which have shared functionality/routes. For example, in both applications there is a diary, goal tracking, sleep tracking, etc which work in the same way. There are also routes specific to each app. In AppA, a user can track their mood, and in AppB a user can view notes from their doctor.

Is there a way to have an umbrella project which contains in /apps the generic app, AppA, and AppB? Each app will have its own router/controllers/templates etc. AppA and AppB will each require the GenericApp as a dependency. So far I have only seen umbrella projects with one app that contains the front end logic (web), with the other apps being libraries that are included in. How can this work with routing across multiple apps? Is there another approach I can take for this?

I have found [this question & answer](#) in my search, however it is not exactly what I am looking for. It seems to follow the pattern of one front end app including in other libraries.

705. <https://stackoverflow.com/questions/24965332/javascript-module-pattern-works-on-javascript-but-not-in-my-server-browser>

T: javascript module pattern works on jsbin but not in my server/browser

Q: I am a backend developer, I write javascript only when needed and in not the best ways. But I wanted to redeem myself and start writing organized and following best practices as much as I could.

So I started a module pattern to encapsulate some functions and bind UI events from my markup, because this was pretty much trial and error, I used jsbin following the suggestion of a friend who is a front end developer.

The thing is, that my concept works on jsbin, but then I moved that to my js file in the server and there it seems I lose scope of the jQuery objects that I cache inside my module pattern.

<http://jsbin.com/ciwomeye/7/edit>

The functionality is pretty basic I populate the options of two select elements (this works) then I bind the on change events for those selects, and when triggered I should call some functions that eventually should do an ajax request to my backend and obtain data.

Can you guys please advise me on the code, and tell me what I am doing wrong please?

A: There's not much to go on here, but I'm fairly certain that your issue is that your script tag is in `<head>`, and it's running before your content is loaded. If this is the case, it will be trying to access elements in the DOM that don't yet exist (e.g. when this line runs, `$hostSelect1: $('#host-select-1')` the select element with id `host-select-1` won't exist yet, but jQuery will look for it anyway and fail silently).

You can move your script to the bottom of the page, right before `</body>`, in which case you can be certain that all of your content will be loaded when your script runs. This method also has some other performance benefits. Or else you can wrap your call to `DbDiff.init()` in `$(document).ready`, like this `$(document).ready(function() {DbDiff.init()});`, which will have largely the same effect (except that settings has already been evaluated... you would need to do a little restructuring in order to make sure `$('#host-select-1')`, etc. are evaluated and assigned to `$hostSelect1` only after your DOM content has loaded).

706. <https://stackoverflow.com/questions/26880752/what-are-the-key-elements-of-a-service-oriented-architecture-and-how-do-they-make-an-soa-effective>

T: What are the key elements of a Service Oriented Architecture and how do they make an SOA effective?

Q: Service-oriented architecture (SOA) is a software architecture design pattern based on distinct pieces of software providing application functionality as services to other applications. Key elements of a Service Oriented Architecture are, application fronted, service, service repository and service bus.

Uses open standards to integrate software assets as services, Standardizes interactions of services, Services become building blocks that form business flows, Services can be reused by other applications, thus increased Reusability, Legacy leverage, Agility, Loose coupling and Interoperation.

707. <https://stackoverflow.com/questions/1379915/why-is-fxpro-used-for-pos-systems>

T: Why is FoxPro used for POS systems?

Q: I'm looking at upgrading a POS (Point Of Sale) project which is currently built in FoxPro to .net. The planned architecture is quite complex and there is plenty of rationale behind the new technologies chosen. Some of the requirements include the ability to have both desktop and web front end (where web front end has limited functionality), syncing data with an external website and the ability for multiple clients to run off of 1 server. My current model of choice is an MVP pattern with Sql Server (probably Express) as the DB, and a WCF service layer between the presentation and services in order to allow for remote UIs.

My concern is that during my research I have noticed that there seems to be a common theme amongst touch screen POS systems to build them in FoxPro.

Apologies for the slightly subjective question however I am keen to find out if there is any particular reason for this? Does FoxPro have any particular out of the box functionality that lends itself to this type of system? I have not used FoxPro and so before finalising my choice of technologies for this project would like to make sure I am not missing a trick by ruling it out completely.

A: Licencing - SQLserver didn't run well on client OSes and was expensive.

Foxpro was cheap and easy.

If all you are doing is retrieving price values from one table and updating sales in another, then SQL is rather overkill.

A2: Many POS systems have a standalone capability so that the store can continue to trade even if the connection to the in-store server(s) is down.

Typically this means a local database for price lookup etc, and local storage of transaction data until the server connection comes back up again.

The hardware and licensing costs need to be as low as possible.

Hence FoxPro was a good choice a few years ago, but a properly architected .NET application would be an excellent choice today.

A3: FoxPro had a few advantages at that time. I can remember that for many many years all the new concurrent DBs laked at least in on place, so we choose FoxPro over and over again for now POS solutions:

- it was fully integrated database - so an out-of-the box solution
- it was really cheap compared to the alternatives (as other users have pointed out too)
- it ran on cheap hardware - for moderate sizes (like most customers required).
- it had a simple to learn and intuitive integrated environment, so no extra tools were required.
- it was very very easy to create very nice reports at that time (managers liked it allot, and since they made the decisions mostly... :) ).
- FoxPro was a learning course in almost all IT schools, so it was very cheap and easy to find FoxPro specialists. Especially in eastern European countries, their number is still huge (many POS software was outsourced there).

There are still an incredible huge number of FoxPro legacy applications (especially in small and medium companies), so this is not just a POS issue.

708. <https://stackoverflow.com/questions/2580956/creating-a-web-application-that-can-be-extended-by-plugins-modules>

T: Creating a web application that can be extended by plugins/modules

Q: I'm currently involved with developing a C# CMS-like web application which will be used to standardise our development of websites. From the outset, the idea has been to keep the core as simple as possible to avoid the complexity and menu/option overload that blights many CMS systems. This simple core is now complete and working very well.

We envisaged that the system would be able to accept plugins or modules which would extend the core functionality to suit a given projects needs. These would also be re-usable across projects. For example, a basic catalogue and shopping basket might be needed. All the code for such extensions should be in separate assemblies. They should be able to provide their own admin interfaces and front-end code from this library. The system should search for available plugins and give the admin user the option to enable/disable the feature. (This is all very much like WordPress plugins)

It is crucial that we attack this problem in the correct way, so I'm trying to perform as much due diligence as possible before jumping in.

I am aware of the Plugin Pattern (<http://msdn.microsoft.com/en-us/library/ms972962.aspx>) and have read some articles on its use. It seems reasonable but I'm not convinced it's necessarily the correct/best technique for this situation. It seems more suited to processing applications (image/audio manipulation, maths etc). Are there any other options for achieving this kind of UI extensibility functionality? Or is the plugin pattern the way to go?

I'd also be interested if anybody has links to articles that explain using the plugin pattern for this purpose?

A: The managed extensibility framework (MEF) provides a way that is focused specifically towards building composeable and extensible applications. It's on codeplex for .net 3.5 and will be bundled with .net 4 when it's released here in a couple of weeks. It'll help provide the plumbing that you'll need for what you're trying to do.

709. <https://stackoverflow.com/questions/32415529/mvc-vs-web-api-for-multi-page-app-is-the-future-web-api>

T: MVC vs Web API for Multi Page App. Is The Future Web API?

Q: I'm starting a new project in super early story phase and I'm a little unsure of what design pattern to use. The app is a reporting app that will allow users to design reports and download them. The app will basically be a wizard style multi page data selector. I'd like to offer the functionality to build these reports from a desktop app too.

Considering the advances in Web API over the past few years, would it be crazy to not use it over MVC?

I've been out of the development game for a bit and it seems that Web API and an angular or other js front-end is the route of choice for new application developers looking to focus on server side business logic along with as many consuming front-ends as possible. There's very little data persistence in this app apart from settings etc.

So am I right to go the web API route? Would this be a good example of when NOT to use MVC? Or is there a middle ground that uses both that's universally understood as being a smart design choice?

A: This is a difficult question to answer because it raises more questions.

In short, the answer is: It depends.

As you're well aware, MVC is a **Pattern** that is used to separate application's concerns. **Design Patterns** on the other hand, are solutions to software design problems.

Microsoft's branding of asp.net MVC was initially introduced to offer an *alternative* to webforms. Both of these patterns (webforms and MVC) are viable solution for when you want to create a website or web application. It all comes down to what needs to be done and how efficient your team is in either one of them.

Microsoft asp.net Web API is a framework for building web APIs on top of the .NET framework. Back in the days, we would create Web Services using .asmx files. Then, they introduced WCF and now, we have Web API. Web Services and WCF still exist today and are valid choices but...the newer stuff does overcome some of the limitations found in the earlier stuff. There are Pros and Cons in using anyone of them. You need to pinpoint what does one offer over the other and if it fits your need.

The app is a reporting app that will allow users to design reports and download them. The app will basically be a wizard style multi page data selector. I'd like to offer the functionality to build these reports from a desktop app too.

What's not clear is when you say the ability to **design reports**. Do you mean that your users will get to choose where and how they want things to look and feel on the report? For example, user1 wants its logo at the top right while user2 wants it at the bottom left etc...How much will your users be able to "**design**" their reports? Then you mention something about a wizard. Are the steps in your wizard there to help the user **design** his report or are the steps there to **act as parameters** to your report?

You then mention that you'd like to offer this wizard-like functionality from within a Desktop application as well...my first instinct would be to host your web application somewhere and from within your Desktop application, have a browser control that points to the URL of your wizard-like web application. Considering the advances in Web API over the past few years, would it be crazy to not use it over MVC? Well...they serve different purpose.

In the past years, you **typically** created a website using webforms and/or asp.net MVC in order to design web pages/VIEWS which were then sent to the user's browser.

Web APIs are **typically** used for creating APIs that does not return Views or Web Pages but instead, returns data. Notice how I use **typically**...that's because the **trend** for the past 2-3 years now has been to create Web APIs and use a client side framework such as Angular to invoke that Web API and render **Views**. With this approach, you pretty much bypass the need of using asp.net MVC and/or webforms.

Keep in mind that although I say **trend**, I do not mean this will die in the next few months or years. There is value in creating these types of application which is beyond the scope of this post. But remember that client side framework requires people knowing them...so you'll need to take that into consideration if you choose to go down that route.

By the way, Microsoft did introduce yet another alternative to asp.net MVC called SPA (Single Page Application) which allows you to build web application using the above mentioned approach. With all that, I'm not even sure if I did end up answering your question :-)

I guess I'd still need more clarification on the exact task at hand.

A2: Well, both the MVC and Web API approach allow separation of your model and logic from presentation, which fits your requirement to have the wizard working via a desktop app as well as web. For me it comes down to your requirement for development time vs. application performance.

Using MVC will be quicker however you'll incur a server round trip unless you use some kind of proprietary controls in your view that are AJAX based. With Web API only, you're going to need to do a lot of manual JSON manipulation and be reliant more on your front-end MVVM (a client-side representation of the MVC pattern), which is *always* more time consuming.

Using Web API definitely keeps you more loosely coupled, has the potential for overall highest performance, and if you have a need to publish your API out to the public, you've got that in place. It will come at development time cost though.

So, if you just want to get something up and running quickly, use MVC is my advice. Need a very loosely coupled, optimally performant solution? Go the Web API route. Microsoft are now almost merging Web API and MVC anyway so Web API is essentially the controller of an MVC pattern.

Also I should add in relation to Vlince's answer that a single page web application is simply an application that makes use of multiple DOM elements at the client-side that are shown or hidden according to the input. Kendo UI is a framework particularly suited to that approach, however it can be done with nothing more than pure JavaScript, and isn't a Microsoft specific technology.

A3: PHP provides autoload functionality with [SPL](#) and [spl\\_autoload](#) (and related functions). You can register a custom autoloader for your library code.

For the shared functionality handled by your application, have you considered the [Front Controller design pattern](#)?

710. <https://stackoverflow.com/questions/191934/does-anyone-have-database-programming-language-framework-suggestions-for-a-gui>

T: Does anyone have database, programming language/framework suggestions for a GUI point of sale system?

Q: Our company has a point of sale system with many extras, such as ordering and receiving functionality, sales and order history etc. Our main issue is that the system was not designed properly from the ground up, so it takes too long to make fixes and handle requests from our customers. Also, the current technology we are using (Progress database, Progress 4GL for the language) incurs quite a bit of licensing expenses on our customers due to multi-user license fees for database connections etc.

After a lot of discussion it is looking like we will probably start over from scratch (while maintaining the current product at least for the time being). We are looking for a couple of things:

4. Create the system with a nice GUI front end (it is currently CHUI and the application was not built in a way that allows us to redesign the front end... no layering or separation of business logic and gui...shudder).
5. Create the system with the ability to modularize different functionality so the product doesn't have to include all features. This would keep the cost down for our current customers that want basic functionality and a lower price tag. The bells and whistles would be available for those that want them.
6. Use proper design patterns to make the product easy to add or change any part at any time (i.e. change the database or change the front end without needing to rewrite the application or most of it). This is a problem today because the Progress 4GL code is directly compiled against the database. Small changes in the database requires lots of code recompiling.

Our new system will be Linux based, with a possibility of a client application providing functionality from one or more windows boxes.

So what I'm looking for is any suggestions on which database and/or framework or programming language(s) someone might recommend for this sort of product. Anyone that has experience in this field might be able to point us in the right direction or even have some ideas of what to avoid. We have considered .NET and SQL Express (we don't need an enterprise level DB), but that would limit us to windows (as far as I know anyway). I have heard of Mono for writing .NET code in a Linux environment, but I don't know much about it yet. We've also considered a Java and MySQL based implementation.

To summarize we are looking to do the following:

4. Keep licensing costs down on the technology we will use to develop the product (Oracle, yikes! MySQL, nice.)
5. Deliver a solution that is easily maintainable and supportable.
6. A solution that has a component capable of running on "old" hardware through a CHUI front end. (some of our customers have 40+ terminals which would be a ton of cash in order to convert over to a PC).

Suggestions would be appreciated.

Thanks

[UPDATE] I should note that we are currently performing a total cost analysis. This question is intended to give us a couple of "educated" options to look into to include in or analysis. Anyone who could share experiences/suggestions about client/server setups would be appreciated (not just those who have experience with point of sale systems... that would just be a bonus).

### [UPDATE]

For anyone who is interested, we ended up going with Microsoft Dynamics NAV, LS Retail (a plugin for the point of sale and various other things) and then did some (and are currently working on) customization work on top of that. This setup gave us the added benefit of having a fully integrated g/l system, which our current system lacked.

A: I suggest you first research your constraints a bit more - you made a passing reference to a client using a particular type of terminal - this may limit your options, unless the client agrees to upgrade.

You need to do a lot more legwork on this. It's great to get opinions from web forums, but we can't possibly know your environment as well as you do.

My broad strokes advice would be to aim for technology that is widely used. This way, expertise on the platform is cheaper than "niche" technologies, and it will be easier to get help if you hit a brick wall. Of course, following this advice may not be possible if you have non-negotiable technology already in place at customers.

My second suggestion would be to complete a full project plan, with detailed specs and proper cost estimates, before going with the "rewrite from scratch" option. Right now, you're saying that it would be cheaper to rewrite the system than maintain it, and you don't really know how much it would cost to re-write.

A2: Java for language (or Scala if you want to be "bleeding edge", depending on how you plan to support it and what your developers are like it might be better, but also worse)

H2 for database

Swing for GUI

Reason: Free, portable and pretty standard.

Update: Missed the part where the system should be a client-server setup. My assumption was that the database and client should run on the same machine.

A3: I suggest you use browser for the UI.

Organize your application as a web application.

There are tons of options for the back-end. You can use Java + MySQL. Java backend will save you from windows/linux debate as it will run on both platforms. You won't have any licensing cost for both Java and MySQL. (Edit: Definitely there are a lot of other languages that have run-times for both linux & windows including PHP, Ruby, Python etc)

If you go this route, you may also want to consider Google Web Toolkit (GWT) for creating the browser based front-end in a modular fashion.

One word of caution though. Browsers can be pesky when it comes to memory management. In our experience, this was the most significant challenge in doing browser based POS You may want to checkout Adobe Flex that runs in browser but might be more civil in its memory management.

A4: Golden Code Development (see [www.goldencode.com](http://www.goldencode.com)) has a technology that does automated conversion of Progress 4GL (the schema and code... the entire application) to a Java application with a relational database backend (e.g. PostgreSQL). They currently support a very complete CHUI environment and they do refactor the code. For example, the conversion separates the UI, the data model and the business logic into separate Java classes. The entire result is a drop-in replacement that is compatible with the original (users don't need retraining, processes don't need to be modified, the data is migrated too). This is possible because they provide an application server and a set of runtime classes that provide that compatibility. The result of the automated conversion is not something that needs further editing before you can compile and run it. True terminal support is included so hardware terminals still work (it requires a small JNI library to access NCURSES from Java). All the rest of the code in the runtime is pure Java. No Progress Software Corp technology is used in the resulting system and it runs on Linux.

At least one converted system is already in production, running a 24 by 7 mission critical environment. It is a converted ERP system that their mid-sized pilot customer uses to run their entire business.

711.<https://stackoverflow.com/questions/25229217/types-of-three-tiers-web-programming-webforms-or-mvc/25230058#25230058>

T: Types of three-tiers Web Programming (Webforms or MVC)

Q: Are there different types of web programming layer?

The relationships between the layers can be different ? Different than in the image above

*(Presentation Layer - Business Logic Layer - Data access Layer)*

If there are, please explain them Or even introduce some resources. (Advantages and Disadvantages)

A: Probably the most important one that you (and most everyone else) should know about is Onion Architecture..

[http://media.ch9.ms/ch9/7a85/504ec747-81f3-49c1-bce3-2af5cb497a85/aspConfMvcSolutionBestPractices\\_Custom.jpg](http://media.ch9.ms/ch9/7a85/504ec747-81f3-49c1-bce3-2af5cb497a85/aspConfMvcSolutionBestPractices_Custom.jpg)

The image is from a presentation on Channel9 about building an ASP.NET MVC 4 app with this architecture. Really worth watching, but be warned, it may forever change the way you think about building applications (:-))

<http://channel9.msdn.com/Events/aspConf/aspConf/ASP-NET-MVC-Solution-Best-Practices>

In essence, you stop thinking about the database as being the "bottom layer". In fact, you think of it as a "top layer" alongside the user interface, or put another way, it's a port to the world outside your application. Your domain entities are at the bottom, but they have no reliance on or awareness of anything that uses them. You then define interfaces -- again with no reliance on or awareness of particular data access technologies -- that describe whatever storage and retrieval operations you need. (Try to avoid simply defining the five CRUD operations.... and even more importantly, avoid using a [generic repository pattern](#) ... long-term maintainability often becomes an issue here)

The UI layer and business logic will never have direct access to the database-specific implementation of your repository interfaces. You write your application code against interfaces only.

712.<https://stackoverflow.com/questions/27251713/wpf-architecture-with-business-layer-and-dal/27252423#27252423>

T: WPF Architecture with Business Layer and DAL

Q: I'm starting a new application in WPF and I want it to have a good architecture so that it can be maintainable. I'm using Entity Framework and what I planned so far is.

- View Layer: One project (startup) with the startup view, and main menus. Different projects for each type of view, for example, if I have views related with Books then I'd have a project named BooksView with all the views.
- Business Layer: One project for each type of Business Class, for example BusinessBooks. Each one would have a Repository with the specific operations and any helpers to do calculations if needed.
- Data Access Layer: It contains a folder named Entity Framework with the DBContext and with the T4 generated classes and with a class named ContextCreator which has the following code:

Is this approach any good?

A: Though I am quite not sure of your application scale but it seems good to me that you have started on a right path for separation of concerns.

But you may need to rethink if creating separate project for each category of views does not introduce unnecessary complexity.

Again I am not sure if you are new to WPF, but for the View layer for better maintainability, loose coupling and hence testability etc., [MVVM](#) is the best chosen pattern to organize things in place. For getting MVVM in place you may handcode everything from scratch or there are nice frameworks available like:

#### [MVVM Lite](#)

#### [Assisticant](#)

Also if you are planning towards a relatively big(layman term!!)/enterprise class application and since you are looking for highly maintainable, flexible application you may consider using [PRISM framework from Microsoft](#). [Prism Guidance and downloadable PDFs etc.](#)

Once you finalized on the View part, the you need to focus on Validations for your app and whether you would be implementing validations in the ViewModel or in your domain objects. Assisticant framework has some good domain-centric validation mechanism built into it.

For the Data access layer, since you chose to go with EF, from my understanding so far, the [Unit-Of-Work with Repository pattern](#) would greatly help you to gain extensibility, testability etc. features.

If you are planning high on unit testability and loose coupling of your application, you need to consider Inversion of Control and Dependency Injection perhaps with a suitable framework.

[Here](#) you can check a WPF application framework to understand on how to organize different areas of a WPF application in a layered approach.

<https://stackoverflow.com/questions/11481149/difference-in-dal-with-repository-pattern-and-dal-without-repository-pattern/11481172#11481172>

T: Difference in DAL with repository pattern and DAL without repository pattern?

Q: Some time back I started using EF as a DAL and from tutorials and videos come to know about repository pattern and Unit of work patterns.

About repository I learned it is an abstraction over DAL and it separate business logic from data access code. Also that it avoid reputation of data access code and help in unit testing.

I understand repository pattern is a particular way of making DAL. But what it brings ? I am not getting. My confusion is just making a DAL (a separate class library/ project) it will also give these benefits (separate data access logic from business logic, save data access code reputation, help in unit testing etc).

Probably I am still missing benefits of repository patren. Please guide me on this.

A: Data Access Layer is supposed to deal with data sources like databases, but to achieve some higher level goals as described by [MSDN](#) you need repository pattern.

As per [MSDN](#)

- You want to maximize the amount of code that can be tested with automation and to isolate the data layer to support unit testing.
- You access the data source from many locations and want to apply centrally managed, consistent access rules and logic.
- You want to implement and centralize a caching strategy for the data source. You want to improve the code's maintainability and readability by separating business logic from data or service access logic.
- You want to use business entities that are strongly typed so that you can identify problems at compile time instead of at run time.
- You want to associate a behavior with the related data. For example, you want to calculate fields or enforce complex relationships or business rules between the data elements within an entity.
- You want to apply a domain model to simplify complex business logic.

713. <https://stackoverflow.com/questions/5209939/which-pattern-most-closely-matches-scenario-detailed-and-is-it-good-practice/5323537#5323537>

T: Which pattern most closely matches scenario detailed and is it good practice?

Q: I have seen a particular pattern a few times over the last few years. Please let me describe it.

In the UI, each new record (e.g., new customers details) is stored on the form without saving to database. This clearly has been done so not clutter the database or cause unnecessary database hits.

While in the UI state, these objects are identified using a Guid. When these are saved to the database, their associated Guids are not stored. Instead, they are assigned a database Int as their primary key.

The form can cope with a mixture of retrieved items from the database (using Int) as well as those that have not yet been committed (using Guid).

When inspecting the form (using Firebug) to see which key was used, we found a two part delimited combined key had been used. The first part is a guid (an empty guid if drawn from the database) and the second part is the integer (zero is stored if it is not drawn from the database). As one part of the combined key will always uniquely identify a record, it works rather well.

Is this Good practice or not? Can anyone tell me the pattern name or suggest one if it is not already named?

A: There are a couple patterns at play here.

#### Identity Field Pattern

Defined in P of EAA as "Saves a database ID field in an object to maintain identity between an in-memory object and a database row." This part is obvious.

#### Transaction Script and Metadata Mapping

In general, the ASP.NET DataBound controls use something like a Transaction Script pattern in conjunction with a Metadata Mapping pattern. Fowler defines Metadata Mapping as "holding details of object-relational mapping in metadata". If you have ever written a data source control, the Metadata Mapping aspect of this pattern seems obvious.

The Transaction Script pattern "organizes business logic by procedures where each procedure handles a single request from the presentation." In order to encapsulate the logic of maintaining both presentation state and data-state it is necessary for the intermediary object to indicate:

If a database record exists

How to identify the backend data record, to populate the UI control

How to identify the data and the UI control if there is no current data record, so that presentation data can be updated from the backend datastore.

The presence of the new client data entry Guid and the data-record integer Id provide adequate information to determine all of this with only a single call to the database. This could be accomplished by just using integers (and perhaps giving a unique negative integer for each unpersisted UI data item), but it is probably more explicit to have two separate fields.

Good or Bad Practice?

It depends. ASP.NET is a pretty successful software project, and this pattern seems to work consistently. However, this type of ASP.NET web control has a very specific scope of application - to encapsulate interaction between a UI and a database about data objects with simple mappings. The concerns do seem a little blurred, but for many applicable scenarios this will still be acceptable. The pattern is valid wherever a Row Data Gateway would be acceptable. If there is more than one database row affected by a web control, then this approach will not be functional. In these more complex cases, either an Active Record implementation or the combination of a Domain Model and a Repository implementation would be better suited.

Whether a pattern is good or bad practice really depends on the scenario in which it is being applied. It seems like people tend to advocate more complex design structures, because they can be applied to more scenarios without failing. However, in a very simple application where the mappings between data records and the UI are direct, this pattern is very useful because it creates the intended result while minimizing the amount of performance and development overhead.

714. <https://stackoverflow.com/questions/2765583/reusable-architectural-code-management>

T: Reusable architectural code management

Q: Our code is in Java and Javascript (AJAX libraries). We have wrappers/reusable code around the existing libraries to perform mundane tasks like, db connections, session management, logging, hibernate settings, base structure, some reusable multitenancy code etc.. From the javascript end, we have page initializers, UI layout components, custom js objects, and some of our own logic.

We have multiple projects where this code can be reused, but at the same time, this code is evolving along with the application. So if we find a common way to do it, we can move it to the framework code and let other projects also benefit out of it. If/when we find a bug in the base code, we can fix it in one place and commit and all the other projects will pick up the change (rather than everyone making the changes locally).

If it's just java files, we can keep it as a separate project, and include it as a dependent module in eclipse/maven and have it included as a jar, as and when needed. This part is easy to handle, but now we also have reusable javascript in the code, which cannot exactly be jar(ed). We want some suggestions on how the code should be laid out, so we can reuse it via maven (deployment time) and via eclipse (development time), without going thru too many hoops.

Before writing this, I did come across some articles on stackoverflow, which do talk about reusable code and methodologies which are great, but not exactly how to manage them using svn, maven, eclipse etc..

Linking them, for reference.

- [Architecture of some reusable code](#)
- [How do you make code reusable?](#) -> This is a great article from a theory stand point, but no tips on management.
- [How do I index and make available reusable code?](#)

In some of our old projects, we maintained ant files, which would copy files from base locations to the final war, so everything is available. But over the period of time as the project grew, even for a simple check, we had to rebuild the whole war and deploy to test on the developers machine. Which took away 5 minutes every time.

So the question is, are there any repository patterns, eclipse project layout ideas, packaging styles, which can help us resolve this issue ?

A: I would suggest using a Component oriented java web framework for such tasks. Wicket immediately comes to mind. (But JSF, Tapestry etc will work equally well)

In wicket, everything is a component and components can be packaged with behaviors (which may include javascript, css etc)

So you'd have a commons - project where you maintain reuseable java and javascript code.

The benefits are obvious, it's pretty much exactly what you have been asking for. The drawbacks, on the other hand are mainly that javascript and css content is inside your jars and will be served by the app server rather than a static web server or CDN.

715. <https://stackoverflow.com/questions/29357680/how-much-responsibility-should-the-model-have-in-mvc/29358866#29358866>

T: How much responsibility should the Model have in MVC?

Q: First off, I apologize if this question has already been asked and answered somewhere else? I've read many questions and answers on here regarding MVC, but not quite like this (yet).

My question is, how much should the Model in MVC, know? In almost every tutorial or MVC sample I've came across, the Page's Title and Description are set in a ViewBag, and then the layout reads from it, and sets it on the page.

To me, that seems a bit, not right. I would think that the a Model for that Controller and View, should have a Title property. To do this, I would have a BasePageModel with the Title, Description, and a Meta Collection. The controller would set each one, and then the \_layout would have a @model BasePageModel and then set them on the page.

Is this "wrong" to do it this way (even though it does work), since the Model now kind of knows about the View/layout? Or is this more of a ViewModel than a Model?

A: You're right that it belongs in a ViewModel. I think the slightly confusing part about your example is that you need to distinguish between the *blog* title and the *page* title.  
You would typically have a generic ViewModelBase for all your pages that have title and description properties, which would be populated manually when you materialize the ViewModel. In the case of the Blog post you would populate The ViewModel from the BlogPost data model.

"MVC" as a design pattern doesn't account for proper layering of concerns. In it's purest form you either get logic in the controller or the model which is messy and sometimes hard to test.

Every dev shop has a slightly different way structure their projects for easy maintainability, everyone's got an opinion (there's not right answer except whatever's easiest to maintain) But as an example, our apps layers are typically structured as

- Data Model (EF, only visible to queries, ideologically the "repository")
- Queries (context specific Model materialization - don't "include" what you don't need)
- Services (Collect data from external sources and aggregate)
- ViewModels (Only pass data that's required in the necessary format. if it looks simple, use automapper)

716. <https://stackoverflow.com/questions/15350012/best-c-sharp-architecture-pattern-for-communicating-between-separate-plugins-o/15350520#15350520>

T: Best c# architecture / pattern for communicating between separate plugins of application

Q: I am currently involved in designing a system from the ground up, and we have come across an architectural design scenario that I'm not sure of the best way to solve - but I'm sure other people have solved and there's probably even a pattern for it.

### The story so far:

We have a multi-tenant website in which we are implementing various features as Plugins, our clients will choose which plugins they wish to use in their application. And each plugin could have a variety of "widgets" that a user can add to a page. (eg. similar idea to how Android apps often come with widgets that you can add to the main screens).

A plugin can depend upon other plugins to be enabled (eg an eCommerce Plugin would need Payments Plugin). Also plugins can use other plugins to enhance their functionality (eg Blogs plugin has the option of using the Comments plugin, could also use Comments with eCommerce Products).

As much as possible, we want each plugin to be self contained, with a very skinny public interface. We believe this separation of concerns will give us the best long term flexibility and maintainability of the overall system.

### The problem:

When we started to layout all the plugins we currently know about (let alone future requirements), and their dependencies and possible relationships with other plugins - it started to have a very strong resemblance to a spider web of madness. And we also started to see some Circular References happening.

eg Navigation Plugin needs to know about what Pages are on the site. But you can also add a Navigation widget to a Page.

### The partial/potential solution:

We were thinking that each plugin should be completely separate from other plugins, but would get info from and communicate with other plugins via Messages. These messages can be broken down into 2 basic types

- request for info from another plugin (Request / Response Messages)
- event notifications (Event Messages)

Both of these message types will be very simple DTO type classes - they shouldn't contain any business logic - just the info required for some other service to process the request, and provide a response.

I have mocked up a very simplified version of a couple of plugins and what we see the solution to their interactions to other plugins would be: <http://screencast.com/t/Mdb9wUmMF>

In this diagram, the Navigation, Page, Search and Other plugins wouldn't know anything about each other. But they would know about the Messages that are available, and the ProcessMessages interface.

#### *eg Request / Response Messages*

The Navigation and Other Plugins would know that if it sends a GetPagesRequest to ProcessMessages, it will get back a PagesResponse with all the info they need. (The Nav/Other plugins would need a response to the GetPagesRequest immediately.)

The Navigation and Other Plugins wouldn't know anything about the Page plugin.

#### *Request / Response Message Requirements*

A plugin that raises a Request Message would always (usually?) expect a Response message immediately.

Only 1 service would know how to process a Request Message, and provide the Response Message that would get passed back to the calling Plugin.

#### *eg Event Messages*

When a user updates the url of a page in the Page Plugin, the plugin would send a PageUrlUpdated message to ProcessMessages. The Navigation and Other plugin would then consume the PageUrlUpdated message and do whatever it needs to.

### *Event Message Requirements*

A plugin that raises an Event would *never* expect a response. 0-Many plugins might consume a given message. (Tech Note: for Event messages we are going to send them to MassTransit and RabbitMQ - then have 1-n consumers for each message)

### **The questions**

3. From a few sketches we've made, the above idea seems to work, and has a lot less inter-dependencies between different elements of the system. But I don't know the name of the design pattern or architectural structure - or if I'm on complete the wrong track. I was hoping that someone could point me to the proper solution - some good documentation and examples would be excellent. (Trying to avoid re-inventing the wheel - and an existing pattern is likely to be more robust and successful)
4. For the Request Messages, we were envisioning some kind of StructureMap-ish mapping from the Request Message to the concrete plugin / service that would process the message. Again - I'm sure that this has been solved before and there's a pattern for it, or we're completely on the wrong track and there's a better solution.

Any help and ideas are greatly appreciated Saan

PS - I would also have an IWidget in a common project with some basic properties - so the Pages Plugin could just request all classes that implement IWidget to add to a page

A:

I am currently involved in designing a system from the ground up, and we have come across an architectural design scenario that I'm not sure of the best way to solve - but I'm sure other people have solved and there's probably even a pattern for it.

### **The story so far:**

We have a multi-tenant website in which we are implementing various features as Plugins, our clients will choose which plugins they wish to use in their application. And each plugin could have a variety of "widgets" that a user can add to a page. (eg. similar idea to how Android apps often come with widgets that you can add to the main screens).

A plugin can depend upon other plugins to be enabled (eg an eCommerce Plugin would need Payments Plugin). Also plugins can use other plugins to enhance thier functionality (eg Blogs plugin has the option of using the Comments plugin, could also use Comments with eCommerce Products).

As much as possible, we want each plugin to be self contained, with a very skinny public interface. We believe this separation of concerns will give us the best long term flexibility and maintainability of the overall system.

### **The problem:**

When we started to layout all the plugins we currently know about (let alone future requirements), and their dependencies and possible relationships with other plugins - it started to have a very strong resemblance to a spider web of madness. And we also started to see some Circular References happening.

eg Navigation Plugin needs to know about what Pages are on the site. But you can also add a Navigation widget to a Page.

### **The partial/potential solution:**

We were thinking that each plugin should be completely separate from other plugins, but would get info from and communicate with other plugins via Messages. These messages can be broken down into 2 basic types

- request for info from another plugin (Request / Response Messages)
- event notifications (Event Messages)

Both of these message types will be very simple DTO type classes - they shouldn't contain any business logic - just the info required for some other service to process the request, and provide a response.

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[c#](#) [design-patterns](#) [plugins](#) [architecture](#)

[shareedit](#)

[edited Mar 11 '13 at 22:58](#)

asked Mar 11 '13 at 22:38



[Saan](#)

341317

**closed** as not a real question by [jgauffin](#), [Forty-Two](#), [slfan](#), [Björn Kaiser](#), [santosh singh](#) Mar 12 '13 at 19:45  
It's difficult to tell what is being asked here. This question is ambiguous, vague, incomplete, overly broad, or rhetorical and cannot be reasonably answered in its current form. For help clarifying this question so that it can be reopened, [visit the help center](#). If this question can be reworded to fit the rules in the [help center](#), please [edit the question](#).

up  
vote  
4down  
vote

Your question is subject to a lot of different approaches; but I might suggest Service Oriented Architecture. Mostly because it can bend to a business in a very quick and agile manner. This architecture provides many bonuses:

- Lightweight
- Agile
- Code Re-usability

However it does come with an array of hurdles that may need to overcome such as:

- Interoperability
- Security
- Performance
- Persistence

So implementing some of these resolutions may alleviate such an issue. However, that will require some knowledge of the matter on your part. As this Architecture is agile, but everything is exposed to a degree. Additionally what about multiple instances being instantiated?

Those are all potential items you'll have to identify.

What I would personally do, is find the true core of the business- Not the project; but the business. Then determine what approach would best accomplish that task. That will be a model that will last as the business core is at its heart.

Some things I'd highly recommend on this matter are:

- [Patterns Of Enterprise Application Architecture](#).
- [Implementing Domain Driven Design](#).
- [Domain-Driven Design: Tackling Complexity In The Heart Of Software](#).
- [Service Design Patterns: Fundamental Design Solutions](#).

There are a lot of other viable books, but those were some I found very helpful. As they culminate a vast array of design discussions that involve:

- Lazy Loading
- Unit Of Work
- Repository
- Dependency Injection
- Model Extensibility Framework
- and more...

This will fill in several gaps; but I can't emphasize enough. *No technology is better than one another, they all have pros and cons. But the technology that captures your business goals the best is the ideal choice.*

And I understand your need for a response to help you, but remember:

Ask not the Elves for counsel, as they both say yes and no.

Simply because we don't know your project or your business, those goals are going to heavily impact your decision. Those are things that only you will know. As I stated things we don't know that you'll want to account for:

- Company Objectives
- Maintainability
- Companies Growth Projections
- Possible Shifts in the Company paradigm.

There are more, but you'll have to account for some of those variables for the applications rate of decay to stay stagnant for awhile. So the life of the application will endure for quite awhile.

Hopefully that helps, but that is my two cents.

717. <https://stackoverflow.com/questions/30252729/what-are-the-advantages-to-passing-a-global-db-connection-into-each-function-of/30261636#30261636>

T: What are the advantages to passing a global DB connection into each function of a model?

Q: I am working with an older code base that passed a db connection into most functions in each class of the models. The db connection is created as a global and passed everywhere in the application:

```
$user = new User();
$user->loadById($db, $userId);
```

What advantages do we get by doing this vs a single connection the entire model inherits similar to the way most frameworks currently work?

Any insight would be very helpful.

**Full Disclosure:** I asked this question this way because this is how we do it at work. I don't like that we pass around the DB connection. I am trying to find a proponent of this method to see if my mind can be changed. That is why I tried to sway the discussion to the PRO side of this conversation without being blocked as a bad question. And it worked. I didn't get banned, but the great StackOverflow community didn't let me down. It appears I'm not out in left field with how I think about this issue.

A: The main advantage is: *it's easier*. As in, it's the simplest thing to do, because as a result, **you have no application architecture**. You're grasping at things from everywhere and anywhere because you have no idea how to get them otherwise, and this makes for very poor maintainability. Guess what happens 5 years down the line with this sort of codebase? Massive legacy technical debt, and it's very likely your developers aren't using Object Oriented Programming - more likely shoving procedural code in classes.

I'm not going to bother explaining about global state, because there's already a [fantastic answer](#) that already exists on programmers. A small excerpt:

Very briefly, it makes program state unpredictable.

To elaborate, imagine you have a couple of objects that both use the same global variable. Assuming you're not using a source of randomness anywhere within either module, then the output of a particular method can be predicted (and therefore tested) if the state of the system is known before you execute the method.

However, if a method in one of the objects triggers a side effect which changes the value of the shared global state, then you no longer know what the starting state is when you execute a method in the other object. You can now no longer predict what output you'll get when you execute the method, and therefore you can't test it. You'll find some developers do this purely out of laziness or a lack of knowledge / understanding of the basic concepts of [SOLID](#). If you access global state (like the database), then the beautiful, isolated class you are currently writing that theoretically can be handed off to any other developer, and also tested in its own right, is now *coupled* to this object somewhere off in the clouds.

As well as the above, you're making a liar of your object API. Each object should, via its constructor / method signatures, specify *exactly* the required external objects with which it requires to function. This allows:

- Your object to have a *definitive* API for its usage

- Future developers can see exactly what is required for this object to function from the constructor / method signatures
- Everything passed in via [Dependency Injection](#) (the posh word for passing in parameters, basically), can be 'mocked out' for testability
- Developers don't need to read through your code to find out what other objects are required, because of point 2
- You aren't accessing something that can be changed by something else, somewhere else, and make debugging a nightmare

**Your code should not be brittle.** You should be completely confident in making changes somewhere in a massive codebase, without worrying about breaking something somewhere else. Your unit tests will cover this. I highly recommend reading [The Clean Coder](#) as it elaborates on some of these concepts.

AlmaDO has a picture of a good image about [Singletons](#), which are basically objects that return a *single instance* of an object, like a database or logger. So if you request a new database from it, you either get a new one or just get back the one that already exists. In the traditional request / response / dead context, *this is completely unnecessary*. If you're having a *very* long-running process, maybe this might be necessary, especially in other languages, but as a general rule of thumb in PHP; unless you're running a PHP web socket server or similar, DI is a much better way to go for maintainability.

This is *exactly* the same as calling `StaticObject::Database`, again - something that can be accessed from anywhere.

[This](#) is a really good post on Singletons in PHP, and how they're not at all needed - that post also has a lot of useful links in it further down.

Basically - don't be lazy and grasp SOLID. There's a reason it exists, and it's certainly not just for PHP, either. The main reason people do it is because they don't know better and it's easier, and easier isn't always the best way.

718.<https://stackoverflow.com/questions/24851276/mvc-search-functionality-using-repository-pattern>

T: MVC Search functionality using repository pattern

Q: I'm trying to build a simple Search functionality into an application using repository pattern, domain models, and a service layer.

I've searched around and haven't found anything that fits the repository pattern. I've had a quick read on the Specification method, but that doesn't look like it will fit what I require. Please read on.

A typical search would involve: Find a student that goes to college xyz, and studies subject abc, and speaks english, and... So, I'm hitting each table essentially.

I have the following layers:

#### Service layer

`AppStudentService`, `AppCollegeService`, ...

#### Business Logic Layer (BLL) which contains the following domain models:

`Student`, `College`, `Subject`, `Language`, `SearchService` ...

#### Data Access Layer (DAL) which contains the following repositories:

`StudentRepository`, `CollegeRepository`, `SubjectRepository`, `LanguageRepository`

To attack this problem, I built an `AppSearchService` in the Service layer. This instantiates the `SearchService` in the BLL, and all required repositories in the DAL.

In the BLL I built a `SearchService` which contains the search logic and calls a `SubSearch()` method on each of the repositories to fetch data for its area, e.g. `StudentRepository.SubSearch` returns student(s) details. The business logic will tie up all the sub-search results together for the final search results to be returned.

I decided to break the search into a number of small queries, i.e. `SubSearch` methods, rather than a massive search query which would contain many joins. Using Entity Framework.

Question 1.

Each repository has its standard methods, e.g. Add, Save, Remove, FindAll, FindBy, and a SubSearch method. Is adding my custom (non-repo) method a good idea here, or does it contaminate the repository design?

Question 2.

Would it be better put all the SubSearch methods and search logic together into a new Search class (and method) in the DAL? This way all the logic is together and doesn't require instantiating all the BLL objects and Repo objects, i.e. better performance.

Question 3.

Is what I've done a good approach for the repository pattern? If not can someone point me in the right direction, thanks.

A: You would be better off create a SearchRepository, that is used to search across your data layer. This will be the most efficient, because joining the results of multiple repositories together is going to be ugly, and inefficient at best. A nightmare to maintain at worst.

You don't want to perform multiple queries for a search if you don't have to. You should perform the query as a single unit. This is most efficient.

719. <https://stackoverflow.com/questions/13738605/repository-pattern-where-to-place-functionality-that-touches-multiple-entities>

T: Repository pattern: Where to place functionality that touches multiple entities?

Q: I'm using the Repository pattern, and have been for a long time, but there's one thing I've never really found a good solution for. Often I need to access data that relates to multiple entities, and I can't find what feels like a good solution for where to place that functionality. A few cases:

Assuming that in the system there are Users which have Tasks:

- I need to retrieve a list of the most recent task for each user as a pairing of User to Task, say as a Dictionary<int, int> GetUsersRecentTask()
- I need to generate a report of all Users and their Tasks for that month.
- I need to generate statistics on all the objects in the system.

Now normally I would just put it in say the Users repository, but *it just doesn't feel right*.

I've also tried placing it in a higher level service, but *it just doesn't feel right to put data access there*. So where would I best place it

A: Don't consider the Repository pattern a dogma. It's just a concept. So, the UsersRepository has GetUsersRecentTask while you have different repositories such as: ReportsRepository with GetUsersReport (which includes tasks) and StatisticsRepository with Get[Object]Stats .

While the Repository Pattern originally deals only with business objects, it's still a good pattern if you need 'lesser' objects such as View Models or report data which are just data structures (no behavior). So it makes sense to ask the ReportsRepository for a certain report.

The only thing you have to be aware is that some repositories deal with business objects while others deal with DTOs .

720. <https://stackoverflow.com/questions/33811387/is-it-a-good-idea-to-have-a-business-service-depend-upon-interfaces-to-other-bus>

T: Is it a good idea to have a business service depend upon interfaces to other business services?

Q: I am utilizing the unit of work pattern, the repository pattern, that are used in a Business Logic Layer that are typically called Services. Is it a good idea to have a business service depend upon interfaces to other business services within this type of architecture to reuse functionality?

A: Yes, unless your business services are absolutely trivial, they will almost always have to be decomposed into finer grained bits of logic. This logic is often extracted into a "domain" layer, separate from the service layer.

T: Writing unit tests when the repository holds your most important code

Q: I have an EAV system that stores entities in a SQL database, fetches them out and stores them in the cache. The application is written using the repository pattern because at some point in the future we will probably switch to using a NOSQL database for serving some or all of the data. I use Ninject to fetch the correct repository at runtime.

A large part of the system's functionality is around storing, retrieving and querying data in an efficient and timely manner. There is not a huge amount of functionality that doesn't fall into the realm of data access or user interface.

I've read up on unit testing - I understand the theory but haven't put it into practice yet for a few reasons:

- An entity consists of fieldsets, fields, values, each of which has many properties. Creating any large number of these in code in order to test would require a lot of effort.
- Some of the most crucial parts of my code are in the repositories. For instance all of the data access goes through a single highly optimised method that fetches entities from the database or cache.
- Using a test database feels like I'm breaking one of the key tenets of unit testing - no external dependencies. In addition to this the way the repositories are built feels like it's tied into how the data is stored in SQL. Entities go in one table, fields in another, values in another etc. So I have a repository for each. It is my understanding though that in a document store database that the Entity, its field and values would all exist as a single object, removing the need for multiple repositories. I've considered making my data access more granular in order to move sections of code outside of the repository, but this would compound the problem by forcing me to write the repository interfaces in a way that is designed for retrieving data from SQL.

**Question:** Based on the above, should I accept that I cannot write unit tests for large parts of my code and just test the things I can?

A: No, you shouldn't accept that. In fact, this is never the case - with enough effort, you can unit test pretty much anything.

Your problem boils down to this: your code relies upon a database, but you cannot use it, because it is an external dependency. You can address this problem by using *mock objects* - special objects constructed inside your unit test code that present themselves as implementations of database interfaces, and feed your program the data that is required to complete a particular unit test. When your program sends requests to these objects, your unit test code can verify that the requests are correct. When your program expects a particular response, your unit tests give it the response as required by your unit test scenario.

Mocking may be non-trivial, especially in situations when requests and responses are complex. Several libraries exist to help you out with this in .NET, making the task of coding your mock objects almost independent of the structure of the real object. However, the real complexity is often in the behavior of the system that you are mocking - in your case, that's the database. The effort of coding up this complexity is entirely on you, and it does consume a very considerable portion of your coding time.

T: What are the key elements of a Service Oriented Architecture and how do they make an SOA effective?

Q: Service-oriented architecture (SOA) is a software architecture design pattern based on distinct pieces of software providing application functionality as services to other applications. Key elements of a Service Oriented Architecture are, application fronted, service, service repository and service bus.

Uses open standards to integrate software assets as services, Standardizes interactions of services, Services become building blocks that form business flows, Services can be reused by other applications, thus increased Reusability, Legacy leverage, Agility, Loose coupling and Interoperation.

723. <https://stackoverflow.com/questions/10496193/in-asp-net-mvc-repository-pattern-does-every-class-needs-to-have-an-interface/10496266#10496266>

T: In ASP.NET MVC repository pattern, does every class needs to have an interface?

Q: I'm kind of confusing what should be a repository and what should have an interface.  
Yes I know those are all for the comfort of unit tests.

Can somebody give me a hint?

A: Repository pattern helps you to make your application more manageable and scalable. It provides you facility to plug or unplug certain functionality with bare minimum changes and as well effecting application compatibility.

Generally when it comes to MVC Repository is used for Data Layer.

It is not necessary to implement it but will be good if you do it and specific answer to your question it depends how you implement it as such one to one mapping of interface and class is not needed.

You can go through following link for more details

[MVC repository pattern design decision](#)

724. <https://stackoverflow.com/questions/26746711/simplemembership-websecurity-getconfirmationtoken-problems>

T: SimpleMembership - WebSecurity GetConfirmationToken Problems

Q: I'm building an application which is close to completion, I'm adding in the final layers of security and functionality for emailing new user's a confirmation token when they register. Getting the initial registration confirmation token was easy enough. The token is passed to the view and an email is sent out. However, there are two scenarios where I need to resend that token, these being:

- When the user is redirected to a view called 'Registration Step Two'.
- When a user tries logging in before they have confirmed their account.

The first scenario has a button on the page which could easily have the token embedded, making this a simple task. However, the login page will not have this functionality, the server will only know the user's email address. Keeping to the DRY principle I am merging this into one method, however whilst I can get the email address the user registered with I can't find an appropriate `WebSecurity` or `Membership` call which gets the confirmation token.

I've tried requesting this from the membership table using the below Expression, however an exception is thrown stating the `LastPasswordFailureDate` is null (which is to be expected), so this wasn't possible.

I've looked at blogs similar to Kevin Junghans (below), however `WebSecurity.GetConfirmationToken` doesn't seem to be supported anymore as I cannot locate it anywhere.

[Retrieving Confirmation Token](#)

I've even seen the next link, which points at a question on StackOverflow and to be honest I don't want to be implementing it in this manner as I've spent a vast amount of time incorporating an EntityFramework repository pattern to do all this for me.

[Resend Confirmation Email with WebSecurity](#)

I'm wondering if anyone has any recommendations on getting the confirmation token without writing the SQL within the application itself.

A: Whilst thinking on it a little more this morning, I finally realised why the `LastPasswordFailureDate` was returning the mentioned Exception. Essentially I believe I am an idiot and have forgotten to add a nullable reference to the `DateTime` fields within my Model. I can't test this for fix for several hours, but will update this answer/question in either event.

725.<https://stackoverflow.com/questions/15830917/migrating-from-asp-mvc-application-to-node-js-application-with-a-focus-on-design>

T: Migrating from asp.mvc application to node.js application with a focus on design

Q: I am currently looking into alternative platforms to migrate an existing application onto, it started out as a prototype using asp.mvc but the majority of code is javascript with a simple asp mvc web service so as we are looking at taking it forward it seems sensible that we just scrap the current microsoft stack and just go for nodejs giving us more freedom of where and how we host our application, also we can reuse some of the models and code in both the web service and front end, although this would probably end up being a small amount.

This will probably be quite a large question encompassing many parts but I will put it out there anyway as I am sure this could be helpful to lots of other people looking at how they can move from something like .net/java to node.js. As most of these statically typed languages have lots of patterns and practices used, such as Inversion of Control, Unit of Work, Aspect Oriented Programming etc it seems a bit strange moving towards another platform which doesn't seem to require as much structure in this area... So I have some concerns about migrating from my super structured and tested world to this new seemingly unstructured and dynamic world.

So here are the main things I would do in MVC and would want to do in node.js currently but am not quite sure the best way to achieve the same level of separation or functionality.

A:

I recently recently switched from ASP MVC to Node.js and highly recommend switching.

I can't give you all the information you're looking for, but I highly recommend Sequelize as an ORM and mocha (with expect.js and sinon) for your tests. Sequelize is adding transaction support in the next version, 1.7.0. I don't like QueryChainer since each of its elements are executed separately.

I got frustrated with Jasmine as a test framework, which is missing an `AfterAll` method for shutting down the Express server after acceptance tests. Mocha is developed by the author of Express.

If you want to have an Express server load in plugins, you could use a singleton pattern like this: <https://github.com/JeyDotC/articles/blob/master/EXPRESS%20WITH%20SEQUELIZE.md>  
You will probably will also really like <https://github.com/visionmedia/express-resource> which provides a RESTful interface for accessing your models. For validation, I think you'll be happy with <https://github.com/ctavan/express-validator>

Why would you need to test Node modules without using Node? It's considered standard to call a test script with a Makefile, and you can add a pre-commit hook to git to run the tests before making a commit.

726.<https://stackoverflow.com/questions/340183/plug-in-architecture-for-asp-net-mvc/677682#677682>

T: Plug-in architecture for ASP.NET MVC

Q: I've been spending some time looking at Phil Haack's article on [Grouping Controllers](#) very interesting stuff. At the moment I'm trying to figure out if it would be possible to use the same ideas to create a plug-in/modular architecture for a project I'm working on.

So my question is: Is it possible to have the Areas in Phil's article split across multiple projects?

I can see that the name spaces will work themselves out, but I'm concerned about the views ending up in the right place. Is it something that can be sorted out with build rules?

Assuming that the above is possible with multiple projects in a single solution, does anyone have any ideas about the best way to make it possible with a separate solution and coding to a predefined set of interfaces? Moving from an Area to a plug-in.

I have some experiences with plug-in architecture but not masses so any guidance in this area would be useful.

A: I did a proof of concept a few weeks ago where I put a complete stack of components: a model class, a controller class and their associated views into a DLL, added/tweaked [one of the examples](#) of the VirtualPathProvider classes that retrieve the views so they'd address those in the DLL appropriately. In the end, I just dropped the DLL into an appropriately configured MVC app and it worked just like if it had been part of the MVC app from the start. I pushed it a bit further and it worked with 5 of these little mini-MVC plugins just fine. Obviously, you have to watch your references and config dependencies when shuffling it all around, but it did work.

The exercise was aimed at plugin functionality for an MVC-based platform I'm building for a client. There are a core set of controllers and views that are augmented by more optional ones in each instance of the site. We're going to be making those optional bits into these modular DLL plugins. So far so good.

I wrote up an overview of my prototype and a [sample solution for ASP.NET MVC plugins](#) on my site. EDIT: 4 years on, I've been doing quite a few ASP.NET MVC apps with plugins and no longer use the method I describe above. At this point, I run all of my plugins through MEF and don't put controllers into plugins at all. Rather, I make generic controllers that use the routing information to select MEF plugins and hand the work off to the plugin, etc. Just thought I'd add since this answer gets hit a fair bit.

727. <https://stackoverflow.com/questions/6162329/implement-a-fake-nhibernate-repository/6163796#6163796>

T: Implement a fake NHibernate repository

Q: I am using StoryQ to perform some basic integration testing and we are using NHibernate as our ORM. When I started, I didn't know that NHibernate implemented the Repository pattern and so I created my own IRepository in order to run my integration tests.

However, considering that NHibernate already implements the Repository pattern, I assume that it is doing so against some kind of interface. So, I would like to work against NHibernate's interface for the Repository if my assumptions are correct.

I have tried to search for it but I come across information that to do that I need to work against the ISession interface. As I do not really know NHibernate that well, can someone explain why I would need to implement my fake repository against the ISession interface? What is the IRepository equivalent in NHibernate? Is there some tutorial which goes into greater depth into the matter?

A: NHibernate doesn't implement the Repository pattern. It replaces it.

SQLite in-memory databases are nice if you've got a simple database implementation, but I've found that things can become cumbersome quickly, almost to a point where it becomes as painful, if not more, to use SQLite as it is to stub/mock ISession/ICriteria/etc.

One perfect example of this: In one of my recent projects, in which I was using PostgreSQL as my production database and SQLite as my test database, I had a need to extend NHibernate to add support for an aggregate function that was recently added to PostgreSQL. Figuring out how to add this was a story in itself, but I worked it out. I then had to find a functional equivalent in SQLite. I needed an aggregate function that worked in the same exact way as its Postgres counterpart. There was none. I asked around and was told that there were ways to extend NHibernate to "fake" this function in SQLite. I also had the option of extending SQLite to add this functionality.

All I wanted to do was write two, maybe three, tests around the scenario that I was trying to implement. I ended up spending way too much time trying to ensure functional equivalency between the two systems. It wasn't worth all this effort for one function. And what would happen if down the road, I needed to add another function?

I think SQLite is useful. It's a great lightweight database system and I love that you can conveniently use it as a in-memory database for simple scenarios. However, I'm not sure it's worth using beyond that. I think from now on, I'll be using the same database across all environments, even if it means having slower integration tests for all data persistence logic.

A2: I'm not sure where in core NHibernate there is an IRepository interface (AFAIK there's none) so you might be referring some other NHibernate side projects.

It is not the best approach to go about mocking ISession either. The best thing in my opinion, is to use a real in-memory database that is fully supported by NHibernate. You may need to check how to configure NHibernate to run on sqlite in-memory database, which basically is just configuring NHibernate in your tests.

The good thing about this approach, is that tests run with a very good speed, as if there's no database involved, and you don't need to abstract away all your ORM functionality (and loose features too) just to run / drive your tests

728. <https://stackoverflow.com/questions/11388994/how-to-design-application-architecture-in-asp-.net/11389886#11389886>

T: how to design application architecture in ASP.NET

Q: I am going to convert Visual C# application into ASP.NET. For this task, I want to create architecture first and then want to develop programme. So, how can I break-down my logic into libraries? I know, its very basic question, but very much worried about it as I am working alone and I need assistance..

A1: I used this [Building Layered Web Applications with Microsoft ASP.NET](#) as a model when i started building web applications using ASP.Net

A2: With any luck your existing application has been written using SOLID OO principles. In this case you can separate your business logic from your UI. If this is not the case then I would start by making a clean set of interfaces to your business logic and make some unit tests around them. The next thing is MVC is optimized for disconnect situations such as web applications. Depending on what infrastructure you have create either an MVC3 or and MVC4 application using Razor and test projects. As you build out your project try to make unit tests as you go. This will improve the reliability of your code, also switch on the FxCop static code analysis. The next thing you will need to think about is how interactive you want your web UI to be. If your users are intranet users perhaps you could get away with using the scaffolding features with the data annotations in the model. If your application is to impress external customers then you need a richer user experience. In which case look into making an MVVM pattern on your client browser using knockout. Here is a link <http://www.codeproject.com/Articles/305308/MVC-Techniques-with-JQuery-JSON-Knockout-and-Csharp> As you build the controllers there is a tendency for them to become fat (it's a consequence of SRP) Think about using techniques such as aspect orientated programming with compiler attributes and filters to keep the code dry and clean.

A lot of what you need to do will depend on your organization. For example if you are working in an organization with SOA policies then you will need to discuss with your architects how you want to use WebAPI vs WCF. Another aspect to think about is how will Microsoft support client side scripting in the future. At a guess I am hoping that they will make tooling to simplify the javascripting side. For the time being I am learning HTML5 with javascript libraries like Jquery,Jquery-Ui, Ajax in order to make a richer user experience

729. <https://stackoverflow.com/questions/969964/when-to-use-soa-service-oriented-architecture/4085124#4085124>

T: When to use SOA (Service Oriented Architecture)

Q: I had a conversation with one of our architects recently and he summarized his use of SOA as "The only time we'll use services is when we need async actions otherwise we'll use go direct to the data store"

I thought about this statement and it seems fairly logical as services work well in a publish subscribe model, but I was wondering in what other scenarios you should be looking to use SOA?

A1: We expose services to our customers because they shouldn't be able to connect to the datasource directly.

We expose services to ourselves because it's easier to spread them over different technologies using WCF.

We expose services because we have different user interfaces for the same datasource. And when we use services we save a third of the work.

It is never only because of the async actions.

A2: Another case to use services is when you want to integrate a heterogeneous technology stack.

In other words, if your DB is postgres, but you have code in Java, Perl, Python, and C++, you can write stored procedures and have each programming language call those. If you are working with a DB that doesn't have stored procs, or you want to have the capability of switch those out - or you just want to run over port 80, you could wrap the SQL calls in a service-oriented layer (think websphere) that can now be called by anyone - plus you can put the authentication and authorization logic (connect to LDAP, whatever) in the SOA layer.

You can also use that SOA layer to, say build up a logical routine to do "stuff" with that old COBOL box in the corner that manages invoices or creates statements for customers.

So if you've got a number of legacy systems you want to interconnect - say the sales system to the warehousing system to the order predicting systems - SOA might be one way to achieve that goal. (You can also use a "service bus" to create an event driven system as a better way of orchestrating change.)

A3: There are many scenarios in which you'd benefit from using services. Some of these scenarios have been codified by industry gurus (such as Thomas Erl of SOA fame).

### SOA Patterns

I'd say you want to look for:

- Legacy application reuse
- Business process reuse (multiple use cases for same process)
- Implementation abstraction (platform, language, persistence abstraction)

Your colleague is right to be cautious. There are a lot of deployment and support variables introduced with adoption of web services.

A4: Another scenario might be an integration scenario, where you'd like many separate components, or systems, to communicate with each other.

A5: SOA can be used as a way to hide the implementation details of your subsystems. If your customers need product information, for instance, it's probably a good idea to wrap your product database or inventory subsystem into a generic service and expose only the subset of functionality and data your customers need. Then, if you ever need to replace or upgrade that subsystem, you'll be able to make those changes transparent to your users and your customer facing software interface.

A6: There is another school of related thought termed SOAD (Service Orientated Application Design) exists where every component of the system is a service. This is to leverage the benefits offered by the environment that they are built with (EJB, WCF) i.e. you get lots of free plumbing.

Some more resources on this at

### Building a SOA

[SOA Design Pattern](#)

[Achieving integrity in a SOA](#)

[Achieving Flexibility/Maintainability in a SOA](#)

A6: I would use SOA in a system that will be extended in the time inside the organization and probably to others organizations.

For products that could change is nice too, you can replace little parts of it.

At the end you will have lots of lego bricks that you will join together.

730. <https://stackoverflow.com/questions/4137605/a-good-way-to-send-the-results-from-a-mysql-query-over-a-web-service/4137739#4137739>

T: A good way to send the results from a MySQL query over a Web Service?

Q: I've been trying to figure out a good and easy way to send the results of a MySQL Query over my Web Service.

There is a lot of good methods that I've looked into, like Data Transfer Object, but I would like to keep it as simple as possible. At this point simply getting this to work has a higher priority. :)

Any help or documentation is welcome, even on more difficult topics, but as mentioned above the simpler the better at this point.

A: when you say expose your results, do you also mean dynamic querying? such as [Wcf Data Services](#)  
However be careful on what and how you expose information. It is a pain to go back and fix it.

for SOA or a 3 physical Tier I would consider using

- Service Layer
- Data transfer objects, they are great, exposing data directly can cause issues with maintainability/Changeability

to help with DTO's look at AutoMapper, it was designed for it.

if I have missed a point, add a comment

ps here is a great list of helpful patterns [PoEAA Catalogue](#)

731. <https://stackoverflow.com/questions/7155737/how-to-implement-mvc-across-the-lan/7157147#7157147>

T: How to implement MVC across the LAN?

Q: I don't want to reinvent the wheel, so ask how others do this ...

I have 2 upcoming projects, one in Delphi and one in PHP (plus maybe one in Java), so info specific to those would be welcome, but a generic answer is also acceptable.

So, I have a bunch of PCs and a database server (ODBC) and want to develop an MVC app.

I guess that the Model is on the d/b server and that the view is on each individual PC. Where is the controller?  
One on the d/b server, or one copy on each PC?

When writing data I imagine it is enough to lock the relevant d/b table(?). But how to update all of those views and tell them that there is new data or that the data which they are working on has been modified or deleted by another user?

Any code is welcome as are URLs or book recommendations ... thanks

A: As far as I understood MVC, there is no rule about the location of the controller itself.

Please take in consideration that MVC is an [architectural pattern](#), not an hardware nor even logical design. If, like in any n-Tier architecture, it could make sense to have the DB in a dedicated computer (for performance and maintainability/backup reasons), controllers and views can be... everywhere...

MVC is a *pattern*, that is, more a way of modeling/interfacing objects and classes than a way of distributing your application into modules. In fact, you can (and IMHO should) share MVC code among client and servers, whereas the objects are still implementing Model/View/Controllers in a separated way.

A "classic" MVC implementation (e.g. used by RoR or by [DoR](#) or [Relax](#) in the Delphi world - both in draft status) uses directories or files to split views and controllers. But this is just one implementation design of this pattern.

You can have a [pure object](#) MVC orientation, as we implemented for instance in [our ORM framework](#). You can in fact have objects everywhere, to handle your model, to access the DB, to handle your business services.

In our *mORMot Open Source framework*, for Delphi 6-XE, you can follow this development pattern:

- **Data Tier** is either *SQLite3* and/or an internal very fast in-memory database, and/or [any other external database](#) (via OleDB or OCI), most SQL queries are created on the fly by the ORM kernel;
- **Logic Tier** is performed by pure ORM aspect: you write Delphi classes which are mapped by the Data Tier into the database, and you can write your business logic in both Client or Server side, just by adding some events or methods to the classes; a [Service-Oriented-Architecture](#) (DataSnap-like) is also available, and can be used without any object;
- **Presentation Tier** is either a Delphi Client, either an AJAX application, or any other back-end able to communicate using RESTful JSON over HTTP/1.1 - in this case, PHP or JAVA clients are perfect candidates.

I suggest you take the time to download and take a look [at the mORMot documentation](#). It's far from perfect, but it tries to be complete. In the SAD document, you'll find some pages about the architecture we implemented, in particular MVC, n-Tier, SOA and ORM. Don't be afraid of the 1000 pages of PDF - you don't have to read it all: I just added some general diagrams which may help you modeling your solution.

In all cases, taking a breath before implementing a solution for your project is a very good decision. The time you'll spend now by looking at existing architectures will certainly save you pain in the future. Good start!

732. <https://stackoverflow.com/questions/4660156/is-it-ok-to-call-a-service-from-another-service-in-an-soa-architecture/4679843#4679843>

T: Is it OK to Call a Service from Another Service in an SOA Architecture?

Q: I think I know the answer to this one, but I have just spotted someone doing exactly the opposite - who is a very skilled developer, were they just having a bad day?

Q: Is it OK to call a service from within a service in an SOA architected system?

I suspect not, but i'll ask anyway...

A: Definitely yes. This SOA pattern is commonly called choreography where one web service processes and then passes the message to another down a processing pipeline. Google it and you will find some good references.

Another case may be more technical reason like routing, where you have frontend webservices that routes your messaged to different backend services based on security policy, content, bridge different technology or transport protocol etc.

A2: I can't think of any reason why not. I can think of multiple reasons why a service could call another service. I've architected and implemented multiple services that do this. I'm also aware of other architectures that set up this sort of system.

A3: think about the architectural goal of "separation of concerns". instead of each service knowing how to do everything, it can rely on other specialized services for shared pieces of functionality

A4: I have some different scenario. What if you want to implement service level clustering in your SOA? For example, say persistence service is resides on one machine and is responsible for handling all persistence tasks in the cluster. So, on other machine which needs persistence functionality, need to connect to the that machine only(ignore fail over factor).

Now while login, if User service has instance of Persistence service directly, then you will not be able to implement service level clustering.

We have our SOA middleware and I called service from each other directly. But when we implemented service level clustering using JMS/ActiveMQ, we faced the problem for those interconnected services.

733. <https://stackoverflow.com/questions/31612896/what-happens-if-my-node-js-server-crashes-while-waiting-for-web-services-callbac/31629251#31629251>

T: What happens if my Node.js server crashes while waiting for web services callback?

Q: Im just starting to look into Node.js to create a web application that asynchrounously calls multiple web services to complete a single client request. I think in SOA speak this is known as a composite service / transaction.

My Node.js application will be responsible for completing any compensating actions should any web service calls fail within the composite service. For example, if service A and B return 'success', but service C returns 'fail', Node.js may need to apply a compensating action (undo effectively) on service A and B.

My question is, what if my Node.js server crashes? I could be in the middle of a composite transaction. Multiple calls to web services have been made, and I am waiting for the callbacks. If my node server crashes, responses meant for the callbacks will go unheard. It could then be possible that one of the web services was not successful, and that some compensating actions on other services would be needed.

Im not sure how I would be able to address this once my node server is back online. This could potentially put the system in an inconsistent state if service A and B succeeded, but C didn't.

A1: Distributed transactions [are bad for SOA](#) - they introduce dependency,rigidity , security and performance problems. You can implement a [Saga](#) instead which means that each of your services will need to be aware of the on-going operation and take compensating actions if they find out there was a problem. You'd want to save state for each of the services so that they'd know on recovery to get to a consistent internal state.

If you find you must have distributed transactions than you should probably rethink the boundaries between your services.

(updates from the comments) Even if you use a Saga, you may find that you want some coordinator to control the compensation - but if your services are autonomous they won't need that central coordinator -they'd perform the compensating action themselves - for example if they use the reservation pattern [infoq.com/news/2009/09/reservations](http://infoq.com/news/2009/09/reservations) . They can perform compensation on expiration of the reservation. Otherwise, you can persist the state somewhere (redis/db/zookeeper etc.) and then check that on recovery of the coordinator

734. <https://stackoverflow.com/questions/34167965/mvc-with-service-architecture/34168330#34168330>

T: MVC with Service architecture

Q: I'm creating a MVC project where in one of its View, there will be search part and the listing part. At the same time I have an idea of using a service layer (Web API or WCF).

I would like to ask which one is correct way or setup for building this search and listing page ?

The way I'm doing it at the moment is using partial view for listing part that will get updated every time searching occurs and position the service layer behind the controller (service layer in the middle of controller and business layer).

735. <https://stackoverflow.com/questions/8399375/soa-update-request-granularity-and-nulls>

T: SOA update request granularity and nulls

Q: We are striving towards an SOA enterprise...

Given three options for say updating member details how do we design the contract?

The business process is quite simple. The customer calls (or logs in themselves), and updates their personal details so that we have the latest details available. The customers employer can also supply members details (this will be in bulk - potentially 10s of 1000s at a time). This is so we can communicate with them correctly in the future. We have multiple back end systems.

The details are:

- Phone numbers,
- Addresses,
- Email,
- Name or company name,
- Contact person,
- Tax File Number,
- Marital Status
- Smoker status

**As it stands now the business rules are:** If a valid tax file number has already been supplied, you cannot supply it again. (can be overridden) If valid address details are present, the employer cannot update them, only supply them the first time.

**Option 1:** One operation, Member.UpdateDetails

- Only one service to create and manage.
- If business rules grow, this service could become less cohesive.
- Has the problem of having to differentiate between specifying that something should be removed versus leaving it as is.
- Single unit of work, single transaction.

**Option 2:** Break down into four operations: Member.UpdateContactDetails; Member.ProvideTaxFileName; Member.UpdateName; Member.UpdateDemographics

- Potentially simplifies the single operation - spreads the complexity over the four operations.
- Still has the problem of having to differentiate between specifying that something should be removed versus leaving it as is. For example what if I only wanted to specify smoker status without marital status.
- Requires some deep analysis to figure out how to group these correctly - The cohesiveness depends on the business process.
- More services to write and maintain.
- Transactions become a concern - multiple transactions handled by the caller?

**Option 3:** Break down into smaller still: Member.UpdateAddress; Member.UpdateBusinessDetails; Member.UpdateContactNumbers; Member.UpdateContactPerson; Member.UpdateEmailAddress; Member.UpdateMailingAddress; Member.UpdatePhysicalAddress; etc.

- Removes the issue of having to differentiate between specifying that something should be removed versus leaving it as is.
- Business rules can evolve easily in whatever operation.
- Loads of services to write and maintain.
- Transactions become a concern - many transactions handled by the caller?
- Start to look like property setters / CRUD - apparently a no go.

In option one or two, say the caller only wants to update the home email address - I cannot expect that the client complete the entire message - *does the client leave all of the other tags out? What is the accepted, obvious, intuitive pattern to dealing with this problem?*

If this IS indeed the pattern, *then how does the client clear the field, or set it to null?* In .NET, in the server code I cannot see an obvious way to distinguish between not supplied and null. Since it is not obvious, I expect that this is not an accepted pattern.

A: I would strongly suggest the second option, because it preserves the intention of the user making the change all the way through to the code that acts on it.

The first advantage is that it absolves you from answering the question of "how do I represent deletion in a DTO" - because now you would capture that fact as a DeleteContactNumber message, explicitly.

The second advantage is that you are absolved answering the question of "how do I add multiple addresses at once" - because you don't have to infer that someone added an address from the mutated DTO, you get an AddContactAddress message.

The third advantage is that you can do more interesting business analysis at the end of the day - because you know what the events that happen are, without having to do analysis of the DTO and infer that.

Finally, it becomes easy to add more information to the specific events: do you want to know *why* people are deleting their contact address?

Using a model of "fetch the data, mutate the data, save the data" is less lines of code, but it ultimately makes it harder to understand why things are done in your system - and that will eventually cost you.

A2: Personally, I don't see too much wrong with having both the UpdateMember capability AND the simpler capabilities of UpdateAddress etc. Some may argue, but I think this will be perfectly acceptable.

'Intuitive' may be the better word to follow here - what feels right to you?

To me, UpdateMember would seem a definite candidate to include. If this service is being consumed by a UI, all the fields would likely already be populated by a GetMember call, so all the fields would be populated anyway with their original values. You could possibly use something similar even if it is not a UI. Then you can have UpdateAddress, Update PersonalDetails as well, for simpler, specialized circumstances.

What I don't like however is this idea of only having the UpdateMember capability and then leaving fields you don't want to change blank. I don't think many people use this pattern and I certainly wouldn't. As you say, how do you then set a field to null.

736. <https://stackoverflow.com/questions/66040/application-level-replication-technologies>

## T: Application Level Replication Technologies

Q: I am building out a solution that will be deployed in multiple data centers in multiple regions around the world, with each data center having a replicated copy of data actively updated in each region. I will have a combination of multiple databases and file systems in each data center, the state of which must be kept consistent (within a data center). These multiple repositories will be fronted by a SOA service tier.

I can tolerate some latency in the replication, and need to allow for regions to be off-line, and then catch up later.

Given the multiple back end repositories of data, I can't easily rely on independent replication solutions for each one to maintain a consistent state. I am thus lead to implementing replication at the application layer -- by replicating the SOA requests in some manner. I'll need to make sure that replication loops don't occur, and that last writer conditions are sorted out correctly.

In your experience, what is the best pattern for solving this problem, and are there good products (free or otherwise) that should be investigated?

A1: You should definitely consider IBM Lotus Domino. A Lotus Notes database can replicate between sites on a predefined schedule. The replicate in Notes/Domino is definitely a very powerful feature and enables for full

replication of data between sites. Even if a server is unavailable the next time it connects it will simply replicate and get back in sync.

As far as SOA Service tier you could then use Domino Designer to write a webservice. Since Notes/Domino 7.5.x (I believe) Domino has been able to provision and consume webservices.

A2: You dont give enough specifics to be certain of your needs but I think you should check out SQL Server Merge replication. It allows for asynchronous replication of multiple databases with full conflict resolution. You will need to designate a Global master and all the other databases will replicate to that one, but all the database instances are fully functional (read/write) and so you can schedule replication at whatever intervals suit you. If any region goes offline they can catch up later with no issues - if the master goes offline everyone will work independantly until replication can resume.

I would be interested to know of other solutions this flexible (apart from Lotus Notes/Domino of course which is not very trendy these days).

A3: I think that your answer is going to have to be based on a pub/sub architecture. I am assuming that you have reliable messaging between your data centers so that you can rely on published updates being received eventually. If all of your access to the data repositories is via service you can add an event notification to the orchestration of each of your update services that notifies all interested data centers of the event. Ideally the master database is the only one that sends out these updates. If the master database is the only one sending the updates you can exclude routing the notifications to the node that generated them in the first place thus avoiding update loops.

737. <https://stackoverflow.com/questions/969964/when-to-use-soa-service-oriented-architecture/4085124#4085124>

T: When to use SOA (Service Oriented Architecture) [closed]

Q: I had a conversation with one of our architects recently and he summarized his use of SOA as "The only time we'll use services is when we need async actions otherwise we'll use go direct to the data store"

I thought about this statement and it seems fairly logical as services work well in a publish subscribe model, but I was wondering in what other scenarios you should be looking to use SOA?

A1: We expose services to our customers because they shouldn't be able to connect to the datasource directly.

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738. <https://stackoverflow.com/questions/4137605/a-good-way-to-send-the-results-from-a-mysql-query-over-a-web-service/4137739#4137739>

T: A good way to send the results from a MySQL query over a Web Service?

Q: I've been trying to figure out a good and easy way to send the results of a MySQL Query over my Web Service.

There is a lot of good methods that I've looked into, like Data Transfer Object, but I would like to keep it as simple as possible. At this point simply getting this to work has a higher priority. :)

Any help or documentation is welcome, even on more difficult topics, but as mentioned above the simpler the better at this point.

A: when you say expose your results, do you also mean dynamic querying? such as [Wcf Data Services](#)

However be careful on what and how you expose information. It is a pain to go back and fix it.

for SOA or a 3 physical Tier I would consider using

- Service Layer
- Data transfer objects, they are great, exposing data directly can cause issues with maintainability/Changeability

to help with DTO's look at AutoMapper, it was designed for it.

if I have missed a point, add a comment

ps here is a great list of helpful patterns [PoEAA Catalogue](#)

739. <https://stackoverflow.com/questions/18067656/ecommerce-frontend-split-databases/18068091#18068091>

T: Ecommerce frontend split databases

Q: Until now I've worked on a web app for keeping record of different products from different warehouses in regards to inventories and transactions etc.

I was asked to do an ecommerce front end for selling products from these warehouses and I would like to know how should I approach this problem?

The warehouses web app has a lot of logic and a lot of products and details and I don't know whether to use the same database(s) for the second app by mingling the data in regards to user mgmt, sales orders and etc.

I've tried doing my homework but for the love of internet I don't even know how to search, if I'm placed on the right track I shall retreat to my cave and study.

I'm not very experienced in this matter and I would like to receive some aid in deciding how to approach the problem, go for a unified database or separated one-way linked databases and how hard would it be to maintain the second approach if so?

A: Speaking of warehouses, I believe that is what you should do with your data, e.g. roll each and every disparate data source into a common set of classes/objects that your eCommerce store consumes and deals with.

To that end, here are some rough pointers:

7. Abstract logic currently within your inventory app into a middle tier WCF Service that both your inventory app and eCommerce app can consume it. You don't want your inventory app to be the bottleneck here.
8. Warehouse your data, e.g. consolidate all of these different data sources into your own classes/data structures that you control. You will need to do this to create an effective MVC pattern that is maintainable and sustainable. You don't want those disparate domain model inventories to control your view model design.
9. You also don't want to execute all of that disparate logic every time you want a product to show to the end user, so cache the data in a well indexed, suitable table as described above for high availability that you can get to using Entity Framework or similar. Agree with the business on an acceptable delay and kick off your import/update processes on a schedule.
10. Use Net.Tcp bindings on your services to move your data around internally. It's quick, it's efficient and there is very little overhead compared to SOAP when dealing in larger data movements.
11. Depending on scale required, you may also want to consider implementing a WCF Service purely for the back-end of your ecommerce store, that deals only in customer interactions with the underlying warehoused data sources, this could then warrant its own server eventually if the store becomes popular. Also, you could figure in messaging eventually between your SOA components, later down the line.
12. Profit. No, seriously!

I hope this helps. Good luck!

740. <https://stackoverflow.com/questions/2553616/wcf-rest-services-for-use-with-the-repository-pattern/2554236#2554236>

T: WCF Rest services for use with the repository pattern?

Q: I am considering moving my Service Layer and my data layer (repository pattern) to a WCF Rest service.

So basically i would have my software installed locally (WPF client) which would call the Service Layer that exists via a Rest Service... The service layer would then call my data layer using a WCF Rest Service also OR maybe just call it via the DLL assembly

I was hoping to understand what the performance would be like. Currently I have my datalayer and servicelayer installed locally via DLL Assemblies locally on the pc.

Also i presume the WCF REST services won't support method overloading hance the same name but with a different signature??

I would really appreciate any feedback anyone can give.

A: If all you want is a thin CRUD layer exposed as a web service (to provide database access without a VPN, etc.), then you can do the same thing using [WCF Data Services](#) without all the effort, and have something that's a great deal more flexible (you can write Linq against the proxies, for example).

What you're calling the *service layer* ought to expose *domain objects*, so assuming you have a domain model and want to expose this using a WCF Web Service (REST or otherwise), the answers to your questions are:

- WCF is very fast. It's obviously not *transparent*, but from experience, if you're connecting to the services over a network connection then any "slowness" you experience will be due to latency/bandwidth limitations of the network itself. The only exception is the setup time of the WCF client (i.e. the channel) - which is why you generally want to keep them alive as long as possible, they are not throwaway objects like a `DataContext`.
- Method overloading is not supported over the wire. You can overload methods within the service assembly and differentiate them via the `OperationContract` attribute (and specifically the `Name` property, but to an outside client, they will appear to be different web methods with different names).
- **However**, if you're designing web services, even REST services, the very first thing you need to do is change your perspective from an RPC-based ("function") mindset to a document-based ("message") one. In other words, instead of having 4 methods that take different combinations of 4 possible arguments, you should define a "request" class that exposes all 4 of those parameters as properties. This is often considered *bad* design for "local" code, but it is *good* design for web services.
- In the same vein, using a web service to expose a "repository" is typically considered an anti-pattern (with the exception of WCF Data Services which serves a very different purpose). The reason is that a web service is supposed to provide *business logic* (which I assume is what your service layer does). It should provide very coarse-grained operations, atomic transactions where the client supplies *all* of the information required to perform a single complete transaction at the same time, instead of invoking several methods in succession.

In other words, if you find, when trying to translate your services into web services, that it's necessary to invoke several operations on several different services in order to perform a single "unit of work", then you should think about redesigning the services to provide better abstractions over the work. The overall design should minimize "chatter" between client and service.

So to summarize, it probably makes very little sense for you to have a "service layer" that lives on the client which talks to a "data layer" that's exposed as a web service, *unless* you need to solve the very *specific* problem of providing CRUD operations over a WAN. From an architectural perspective, what makes a lot *more* sense is to expose the actual *services* through WCF, and move toward more thin-client applications.

Keep in mind, however, that going down the "SOA" path, while it may have many long-term benefits, is likely to cause some short-term pain. You basically have another library to maintain, another library to test, another point of failure, another thing you need to document. If you don't have a large, distributed architecture, or plan to in the near future, then it may be too early to start integrating WCF services beyond the WCF Data Services framework mentioned at the top.

Also, you don't specify the domain or the kind of application you're developing, but REST as a specific service model imposes a number of trade-offs with respect to security, distributed transactions, etc. If these services are intended for internal or B2B consumption - i.e. if they are "enterprise" services - you really should consider

SOAP instead, which gives you access to WS-Security, Active Directory integration and all that good stuff. REST is *great* for public apps and mashups but isn't appropriate for *every* scenario.

741.<https://stackoverflow.com/questions/26880752/what-are-the-key-elements-of-a-service-oriented-architecture-and-how-do-they-make>

T: What are the key elements of a Service Oriented Architecture and how do they make an SOA effective?

Q: Service-oriented architecture (SOA) is a software architecture design pattern based on distinct pieces of software providing application functionality as services to other applications. Key elements of a Service Oriented Architecture are, application fronted, service, service repository and service bus.

Uses open standards to integrate software assets as services, Standardizes interactions of services, Services become building blocks that form business flows, Services can be reused by other applications, thus increased Reusability, Legacy leverage, Agility, Loose coupling and Interoperation.

742.<https://stackoverflow.com/questions/41339432/why-are-web-services-a-preferred-standard-to-achieve-soa/41398183#41398183>

T: Why are Web Services a preferred standard to achieve SOA?

Q: I'm learning about web services and I read it is the standard way to archive a Service Oriented Architecture. Why are Web Services used so much to implement SOA?

A: A service is a self contained unit of functionality. You access that functionality over a well defined interface that the service exposes to the outside world.

SOA is (obviously) about service-orientation. It is an architectural pattern relying on loosely connected services that interact and collaborate to provide larger functionality than the individual services. Web services are just one way to implement SOA. You can just as well use message oriented middleware to obtain the same, or even have the services as processes on one machine.

Why web services are popular as a SOA implementation is because of history. Before SOA had a name, people were doing a similar thing using RPC. However RPC only works in a homogenous technology stack so soon after that XML-RPC appeared, then after that SOAP, and all sorts of specifications and programming standards to support different types of software talking to each other across the network. So, many companies have turned to web services to interconnect different, heterogeneous, legacy systems, with newly created solutions, or even software systems of their business partners.

Being the right thing at the right time (with accompanying standards to interconnect heterogeneous systems) made web services the first tool being picked up by companies while trying to make the move to a SOA architecture. But you can have SOA implementations without necessarily resorting to using web services.

743.<https://stackoverflow.com/questions/59537/service-oriented-architecture-how-would-you-define-it/30051421#30051421>

T: Service Oriented Architecture: How would you define it

Q: Service Oriented Architecture seems to be more and more of a hot topic these days, but after asking around the office I have found that I seem to get many different definitions for it. How would you guys define SOA? What would you consider the official definition?

A: Wikipedia: "A SOA is a software architecture that uses loosely coupled software services to support the requirements of business processes and software users. Resources on a network in an SOA environment are made available as independent services that can be accessed without knowledge of their underlying platform implementation."

SOA is not that new, but it has potential to achieve some amazing things. But the organization has to be ready for it: the business has to think in processes and that's the big problem

A2: An SOA design includes components (i.e., *services*) that can be used by code regardless of implementation (i.e., any OS or language). A single instance of a service may also be used by multiple applications, whereas, e.g., a DLL would have to be duplicated for each app and require the same implementation technology as the linking application.

Services in an SOA design are usually implemented as interoperable web services.

A3: A clarification here - "Service Oriented Architecture is a **systems integration** and code reuse approach where applications are dependent on **connecting to services provided by other running applications across the network.**"

I have a scenario where two j2ee applications have been integrated using event driven messaging. Here the above phrases of **systems integration** and **connecting to services provided by other running applications across the network** hold good. Can i call this SOA ?

The following principles would hold good here 1) statelessness 2) message oriented - loosely coupled infact decoupled 3) extensible.

However, the following do not apply 1) platform independence - neither of the applications being integrated has been designed to work in a different platform. 2) The applications are plain j2ee applications which have not been designed with all soa concepts.

A4: I agree with all of the people that point you to Fowler on this. Basically it runs like this: service oriented architecture got a reputation as being good, so anything that people want to be associated with good they call SOA. In reality it has a lot of downsides and can create a Service Oriented Gridlock or Dependency Oriented Architecture.

Here's my go at a definition: Service Oriented Architecture is a systems integration and code reuse approach where applications are dependent on connecting to services provided by other running applications across the network. This is distinct from component architectures, where software components are shared statically between applications in the form of libraries or SDKs, for example.

744. <https://stackoverflow.com/questions/6232926/what-is-a-good-open-source-package-for-building-flexible-spam-detection-on-a-lar>

T: What is a good open source package for building flexible spam detection on a large Rails site?

Q: My site is getting larger and it's starting to attract a lot of spam through various channels. The site has a lot of different types of UGC (profiles, forums, blog comments, status updates, private messages, etc, etc). I have various mitigation efforts underway, which I hope to deploy in a blitzkrieg fashion to convince the spammers that we're not a worthwhile target. I have high confidence in what I'm doing functionality wise, but one missing piece is killing all the old spam all at once.

Here's what I have:

- **Large good/bad corpora** (5-figure bad, 6 or 7-figure good). A lot of the spam has very reliable fingerprints, and the fact that I've sort of been ignoring it for 6 months helps :)
- **Large, modular Rails site deployed to AWS.** It's not a huge traffic site, but we're running 8 instances with the beginnings of a SOA.
- **Ruby, Redis, Resque, MySQL, Varnish, Nginx, Unicorn, Chef, all on Gentoo**

My requirements:

5. I want it to perform reasonably well given the volume of data (therefore I'm wary of a pure ruby solution).
6. I should be able to train multiple classifications to different types of content (419-scam vs botnet link spam)
7. I would like to be able to add manual factors based on our own detective work (pattern matching, IP reuse, etc)
8. Ultimately I want to construct a nice interface to be used with Ruby. If this requires getting my hands dirty in C or whatever, I can handle it, but I'll avoid it if I can.

I realize this is a long and vague question, but what I'm looking for primarily is just a list of good packages, and secondarily any random thoughts from someone who has built a similar system about ways to approach it.

A: We looked for an acceptable open source solution and didn't find one.

If you come to the same conclusion and decide to consider proprietary anti-spam, check out the paid [Akismet](#) collaborative spam filtering service. We've had decent performance from it across a dozen medium sized sites. It integrates with rails through rack and [rackakismet](#).

745.<https://stackoverflow.com/questions/18611447/node-web-app-with-java-api/18612494#18612494>

T: Node Web App with Java API

Q: Here is the story;

We recently started a project with 1 FE guy experienced in Node environment and 2 BE guy working with Java.

We built the BE of it, the API side on Tomcat + Java and the actual web app part running on node.js/express.js. So, the www (web app) part of it runs on express.js and makes ajax calls to the Tomcat Server to return json results.

As we had full time jobs and limited time to sit down and talk about things, this seemed to be a fast way to get the project up and running.

The thing is that, you have two separate projects, to git pushes and two instances running on amazon.

Right now, we are stuck in a discussion where this architecture makes sense or not. So we need an expert to put an end to this argument.

A: It reads as though you're recreating a [Service Oriented Architecture](#)

Service-oriented architecture (SOA) is a software design and software architecture design pattern based on discrete pieces of software that provide application functionality as services, known as Service-orientation. It's hard to give a informed answer in your instance without more information on the context. But there are dozens of posts on SO and elsewhere which can guide your discussion on when it is the right approach.

Try [What are the advantages and disadvantages of using Services over Components](#) and [When to use SOA Service Oriented Architecture](#)

746.<https://stackoverflow.com/questions/2665024/how-is-an-soa-architecture-really-supposed-to-be-implemented/2665155#2665155>

T: How is an SOA architecture really supposed to be implemented?

Q: My project is converting a legacy fat-client desktop application into the web. The database is not changing as a result. Consequently, we are being forced to call external web services to access data in our own database. Couple this with the fact that some parts of our application are allowed to access the database directly through DAOs (a practice that is much faster and easier). The functionality we're supposed to call web services for are what has been deemed necessary for downstream, dependent systems.

Is this really how SOA is supposed to work? Admittedly, this is my first foray into the SOA world, but I have to think this is the complete wrong way to go about this.

A: I've seen people try to jam SOA at too low a level and this may be such a case. I would certainly not equate DAO and SOA at the same level.

I agree with @ewernli

[What is SOA "in plain english"?](#)

IMHO, SOA makes sense only at the enterprise-level, and means nothing for a single application.

*If I'm reading into your question correctly, your web services are for C/R/U/D data into the database. If so, providing C/R/U/D services directly to the database and its tables are likely too low level to be SOA services.*

I'd look for services at a higher level and try to determine whether they are interesting at to the enterprise. If so, those are your services. I'd also ask myself whether my former desktop app is providing services (i.e. should you be looking to make your new app an SOA service itself rather than trying to force an SOA architecture into the desktop app at a low level).

A2: SOA... SOA... is the bane of my existence, for just this reason. What, or what not, constitutes SOA? I support SOA products in my day job, and some people get it, some don't. SOA.. SOA is about wrapping discrete business services in XML. ZIP+4 validation services. Payment gateways. B2B messaging.

SOA *CAN* be used to decouple desktop apps from backend databases. Sometimes it doesn't make sense, sometimes it does. What almost *NEVER* makes sense is low-latency high-query-count logic. If you ever have to use an application in France directly connected to a database in California, you'll get what I mean. SOA pretty much forces you to then smartly about how you model and return your data (look into **SDO - Service Data Objects**). The devil's in the details though. Marshalling data to/from XML can be costly.

747. <https://stackoverflow.com/questions/13862333/understanding-soa-architecture/13863580#13863580>

#### T: Understanding SOA architecture

Q: I'm working on a SOA project based on SOAP. Well, i read many tutorials on Internet, but i still have the same problem, which is all articles & blogs, even the official documentation of eclipse told you how to use the IDE assistant or such APIs & frameworks (e.g : JAX-WS, CXF) to create a web service and gives you as bonus some definitions of SOAP, WSDL & UDDI, but none of them explained how an SOA works, the process of publishing & deploying a WS is done & how the C/S req/resp process of invoking a distant web service is done using all these entities SOAP, WSDL & UDDI and the other files which exist in a SOA project (XML files & java files). I have read many e-books but still don't understand how SOA works. pliiiz i need your help guys, i'm really disturbed & confused. Many thanks in advance.

A: Don't get too hung up on that term Service Oriented Architecture ([SOA](#)) as its really more of a marketing term that describes a well-known and practiced software development methodology of making programs into specialized components that can be reused across a broad range of applications. It can also describe applying this software development methodology to business process modeling where business units and workflows are modularized and looked at as individual services rather than monolithic processes that exist in a bubble, and some call this different but related application of the concept [Service Oriented Modeling](#). While SOA shares a lot in common with modularization, it also adds the requirement that your separate code modules not only inter-operate and integrate (i.e. work well together with) each other, but potentially with everyone else's code in the world, and also that they are available over some well-defined mechanism.

An SOA "purist" might tell you that for your software to be "SOA-compliant" (note: that's not a real thing as there's no single set of rules or governing body on services) that you need to write it as a [SOAP](#) Web Service, publish and maintain a WSDL which can act as a contract between you and any implementing parties, and follow the relevant [WS-\\* specs](#). However, in reality [REST](#) and other lightweight modularization/integration/reusability approaches are just as much in line with the concept of SOA. If you did want to become an "expert" in SOA then read through every word of the following specs:

#### DISCOVERY

- [UDDI](#)
- [RDDL](#)
- [XRI](#)
  - [XRDS](#)

#### MESSAGING

- [SOAP 1.1](#)
- [SOAP 1.2](#)
  - [SOAP over JMS](#)
  - [MTOM](#) (Msg Trans Optimization Mechanism)
- [WS-Addressing](#)

#### META-DATA

- [WSBPEL](#)
- [WSDL 1.1](#)
- [WSDL 2.0](#)
- [WADL](#)
- [WSFL](#)
- [WS-Policy](#)
- [WS-PolicyAssertions](#)
- [WS-PolicyAttachment](#)
- [WS-MetadataExchange](#) (WS-MEX)

## SECURITY

- [WS-SecurityPolicy](#)
  - [WS-Security](#)
- [WS-Trust](#)
  - [WS-SecureConversation](#)

## QUALITY OF SERVICE

- [WS-ReliableMessaging](#) (WS-RM)
  - [WS-Coordination](#)
  - [WS-AtomicTransactions](#)
  - [WS-TX](#)

(those are just some of the most important WS-\* specs, [see full list here](#))

Then read every page of the following essential SOA books:

- [Service-Oriented Architecture - Concepts, Technology and Design](#)
- [Enterprise Integration Patterns](#)
- [RESTful Web Services](#)

However, I don't actually advise that as there's way too much reading material. What I would suggest though, is that you use them as a reference as you code your own programs following an SOA methodology and notice that in a specific area, a reference manual on what to do next would come in handy. Practice makes perfect and you'll really learn a lot more from working with real-world examples than from reading books and learning everything about the standards and theory. As you mentioned, start with the overly-simplistic JAX-WS and JAX-RS Web Service examples that come out-of-the-box with IDEs like NetBeans or Eclipse, then try some examples that come with popular SOA frameworks like [CXF](#), [Axis2](#) or [RESTlet](#).

In general, as you are writing code constantly ask yourself if your code is:

6. Reusable in other applications or domains
7. Makes its core functionality extensible internally and accessible externally (especially over a network connection, i.e. [HTTP](#))
8. Provides output data or metadata in an easy to parse/process (and thus integrate) format like [XML](#), [JSON](#) or one of the many related data languages and sub-languages
9. Able to provide metadata on demand to describe its inner workings, making it possible to automate its integration
10. As specialized and modularized as possible; and at the same time, if there are other similar specialized [APIs](#) or Web Services that already exist out there, would it be better to use them instead of reinventing the wheel

There are lots of other questions and criteria that people may use, but IMHO these are the most important.

748. <https://stackoverflow.com/questions/589488/mvp-mvc-vs-traditional-n-tier-approach-for-winform-apps>

T: **MVP/MVC vs traditional n-tier approach for winform apps**

Q: We have a large suite of apps, most are C# 1.1, but at least 10 major ones are in VB6. We are undertaking a project to bring up the VB6 apps to .NET 3.5.

All the c# 1.1 apps are written using a traditional n-Tier approach. There isn't really any architecture/separation to the UI layer. Most of the code just responds to events and goes from there. I would say that from the point of maintainability, it's been pretty good and it's easy to follow code and come up to speed on new apps.

As we are porting VB6 apps, the initial thinking was that we should stick to the existing pattern (e.g. n-Tier).

I am wondering, whether it's worth it breaking the pattern and doing VB6 apps using teh MVP/MVC pattern? Are MVC/MVP winform apps really easier to maintain? I worked on a MVC-based project and did not feel that it was easier to maintain at all, but that's just one project.

What are some of the experiences and advice out there?

A1: Dude, if something works for you, you guys are comfortable with it, and your team is up to specs with it. Why do you need to change?

MVC/MVP sounds good... Then why am I still working on n-Tier myself?

I think before you commit resources to actual development on this new way of programming... You should consider if it works for YOUR team.

A2: If you are porting the VB6 apps vs. a full rewrite, I'd suggest to focus on your Pri 1 goal - to get asap to the .Net world. Just doing this would have quite a lot of benefits for your org.

Once you are there, you can evaluate whether it's beneficial to you to invest into rearchitecting these apps.

If you are doing full rewrite, I'd say take the plunge and go for MVP/MVVM patterned WPF apps. WPF will give you nicer visuals. The MVP/MVVM pattern will give you unit testability for all layers, including the visual. I also assume that these apps are related, so chances are you might be able to actually reuse your models and views. (though, I might be wrong here)

A3: It moves a thin layer of code you still probably have on the UI. I say thin, because from your description you probably have plenty of code elsewhere. What this gives you is the ability to unit test that thin layer of code.

Update 1: I don't recommend to re architect while doing the upgrade, the extra effort is best expend on getting automated tests (unit/integration/system) - since you will have to be testing the upgrade works anyway. Once you have the tests in place, you can make gradual changes to the application with the comfort of having tests to back the changes.

A4: "Change - that activity we engage in to give the allusion of progress." - Dilbert

Seriously though, just getting your development environment and deployment platforms up to .NET 3.51 is a big step in and of itself. I would recommend that things like security reviews and code walkthroughs should probably come before re-archecting the application.

MVC and MVVM are excellent paradigms, particularly in terms of testability. Don't forget about them, but perhaps you should consider a pilot project before full scale adoption?

A5: MVC in particular does not exclude n-Tier architecture.

We also have ASP.NET 1.1 business application, and I find it a real nightmare to maintain. When event handlers do whatever they like, maybe tweak other controls, maybe call something in business logic, maybe talk directly to the database, it is only by chance that software works at all.

With MVC if used correctly you can see the way the data flows from the database to your UI and backwards. It makes it easier to track the errors if you got the unexpected behaviour.

At least, it is so with my own little project.

I'll make the point once again: whatever pattern you use, stick to the clear n-Tier architecture. 2-Tier or 3-Tier, just don't mess everything into a big interconnected ball.

**749.** <https://stackoverflow.com/questions/2232492/is-using-a-root-persistent-class-or-base-persistable-object-an-architecture-smell>

**T:** Is using a root persistent class or base persistable object an architecture smell?

**Q:** One of the major gripes voiced by the Alt.Net community against the Microsoft Entity Framework is that it forces you to use a Base Persistable Object for everything being stored in the database. I have two questions related to this:

1. Is it acceptable to have a "Root Persistent Class" as the base for the domain objects in your application, or is this an architecture smell?
2. If you feel it is OK for you to have one within your application, is it also OK for an ORM framework to force you to use one? Are there reasons to avoid a framework that makes you do this?

I've been using an abstract base object as the root of all my persistable classes for some time. It makes several housekeeping chores much easier.

### 3 Answers

**A1:** My feeling is that it's ok presuming the context is such that it

- 1 stays out of the way
- 2 doesn't add features that aren't used outside of the scope of the entity

doesn't tie you to any particular ORM (/sort of in keeping with #2)

So if the base class is used to describe, for instance, an ID and the meaning of Equality (since many times entities are considered equal if they have the same ID), then that's fine. However, when it starts describing database-centric information (such as tables, columns, state of the entity, etc), then yes, I think it begins to smell.

**C1:** Good point about database-centric information. +1 – Brett Allen Feb 9 '10 at 21:49

**C2:** That's a good way to think about the issue. I use my persistable base class for Ids, Equality and other housekeeping tasks, but these don't couple me to any particular ORM or database. – dthrasher Feb 10 '10 at 1:47

**A2:** For applications with a low-to-moderate level of complexity, using a base persistable object can really increase development productivity.

However, doing so constrains your code and limits design options as your application gets more complex. Obviously, you use up your base class at the start, which is significant in C# and Java. It also promotes poor separation of concerns.

I'd say the most important thing when considering any ORM is to ask these questions (from Jeremy Miller's article The Unit of Work Pattern and Persistence Ignorance):

- Can the Business Logic Run Independently of the Database?
- Can I Design My Domain Model Independently from the Database Model?
- How Does My Persistence Strategy Affect My Business Logic?

**C1:** I wasn't thinking of the Active Record pattern specifically. I find impossible to work with once you start dealing with child objects, grandchildren, etc. +1 For a great link to the article on Unit of Work and Persistence ignorance. Those are great questions to ask about ORM solutions. – dthrasher Feb 10 '10 at 1:44

**C2:** Argh, in retrospect this is obvious - you're talking about base class features like dirtiness tracking, row version support, identity comparison, etc. - not putting actual data access code in a base class! I'll revise this a bit to see if I can't better address that question. – Jeff Sternal Feb 10 '10 at 13:53

**A3:** Unless you are using Data Transfer Objects (DTO) for persistence and using that model, having a root object for persist-able classes in my experience greatly decreases code repetition and increases developer productivity. And even when using a DTO, I think it could be helpful though I rarely use DTOs so can't speak from experience.

I would not consider it code smell for the following reasons:

- Increase in productivity of developers.
- Consolidates persistence code in one class.
- Easy to change to another framework that implements the same methodology (have to only change inheritance of all your business classes, and update checks of the original root class).

Edit: Inline statichippo's answer, I agree with his opinion about this base class including information about the underlying data storage mechanisms (such as table/column names, database type, etc).

I never liked the DTO approach, either. I get an explosion of classes that makes my solution feel very brittle. I'm more productive with a common root, but wanted to make sure it wasn't going to bite me later.

750. <https://stackoverflow.com/questions/798243/metrics-for-measuring-successful-refactoring/36119147#36119147>

**T:** Metrics for measuring successful refactoring [closed]

**Q:** Are there objective metrics for measuring code refactoring?

Would running findbugs, CRAP or checkstyle before and after a refactoring be a useful way of checking whether the code was actually improved rather than just changed?

I'm looking for trends we can capture that can help us improve the code review process without wasting time on code that gets changed for simple personal preference.

**C1:** While you're at it, could you define "good design" objectively, also? It would help if there was an objective score for "elegant", "sensible" and "coherent". –S.Lott Apr 28 '09 at 14:27

**C2:** I added subjective to my tag list. – sal Apr 28 '09 at 15:36

**C3:** Just completed my answer and added other criteria to measure the value of refactoring –VonC Apr 28 '09 at 17:20

## 9 Answers

**A1:** Would running findbugs, CRAP or checkstyle before and after a refactoring be a useful way of checking if the code was actually improved rather than just changed?

Actually, as I have detailed in the question "What is the fascination with code metrics?", the trend of any metrics (findbugs, CRAP, whatever) is the true added value of metrics.

It (the evolution of metrics) allows you to prioritize the main fixing action you really need to make to your code (as opposed to blindly try to respect every metric out there)

A tool like Sonar can, in this domain (monitoring of metrics) can be very useful.

Sal adds in the comments:

The real issue is on checking what code changes add value rather than just adding change.

For that, test coverage is very important, because only tests (unit tests, but also larger "functional tests") will give you a valid answer.

But refactoring should not be done without a clear objective anyway. To do it only because it would be "more elegant" or even "easier to maintain" may be not in itself a good reason enough to change the code.

There should be other measures like some bugs which will be fixed in the process, or some new functions which will be implemented much faster as a result of the "refactored" code.

In short, the added value of a refactoring is not solely measured with metrics, but should also be evaluated against objectives and/or milestones.shareedit edited May 23 at 12:30Community11 answered Apr 28 '09 at 14:50VonC737k24122462607

**C1:** I agree about the trend line being the value. If code test coverage is increasing and the number of broken builds in a month is zero and the number of warnings or findbugs hits is decreasing; clearly things are ok. The real issue is on checking what code changes add value rather than just adding change. – sal Apr 28 '09 at 15:40

**A2:** Number of failed unittests must be less or equal to zero :)shareedit answered Apr 28 '09 at 14:27Alexander Artemenko6,06953035

**C1:** I love it when I have a negative number of failed tests. –Michael Myers Apr 28 '09 at 14:27

**C2:** That means I'm passing even the ones I haven't written yet, I guess. –Michael Myers Apr 28 '09 at 14:34

**A3:** Depending on your specific goals, metrics like cyclomatic complexity can provide an indicator for success. In the end every metric can be subverted, since they cannot capture intelligence and/or common sense.

A healthy code review process might do wonders though. shareedit answered Apr 28 '09 at 14:31David Schmitt40.5k1998152

**C1:** Its my hope that we could capture trends and use them to improve our code review process. I've seen a lot of loops being re-written and re-re-written without improving readability, speed or anything we can objectively measure.–sal Apr 28 '09 at 17:22

**A4:** Code size: Anything that reduces it without breaking functionality is an improvement in my book (removing comments and shortening identifiers would not count, of course) shareedit answered Apr 28 '09 at 14:43Michael Borgwardt274k56402641

**C1:** Smaller code size is good, but clarity and understandability is better - even at the expense of a few lines of code.–Alister Bulman Apr 28 '09 at 17:49

**C2:** I actually think that reducing code size has a much better chance to improve clarity and understandability than increasing it. – Michael Borgwardt Apr 28 '09 at 20:29

**A5:** No matter what you do just make sure this metric thing is not used for evaluating programmer performance, deciding promotion or anything like that.

**A6:** I would stay away from metrics for measuring refactoring success (aside from #unit test failures == 0). Instead, I'd go with code reviews. It doesn't take much work to find obvious targets for refactoring: "Haven't I seen that exact same code before?" For the rest, you should create certain guidelines around what not to do, and make sure your developers know about them. Then they'll be able to find places where the other developer didn't follow the standards.

For higher-level refactorings, the more senior developers and architects will need to look at code in terms of where they see the code base moving. For instance, it may be perfectly reasonable for the code to have a static structure today; but if they know or suspect that a more dynamic structure will be required, they may suggest using a factory method instead of using new, or extracting an interface from a class because they know there will be another implementation in the next release. None of these things would benefit from metrics.

**C1:** Actually, I'm interesting in gathering this data to improve the quality of the code reviews. I suspect that there is too much change of questionable value – sal Apr 28 '09 at 15:44

**C2:** There may be too much change to be of measurable value, but that will be due to the fact that not everything can be measured. How do you measure how easy it is to understand the code? How do you measure how flexible the code is? There are metrics that purport to measure these things, but I believe they're all wrong, by definition. – John Saunders Apr 28 '09 at 18:44

**A7:** Yes, several measures of code quality can tell you if a refactoring improves the quality of your code.

Duplication. In general, less duplication is better. However, duplication finders that I've used sometimes identify duplicated blocks that are merely structurally similar but have nothing to do with one another semantically and so should not be deduplicated. Be prepared to suppress or ignore those false positives.

Code coverage. This is by far my favorite metric in general, but it's only indirectly related to refactoring. You can and should raise low coverage by writing more tests, but that's not refactoring. However, you should monitor code coverage while refactoring (as with any other change to the code) to be sure it doesn't go down. Refactoring can improve code coverage by removing untested copies of duplicated code.

Size metrics such as lines of code, total and per class, method, function, etc. A Jeff Atwood post lists a few more. If a refactoring reduces lines of code while maintaining clarity, quality has increased. Unusually long classes, methods, etc. are likely to be good targets for refactoring. Be prepared to use judgement in deciding when a class, method, etc. really does need to be longer than usual to get its job done.

Complexity metrics such as cyclomatic complexity. Refactoring should try to decrease complexity and not increase it without a well thought out reason. Methods/functions with high complexity are good refactoring targets.

Robert C. Martin's package-design metrics: Abstractness, Instability and Distance from the abstractness-instability main sequence. He described them in his article on Stability in C++ Report and his book Agile Software Development, Principles, Patterns, and Practices. JDepend is one tool that measures them. Refactoring that improves package design should minimize D.

I have used and continue to use all of these to monitor the quality of my software projects.

**A8:** I see the question from the smell point of view. Smells could be treated as indicators of quality problems and hence, the volume of identified smell instances could reveal the software code quality.

Smells can be classified based on their granularity and their potential impact. For instance, there could be implementation smells, design smells, and architectural smells. You need to identify smells at all granularity levels before and after to show the gain from a refactoring exercise. In fact, refactoring could be guided by identified smells.

Examples: Implementation smells: Long method, Complex conditional, Missing default case, Complex method, Long statement, and Magic numbers. Design smells: Multifaceted abstraction, Missing abstraction, Deficient encapsulation, Unexploited encapsulation, Hub-like modularization, Cyclically-

dependent modularization, Wide hierarchy, and Broken hierarchy. More information about design smells can be found in this book.

Architecture smells: Missing layer, Cyclical dependency in packages, Violated layer, Ambiguous Interfaces, and Scattered Parasitic Functionality. Find more information about architecture smells here.

**A9:** There are two outcomes you want from refactoring. You want to team to maintain sustainable pace and you want zero defects in production. Refactoring takes place on the code and the unit test build during Test Driven Development (TDD). Refactoring can be small and completed on a piece of code necessary to finish a story card. Or, refactoring can be large and required a technical story card to address technical debt. The story card can be placed on the product backlog and prioritized with the business partner. Furthermore, as you write unit tests as you do TDD, you will continue to refactor the test as the code is developed. Remember, in agile, the management practices as defined in SCRUM will provide you collaboration and ensure you understand the needs of the business partner and the code you have developed meets the business need. However, without proper engineering practices (as defined by Extreme Programming) your project will lose sustainable pace. Many agile projects that did not employ engineering practices were in need of rescue. On the other hand, a team that was disciplined and employed both management and engineering agile practices were able to sustain delivery indefinitely. So, if your code is released with many defects or your team loses velocity, refactoring, and other engineering practices (TDD, pairing, automated testing, simple evolutionary design etc), are not being properly employed.

751. <https://stackoverflow.com/questions/49260669/should-http-based-micro-services-always-be-rest>

**T:** Should HTTP Based Micro Services always be Rest

**Q:** I'm currently developing a micro service that basically provides calculation services to other micro services. It does not store data or have any resources like a sales order. It only calls other micro services and then calculates metrics and prices to return a result.

I'm kind of struggling trying to make a rest API with resources names that are nouns when all I do is calculate stuff and return results (more like an action).

So can we have a micro service that behaves more like an HTTP API than a Restful service (is it a bad practice, an anti pattern , an architecture smell, ....)

Regards

**C1:** You don't have to use REST, RPC can be OK. – intentionally left blank Mar 13 at 16:14

**1 Answer**

**A1:** You can use whatever you want and in your particular case I am pretty sure you won't see any drawbacks. From my point of view only difference with rest is mostly semantic -some people may also argue about cacheability but I don't think so-

Apart from rest/rpc creating microservices without any actual domain could cause a maintenance issue in the long run as you totally depend on some other microservices data whenever a change required in their side you may also need change this microservice. That is why I don't recommend those kind of calculation services unless you have a valid scalability requirement.

752. <https://stackoverflow.com/questions/17031387/jax-rs-webservice-architecture-patterns>

T: JAX-RS Webservice Architecture PatternsAsk Question

**Q:** What are the common practices for developing JAX-RS Webservices? I think my architecture has kind of a smell to it: The webservice is acting as a proxy, collecting information from different sources. There are RSS Feeds, SOAP Services and a Database. I would like to abstract away the datasource in my business logic. Thats why I came up with something like this:

Persistence Layer:

```
| RSS Connector Parser SOAP Interface(s) Entities || SomeRssDataDAO
SomeSoapDao AnotherSoapDap UserDao ...Dao |Service Layer

| SomeRssDataService SoapDataService UserFavoritesService |"Resource" Layer

| JerseyResources that map HTTP to service methods |The service layer as well as
the persistence layer would be EJBs.
```

The problem I'm facing is that I would have transactions in the persistence layer. What if a services needs to use mutliple steps to do it's work, that wouldn't be right then.

But using transactions / the entity manager in my service layer doesn't seem right to.

What's the way to go?

Also general Enterprise Application Architecture Tipps would be appreciated.

java-ee rchitecture jax-rssshareimprove this question asked Jun 10 '13 at 19:32thertweck739419 add a comment

## 1 Answer

**A1:** I don't see anything wrong with transactions being managed by the service layer. That's where the context to decide what should be atomic is and should be.

Your service layer doesn't need to be EJBs unless you plan to distribute them. You can use JDO or JPA transactions to manage persistence operations.

Your "Persistence Layer" doesn't really need to be EJBs either unless you plan to distribute them.

shareimprove this answer answered Jun 11 '13 at 21:19TheArchitect1,7641912

**C1:** Thank you. I will go with this kind of structure. It evolved since then into a full fledged DDD application. – thertweck Jun 11 '13 at 22:04

**753.** <https://stackoverflow.com/questions/13065355/how-to-ignore-some-files-in-delphi-qa-audits>

**T:** How to ignore some files in Delphi QA audits?

**Q:** I'm using the fabulous Audits tool within Delphi XE. It's really useful because it finds some architecture smells, coding rules violations ...BUT, I had not found any way to ignore some files. I have 3rd Party files (auto-generated from XML Data Binding) that produce many warnings ... The report is then polluted as I would like to ignore these files and see only 0 warning when I'm done. Any way to ignore files in Audits tool?

**C1:** I would use a script tool like Apache Ant, use it to copy the relevant files to a new clean directory and then invoke the QA Audits. Unfortunately (iirc) the QA Audits can not be run from command line.

**C2:** @mjn Audits can be run from command line :docwiki.embarcadero.com/RADStudio/XE3/en/... – TridentOct 25 '12 at 12:38

**C3:** That would be a great QualityCentral request {\$PRAGMA NO\_AUDIT} or something like that, as a precompiler directive at the top of the file.

**C4:** @mjn In that case you can script it to do what you want.

**754.** <https://stackoverflow.com/questions/19807161/stop-session-from-expiring-when-browser-closes/19807209#19807209>

**T:** Stop session from expiring when browser closes

**Q:** It seems to be that my PHP session is expiring/deleting when the browser is closed.

Is there a way I can prevent this to happen ? Is it only a PHP setting or is there a browser say in this as well?

## 2 Answers

**A1:** You need:

- Change session.cookie\_lifetime value
- Change session.gc\_maxlifetime value so that it should not be lesser than cookie life time value. Otherwise your session cookie will point to invalid session storage

However, if you want your session to persist after browser was closed, it seems that it's not "session" by definition. I.e. technically, you can do that - but logically that seems to be architecture smell.

**C:** Thanks ! Did not know about the session.cookie\_lifetime

**A2:** That is the behaviour of a session . If you don't want that to happen make use of Cookies.

**C1:** Hmmm. Thanks. I think I have to.

**C2:** But you can store uncritical data in Cookies which should be longer available than for the session lifetime.

755. <https://stackoverflow.com/questions/1813979/method-to-handle-killed-java-jobs/1814014#1814014>

**T:** Method to handle “killed” Java jobs?

**Q:** Our server web app will handle jobs that are requested by REST API requests.

Ideally if the server dies during a job (ie: plug pulled), the job should resume or restart at startup.

A very convenient way to process these jobs is in a separate thread using some of the concurrent utility classes in Java 5. The only issue is, given a failure, you need to have written down the job details and create a process that reads these details at startup and resumes the jobs. This seems like a pain to do.

An alternate approach is to use a queue where user makes request, we write to queue, then read from queue and perform job and only remove the message when the job is complete. This makes it easy to resume the job on startup as the server will just read from the queue on startup and resume the process.

Are there any better approaches to this scenario?

## 2 Answers

**A1:** Given that you've specified REST, you obviously have clients that make requests and require results. Why not put the onus of determining if they've completed on the clients themselves.

e.g. a client makes a request. If it gets a result back, all well and good. If, however, the client detects the server has gone done (via a premature disconnection on the HTTP connection), then it can back off and retry later. If you wish, you can implement various retry strategies (e.g. retry on a different host, give up after 'n' retries etc.).

This way the clients maintain knowledge of what they require (as they must do anyway, presumably) and your servers are stateless, which is a lot easier to manage.

**C1:** Agree this is a lot easier to manage. Going to try this.. – Marcus Leon Nov 29 '09 at 20:27

**A2:** I'd use Quartz (which has fail-over capabilities) to manage your jobs.

PS: I'd prefer to be wrong but, having read your last questions, I have the feeling that you are building something overcomplicated or conceptually wrong. There are just too many architecture smells IMHO.

756. <https://stackoverflow.com/questions/19808308/is-it-possible-to-cancel-function-override-in-parent-class-and-use-function-from/19808535#19808535>

**T:** Is it possible to cancel function override in parent class and use function from top level parent

**Q:** class TopParent

```
{
protected function foo()
{
 $this->bar();
}
}
```

```
private function bar()
{
 echo 'Bar';
}
}
```

class MidParent extends TopParent

```
{
protected function foo()
{
 $this->midMethod();
}
```

```

parent::foo();

}

public function midMethod()
{
 echo 'Mid';
}

public function generalMethod()
{
 echo 'General';
}

```

Now the question is if I have a class, that extends MidParent because I need to call

```

class Target extends MidParent
{
 //How to override this method to return TopParent::foo(); ?

 protected function foo()
 {
 }
}

```

So I need to do this:

```

$mid = new MidParent();
$mid->foo(); // MidBar

$target = new Target();
$target->generalMethod(); // General

```

```
$target->foo(); // Bar
```

UPDATE Top parent is ActiveRecord class, mid is my model object. I want to use model in yii ConsoleApplication. I use 'user' module in this model, and console app doesn't support this module. So I need to override method afterFind, where user module is called. So the Target class is the class that overrides some methods from model which uses some modules that console application doesn't support.

**C1:** One question: why do this? – Alma Do Nov 6 '13 at 9:33

**C2:** In short: no. Clean up what your code does and when it does it if you don't want it to do it. – deceze♦ Nov 6 '13 at 9:33

**C3:** Make Target::foo call TopParent::bar ? – Joucks Nov 6 '13 at 9:37

**C4:** The fact that you think you need to do this demonstrates a failure to grasp the concepts of OOP. This is a huge code smell, I think the best thing you can do is to look at your design again and refactor. – vascowhite Nov 6 '13 at 9:43

**C5:** See 'why' in update – Anatoliy Gusarov Nov 6 '13 at 9:59

**C6:** Re "why update": It's a terrible code smell if "a console app doesn't support something in the model so you need to change the model". Those two things should be completely separate. The model always works the same way, the View displays what it can of it. – deceze♦ Nov 6 '13 at 12:39

**C7:** User model handles session, but console app doesn't have sessions =) In my models I can check whether user is guest, or not and then load different rules,relations,scenarios,scopes. It is very comfortably and easy to use all this stuff. And I just added a class with just several overrides, and cosole app works great. where is the smell? – Anatoliy Gusarov Nov 6 '13 at 20:15

## 4 Answers

**A1:** Directly - you can't. This is how OOP works.

You can do it by a little redesign, e.g. in MidParent add method:

```
protected function parentFoo()
```

```
{
```

```
 parent::foo();
```

```
}
```

and in Target:

```
public function foo()
{
 $this->parentFoo();
}
```

But, again, this is only a workaround to solve your question and not a solution.

**C1:** Good workaround, I will use it, thanks! – Anatoliy Gусаров Nov 6 '13 at 9:40

**A2:** Try this (<http://php.net/manual/en/language.oop5.final.php> - not allow to overriding in the childrens):

```
final protected function foo()
{
 $this->midMethod();
 parent::foo();
}
```

in class MidParent and the class Target can't overrides this method.

**C1:** I need to override in Target, but I also need to use TopParent foo() in Target – Anatoliy Gусаров Nov 6 '13 at 9:45

**A3:** Actually, you can do this like this way with Reflection::getParentClass():

```
class Foo
{
 public function test($x, $y)
 {
 echo(sprintf('I am test of Foo with %s, %s'.PHP_EOL, $x, $y));
 }
}
```

```

class Bar extends Foo
{
 public function test()
 {
 echo('I am test of Bar'.PHP_EOL);
 parent::test();
 }
}

class Baz extends Bar
{
 public function test()
 {
 $class = new ReflectionClass(get_class($this));
 return call_user_func_array(
 [$class->getParentClass()->getParentClass()->getName(), 'test'],
 func_get_args()
);
 }
}

$obj = new Baz();
$obj->test('bee', 'feo'); //I am test of Foo with bee, feo

```

-but this is an architecture smell in any case. If you need something like this, that should tell you: you're doing something wrong. I don't want to recommend anyone to use this way, but since it's possible - here it is.

**C1:** See update to know why I need this – Anatoliy Gusalov Nov 6 '13 at 9:46

**A4:** @AnatoliyGusalov, your question is interesting and in a sense you can achieve what you desire using yii and php advances features like Traits and Traits in Yii.

Given that it depends on what version of php you are using. However in yii you can achieve this by behaviors and check this SOQ.

In a nutshell you have to use language advanced features or YII framework features to come around this kind of issues, but that boils down to actual requirements

**757.** <https://stackoverflow.com/questions/48089494/update-enum-using-reflection-in-java/48089779#48089779>

**T:** Update enum using Reflection in java

**Q:** I have declared an enum

```
enum Animal {
 Cat("Tom"), Rat("Jerry");
}
```

I have to add test cases on the values. Is there a way to add another Animal Type on the go using reflection in enum, for which I have to fail the test case.

P.S. These values have some resemblance with another module runs parallel on server, so in future if some other coder updates enum, to ensure he has to make those changes in another module as well. So, I am adding a functional test case around it.

**C1:** Take a look at this: [javaspecialists.eu/archive/Issue161.html](http://javaspecialists.eu/archive/Issue161.html)

**C2:** There is no sense in creating such a testcase for the testcase. Even if you can prove that the testcase will fail on that hacked enum, it does not prove that it will fail on an improperly extended enum.

**C3:** Hey Pankaj, please mark my answer as answer if it resolved your question.

**C4:** @RobbyCornelissen Thanks, your solution worked for me.

## 1 Answer

**A1:** All the values in an enum should be known upfront. In this case, you can also write a test case which 'gets' all the values from this enum and asserts that the size is 2 , values are as expected etc. On a separate note, having duplicate enums in two modules which should remain in sync seems like a design/architecture smell. May be both modules should pick up these values from a shared db or a shared cache to properly mitigate this.

**758.** <https://stackoverflow.com/questions/6737534/how-do-i-use-streaming-with-wcf>

## [services-returning-a-large-data-set/6751349#6751349](#)

**T:** How do I use streaming with WCF services returning a large data set?

**Q:** I'm fairly new to WCF and I'm trying to figure out how streaming works. I basically have a web service that is supposed to return some information from a db. The data returned is potentially very large. I was wondering if anyone could point out a good example of how this is done. If I'm understanding things correctly, my web service method should be returning a stream object. But how do I actually pass data to the stream? Is it just a matter of serializing each object and writing it to the stream? If so, how exactly would the serialization be done? Once again, a simple example would be very much appreciated.

## 2 Answers

**A1:** You should just set the Binding's TransferMode property to the Streamed value and work with your WCF services as you would do. The WCF infrastructure will do all the job automatically.

Here is one more useful link:

### Streaming Message Transfer

**C1:** So, I don't need to return a Stream object ??? If my web service is returning a large List for example, would this still work? – Emil D Jul 18 '11 at 18:36

**C2:** There is no need to return the stream. It will work with large lists as well. I've also added a new link to my answer. – platon Jul 18 '11 at 18:41

**C3:** Note that changing the Binding's TransferMode to Streamed gives limitations on the interface of the service. It is probably a good idea to put the Streamed methods in an own interface and keep the rest of the methods in an interface that remains buffered (which is the default). – Anders Abel Jul 18 '11 at 18:43

**C4:** Yes, there are some limitations on using the Streamed transfer mode. The last link in my answer lists them. – platon Jul 18 '11 at 18:45

**C5:** Thanks, I think that's the part I've been missing. I keep getting a CommunicationException that states that the connection has closed unexpectedly. Could this be due to the maximum message size? – Emil D Jul 18 '11 at 19:15

**A2:** Actually, I'd revisit the architecture, as returning large resultsets from any service (WCF, ASMX, etc) is an architecture smell.

There are very few acceptable reasons to return large resultsets from a service. A combination of more/better filtering and implementing pagination are the solution. If you are just putting a simple service

veneer over your database, look into WCF Data Services, as filtering and paging are built right into the framework. Otherwise, look into WCF Data Services to see what they are doing and mimic in your service.

**759.** <https://stackoverflow.com/questions/39337958/custom-roles-architecture-in-asp-net-mvc-5-dependency-injection-issues>

**T:** Custom roles architecture in ASP.NET MVC 5, Dependency Injection issues

**Q:** I've got an architecture issue that I'm hoping someone can be of assistance to guide me in a more ideal strategy. The way I've been forced to do this reeks of "code smell".

I've got two different kinds of "Roles". I've got the built in Identity Roles, and I've got a custom set of roles (User Group Roles). I store these User Group Roles in a database, essentially a relationship between a user id, a usergroup role id, and a usergroup id. I'm using Ninject for dependency injection of my UserGroupService that handles all the CRUD operations of assigning users with certain usergroup roles to usergroups.

My first plan of attack was to create a custom authorization attribute that I could place on actions, similar to the Identity [Authorize(Role="")] attribute. I did not have any luck with this because I cannot inject a service into an attribute class (needs a parameterless constructor).

After that didn't work, my second plan of attack was to write an extension method for IPrincipal, essentially mimicking User.IsInRole("") with User.IsInUserGroupRole(""). This didn't work because I cannot inject a service into a static class.

Currently I am stuck including some booleans in the model of every view that has role based logic involved. So for instance:

```
public ActionResult Navigation()
{
 var isSystemAdmin = User.IsInRole("Administrator");
 var isUserGroupAdmin = _userGroupService.IsUserGroupAdmin(User.Identity.GetUserId())
 && !isSystemAdmin;
 var isGeneralUser = !isSystemAdmin && !isUserGroupAdmin;

 var model = new NavigationViewModel
```

```

{
 IsSystemAdmin = isSystemAdmin,
 IsUserGroupAdmin = isUserGroupAdmin,
 IsGeneralUser = isGeneralUser
};

return PartialView("_Navigation", model);
}

```

The issue here is that I have to do this any time I want to determine what kind of roles the user is currently in. It works, but it smells.

Am I missing something here? I think the most ideal option would be the extension method strategy of being able to call it right off of User, but cannot seem to make that work.

## 1 Answer

**A1:** Constructor DI is not the only way to get access to a dependency.

Each IOC has a way of resolving a dependency, all you need is a reference to the IOC container. So, even if your attribute requires a parameterless constructor you could still resolve the dependency manually.

Something like this should help :

<http://www.c-sharpcorner.com/UploadFile/47fc0a/resolving-dependency-using-ninject/>

Is it a great way to use your IOC this way? Probably not but it sure beats what you're doing now.

**760.** <https://stackoverflow.com/questions/37608022/component-annotation-to-be-used-with-qualifier/37608621#37608621>

**T:** @Component annotation to be used with qualifier

**Q:** Let's say I have a single class with @Component annotation

@Component

```
public class MyClass {}
```

Now I wanna use it with two different scopes: prototype and singleton without defining it in configuration. Is that possible?

**C1:** Is there any specific reason behind using instance as singleton and prototype in different case? – Vijendra Kumar Kulhade Jun 3 '16 at 7:12

**C2:** You can do it, if you use an @Bean annotated method to create the bean (then you can write two methods with different scopes). – dunni Jun 3 '16 at 7:20

## 1 Answer

**A1:** There should never be a use case for having the same bean in two different scopes. It's a huge architectural smell and you should probably redesign your application.

That said, perhaps you mean you need to inject a prototype-scoped bean into a singleton bean? That's a common use case and the implications are addressed in these manual sections:

Singleton beans with prototype-bean dependencies

Scoped beans as dependencies

But if you do insist to have the same bean in two different scopes, that can be achieved by using @Bean methods:

@Configuration

```
public class MyConfig{
 @Bean public MyClass singletonScope(){ return new MyClass(); }
 @Bean @Scope("prototype") public MyClass prototypeScope(){ return new MyClass(); }
}
```

**C1:** Was just curious to know, not gonna use it. Thanks – Akshay Srivastava Jun 3 '16 at 7:38

761. <https://stackoverflow.com/questions/20059948/message-bus-and-message-based-architecture-with-winforms-desktop-application-and>

**T:** Message Bus and Message Based Architecture With Winforms/Desktop Application and Strategies/Policies for View/UI Logic

**Q:** Our company has been building out a product for year that is using a message-based architecture where modules register with the message bus and listen for messages that are dispatched to the bus and handled in their handler(s).

This is very similar if not exactly the same to what is provided from a product like NServiceBus, but we have some edge cases and needs that are not covered by products we have found, so we rolled our own. it has worked out very nicely thus far.

As we have had to implement some more complicated business logic recently, we have been noticing the code is starting to 'smell'. We are starting to see some of the following happen:

Logic is making its way into some of the view(code behinds)

We have a hard time with items in the view that need immediate feedback from a message that has been dispatched to the message queue.

An example of where this came up was when we needed to do a moderately complex wizard that conditionally determines the flow of the user through the wizard pages.

In order to try to keep the logic outside of the view, we dispatch messages and keep reference to the view originally in the message handler for that module, but this breaks down sometimes.

Is there anything out there that shows best practices or a common pattern for actual realistic examples of message bus systems, or do I have to make my own and just tolerate some of the more complex edge cases.

There doesn't seem to be much 'official' documentation on these types of system, just high level architecture overviews.

I imagine asking people who have done it before have discovered or stumbled upon a system that makes this easier to handle.

## 2 Answers

**A1:** Following on what @EbenRoux said in his answer, you probably wouldn't want to use a service bus for deciding flow in a wizard. That being said, the alternative is not to just stuff the code in the view.

You can keep the logic separate by packaging it in a different module/assembly and then referencing that from your view - or create a separate interface package for some looser-coupling. In any case, deploy that package in the same process as your view and do simple, synchronous request/response between them.

No service bus necessary for this.

There is no silver bullet.

**A2:** There are a couple of things you can look at.

One should never query over a service bus. Your 'immediate feedback' is not really feasible. You can implement a priority queue for scenarios where you need to deal with low latency requirements. All queries should be handled by a synchronous query layer.

Having a UI respond to service bus messages should be fine but typically a UI's inbox should be transient and one should be able to purge it at system start up.

Your wizard scenario sounds quite a bit like an RPC call. This may not be the best idea. Your wizard path definition probably needs a re-look. A service bus is not really designed to be an interactive affair :)

762. <https://stackoverflow.com/questions/2596461/circular-dependency-solution>

**T:** Circular Dependency Solution

**Q:** Our current project has ran into a circular dependency issue. Our business logic assembly is using classes and static methods from our SharedLibrary assembly. The SharedLibrary contains a whole bunch of helper functions, such as a SQL Reader class, Enumerators, Global Variables, Error Handling, Logging and Validation.

The SharedLibrary needs access to the Business objects, but the Business objects need access to SharedLibrary. The old developers solved this obvious code smell by replicating the functionality of

the business objects in the shared library (very anti-DRY). I've spent a day now trying to read about my options to solve this but i'm hitting a dead end.

I'm open to the idea of architecture redesign, but only as a last resort. So how can i have a Shared Helper Library which can access the business objects, with the business objects still accessing the Shared Helper Library?

**C1:** The obvious question is: Why does the Shared Library need access to the Business Objects? If you can answer that, you'll have a solution. – Aaronaught Apr 7 '10 at 22:58

**C2:** The SharedLibrary has a abstract global variable class filled with static properties. These properties are created from values from the database hence the need for business objects, this is just one example of many. And of course the Business objects need access to those constants. – gfoley Apr 7 '10 at 23:05

**C3:** This is why I never use vague terms like "shared" to describe a library. What does it actually do? What you call a shared library clearly has far too many responsibilities, and perhaps the business object library does too. Typically, these solutions are solved by putting the truly independent classes/interfaces into their own library. – Aaronaught Apr 7 '10 at 23:23

### 3 Answers

**A1:** You could create a separate project only for value objects (no logic) and interfaces.

Have your shared library classes implement the interfaces, and the Business library depend on the interfaces (do I hear more testable and decoupled code here? Not to mention you remove the dependency from the Shared Library).

Ideally, you could have the business objects on which your shared library depend on this extra project too. If the business objects are too complex, you could also transform them into interfaces.

You will have both projects not depending on each other, but only on another project with only "dummy" objects (no logic):

Business ---> Interfaces and value objects <--- Shared Library

Now those are decoupled =)

**C1:** This is the answer. – Strelok Apr 7 '10 at 23:08

**C2:** If you're going to go this far to architect away the dependency why stop 5 feet short of the finish line and not just architect away all of it? At that point you'd have no more code that's dependent on the business entities and can leave the core truly shared code in the shared project. Which would be my answer. – Chris Marisic Apr 7 '10 at 23:17

**C3:** @Chris That's not a huge change. That will require some refactoring, but no big redesign or need to remodel stuff. – Samuel Carrijo Apr 7 '10 at 23:23

**C4:** OK, so i understand the concept here but i'm struggling to understand how to implement it. So if SharedLibrary Referenced BusinessObjects and both reference the Interface Layer then i would do, eg:  
//sharedlibrary public abstract class MSSqlReader{ // various methods } //interface layer public interface IMSSqlReader {} //business object IMSSqlReader obj = new IMSSqlReader(); Of coarse this will not work, obj doesn't have access to the MSSqlReader. How can BusinessObject get access to objects in the SharedLibrary using interfaces? – gfoley Apr 8 '10 at 2:00

**C5:** I think you should brush up your general SOLID design knowledge butunclebob.com/ArticleS.UncleBob.PrinciplesOfOOD this case specifically the I which is Interface segregation principle. You will most likely also want to implement this using D which is Dependency Inversion portion. – Chris Marisic Apr 8 '10 at 13:53

**C6:** @gfoley As Chris mentioned, here dependency injection is key. You shouldn't need new IMSSqlReaderImpl(), but rather, get it in the constructor and simply use it in your class – Samuel Carrijo Apr 8 '10 at 16:09

**C7:** Alright i understand that better now, thanks. But for my situation it still won't work, So i have a abstract class with static properties in the shared library(SL) (global variables), but the SL can't access the business logic. So I could create and interface for the business object but then every time i want one of my static properties i would have to instantiate my business object and pass it in. Hardly seems practical. I'm starting to think that anything i have in the SL which is dependant on busonessobjects is in the wrong place, and should be an object in the business library. – gfoley Apr 9 '10 at 5:05

**C8:** @gfoley seems like you have some global state. Please tell me these properties don't change over time. If that's true, you just need to inject them once. If that's not true, then you'll probably have to deal with the ghost of global state and mysterious bugs every so often – Samuel Carrijo Apr 9 '10 at 15:38

**C9:** Amazing solution, I love it. – Pavel Matuska Mar 5 '13 at 10:30

**A2:** Anytime you have a "shared" library you absolutely must not ever reference your business entity project. Doing so will cause this issue to happen as you obviously see.

The solution to this is remove all of the business entity dependent code from the shared library and either rearrange the need for that helper code or place that helper code inside the business entity project itself.

**A3:** One solution would be to put a facade pattern in between. Here you would avoid direct access/dependency to your business objects from the shared library. Instead, you would be using a layer that acts as a facade between your lib and BOs. This way you can pack your shared libraries clean and decoupled.

**C1:** I'd just say 'abstraction' without specifying concrete pattern name (it could as easily be adapter, strategy, bridge) because design patterns main intent is not in solving issues like this one. – Artem Govorov Apr 7 '10 at 23:32

763. <https://stackoverflow.com/questions/20122199/what-would-be-a-nice-architecture-so-i-can-pass-information-of-eventual-problems>

**T:** What would be a nice architecture so I can pass information of eventual problems to a higher layer?

**Q:** I have a standard 3 layer project and my data layer either accesses the database or an API. I would like to be able to show information to the user in case there are problems occurring in the data layer. I would like to show in the interface if there was any error (some required info by the API was not set, problems connecting to the database/API or any other problem that could happen).

Currently I would have an "out string error" parameter that would return the problem message. But this smells bad and this will also require my business layer to have the same parameter, which smells even worse.

What would be a nice architecture so I can pass information of eventual problems to a higher layer?

Thanks!

## 2 Answers

**A1:** There could be two ways:

Raising some custom exception

Raising event at database layer and handle it in business layer.

Now while raising the event/exception at data layer you can pass the information which will help you in business layer.

The only change at business layer will be the listening of these events or catching these exceptions.

**C1:** nice catch! thanks! :D – JSBach Nov 21 '13 at 13:56

**A2:** I personally implement a log routine, where any error caught, gets logged application wide.

I show the errors, and informational logs, to the user inside the main app interface instead of throwing dialog box type errors. This might not be your specific scenario, but works well for me in my scenario, as I don't have to continually pass status / errors of data layer / business layer functions up the chain to the presentation layer.

The presentation layer periodically "looks for" any updates/errors/etc, retrieves them, and clears the "buffer".

**C1:** Thanks! but in my case the error should be shown to the user and the application should be developed fast (it is a maintenance tool, not my project's main one), so creating this log/log checking mechanism would be too complex for my solution. – JSBach Nov 21 '13 at 14:20

764. <https://stackoverflow.com/questions/10879421/domain-validation-in-a-cqrs-architecture>

**T:** Domain Validation in a CQRS architecture

**Q:** Danger ... Danger Dr. Smith... Philosophical post ahead

The purpose of this post is to determine if placing the validation logic outside of my domain entities (aggregate root actually) is actually granting me more flexibility or it's kamikaze code

Basically I want to know if there is a better way to validate my domain entities. This is how I am planning to do it but I would like your opinion

The first approach I considered was:

```
class Customer : EntityBase<Customer>
{
 public void ChangeEmail(string email)
 {
 if(string.IsNullOrWhiteSpace(email)) throw new DomainException("...");
 }
}
```

```

if(!email.IsEmail()) throw new DomainException();
if(email.Contains("@mailinator.com")) throw new DomainException();
}
}

```

I actually do not like this validation because even when I am encapsulating the validation logic in the correct entity, this is violating the Open/Close principle (Open for extension but Close for modification) and I have found that violating this principle, code maintenance becomes a real pain when the application grows up in complexity. Why? Because domain rules change more often than we would like to admit, and if the rules are hidden and embedded in an entity like this, they are hard to test, hard to read, hard to maintain but the real reason why I do not like this approach is: if the validation rules change, I have to come and edit my domain entity. This has been a really simple example but in RL the validation could be more complex

So following the philosophy of Udi Dahan, making roles explicit, and the recommendation from Eric Evans in the blue book, the next try was to implement the specification pattern, something like this

```

class EmailDomainIsAllowedSpecification : IDomainSpecification<Customer>
{
 private INotAllowedEmailDomainsResolver invalidEmailDomainsResolver;
 public bool IsSatisfiedBy(Customer customer)
 {
 return !this.invalidEmailDomainsResolver.GetInvalidEmailDomains().Contains(customer.Email);
 }
}

```

But then I realize that in order to follow this approach I had to mutate my entities first in order to pass the value being validated, in this case the email, but mutating them would cause my domain events being fired which I wouldn't like to happen until the new email is valid

So after considering these approaches, I came out with this one, since I am going to implement a CQRS architecture:

```

class EmailDomainIsAllowedValidator : IDomainInvariantValidator<Customer,
ChangeEmailCommand>

```

```

{
 public void IsValid(Customer entity, ChangeEmailCommand command)
 {
 if(!command.Email.IsValidDomain()) throw new DomainException("...");

 }
}

```

Well that's the main idea, the entity is passed to the validator in case we need some value from the entity to perform the validation, the command contains the data coming from the user and since the validators are considered injectable objects they could have external dependencies injected if the validation requires it.

Now the dilemma, I am happy with a design like this because my validation is encapsulated in individual objects which brings many advantages: easy unit test, easy to maintain, domain invariants are explicitly expressed using the Ubiquitous Language, easy to extend, validation logic is centralized and validators can be used together to enforce complex domain rules. And even when I know I am placing the validation of my entities outside of them (You could argue a code smell - Anemic Domain) but I think the trade-off is acceptable

But there is one thing that I have not figured out how to implement it in a clean way. How should I use this components...

Since they will be injected, they won't fit naturally inside my domain entities, so basically I see two options:

Pass the validators to each method of my entity

Validate my objects externally (from the command handler)

I am not happy with the option 1 so I would explain how I would do it with the option 2

```

class ChangeEmailCommandHandler : ICommandHandler<ChangeEmailCommand>
{

```

```

// here I would get the validators required for this command injected

private IEnumerable<IDomainInvariantValidator> validators;

public void Execute(ChangeEmailCommand command)

{
 using (var t = this.unitOfWork.BeginTransaction())

 {
 var customer = this.unitOfWork.Get<Customer>(command.CustomerId);

 // here I would validate them, something like this

 this.validators.ForEach(x => x.IsValid(customer, command));

 // here I know the command is valid

 // the call to ChangeEmail will fire domain events as needed

 customer.ChangeEmail(command.Email);

 t.Commit();
 }
}

```

Well this is it. Can you give me your thoughts about this or share your experiences with Domain entities validation

## EDIT

I think it is not clear from my question, but the real problem is: Hiding the domain rules has serious implications in the future maintainability of the application, and also domain rules change often during the life-cycle of the app. Hence implementing them with this in mind would let us extend them easily. Now imagine in the future a rules engine is implemented, if the rules are encapsulated outside of the domain entities, this change would be easier to implement

I am aware that placing the validation outside of my entities breaks the encapsulation as @jgauffin mentioned in his answer, but I think that the benefits of placing the validation in individual objects is much more substantial than just keeping the encapsulation of an entity. Now I think the encapsulation makes more sense in a traditional n-tier architecture because the entities were used in several places of the domain layer, but in a CQRS architecture, when a command arrives, there will be a command

handler accessing an aggregate root and performing operations against the aggregate root only creating a perfect window to place the validation.

I'd like to make a small comparison between the advantages to place validation inside an entity vs placing it in individual objects

### Validation in Individual objects

Pro. Easy to write

Pro. Easy to test

Pro. It's explicitly expressed

Pro. It becomes part of the Domain design, expressed with the current Ubiquitous Language

Pro. Since it's now part of the design, it can be modeled using UML diagrams

Pro. Extremely easy to maintain

Pro. Makes my entities and the validation logic loosely coupled

Pro. Easy to extend

Pro. Following the SRP

Pro. Following the Open/Close principle

Pro. Not breaking the law of Demeter (mmm)?

Pro. It is centralized

Pro. It could be reusable

Pro. If required, external dependencies can be easily injected

Pro. If using a plug-in model, new validators can be added just by dropping the new assemblies without the need to re-compile the whole application

Pro. Implementing a rules engine would be easier

Con. Breaking encapsulation

Con. If encapsulation is mandatory, we would have to pass the individual validators to the entity (aggregate) method

Validation encapsulated inside the entity

Pro. Encapsulated?

Pro. Reusable?

I would love to read your thoughts about this

**C1:** Most of the items listed as "pros" for placing validation logic in individual objects can also be listed as "pros" for placing validation logic in the entity. – eulerfx Jun 8 '12 at 18:43

## 11 Answers

**A1:** I agree with a number of the concepts presented in other responses, but I put them together in my code.

First, I agree that using Value Objects for values that include behavior is a great way to encapsulate common business rules and an e-mail address is a perfect candidate. However, I tend to limit this to rules that are constant and will not change frequently. I'm sure you are looking for a more general approach and e-mail is just an example, so I won't focus on that one use-case.

The key to my approach is recognizing that validation serves different purposes at different locations in an application. Put simply, validate only what is required to ensure that the current operation can execute without unexpected/unintended results. That leads to the question what validation should occur where?

In your example, I would ask myself if the domain entity really cares that the e-mail address conforms to some pattern and other rules or do we simply care that 'email' cannot be null or blank when ChangeEmail is called? If the latter, than a simple check to ensure a value is present is all that is needed in the ChangeEmail method.

In CQRS, all changes that modify the state of the application occur as commands with the implementation in command handlers (as you've shown). I will typically place any 'hooks' into business rules, etc. that validate that the operation MAY be performed in the command handler. I actually follow your approach of injecting validators into the command handler which allows me to extend/replace the rule set without making changes to the handler. These 'dynamic' rules allow me to define the business rules, such as what constitutes a valid e-mail address, before I change the state of the entity - further ensuring it does not go into an invalid state. But 'invalidity' in this case is defined by the business logic and, as you pointed out, is highly volatile.

Having come up through the CSLA ranks, I found this change difficult to adopt because it does seem to break encapsulation. But, I agree that encapsulation is not broken if you take a step back and ask what role validation truly serves in the model.

I've found these nuances to be very important in keeping my head clear on this subject. There is validation to prevent bad data (eg missing arguments, null values, empty strings, etc) that belongs in the method itself and there is validation to ensure the business rules are enforced. In the case of the former, if the Customer must have an e-mail address, then the only rule I need to be concerned about to prevent my domain object from becoming invalid is to ensure that an e-mail address has been provided to the ChangeEmail method. The other rules are higher level concerns regarding the validity of the value itself and really have no affect on the validity of the domain entity itself.

This has been the source of a lot of 'discussions' with fellow developers but when most take a broader view and investigate the role validation really serves, they tend to see the light.

Finally, there is also a place for UI validation (and by UI I mean whatever serves as the interface to the application be it a screen, service endpoint or whatever). I find it perfectly reasonable to duplicate some of the logic in the UI to provide better interactivity for the user. But it is because this validation serves that single purpose why I allow such duplication. However, using injected validator/specification objects promotes reuse in this way without the negative implications of having these rules defined in multiple locations.

Not sure if that helps or not...

**C1:** " The other rules are higher level concerns regarding the validity of the value itself and really have no affect on the validity of the domain entity itself." - Why are they higher level concerns? Cannot we create a value object from the email address and check the validity of the injected data by a setter? So we can ensure, that every email address is validated against the pattern. Validating against email patterns on a higher abstraction level might lead to code repetition, which can lead to bugs. For example I can forget to add an email pattern validator to the service, etc... – inf3rno Sep 25 '14 at 2:11

**C2:** "However, I tend to limit this to rules that are constant and will not change frequently." I'd respond by saying that you can have value objects that are local to your aggregate only. And you can have value objects that are "general" (put them in a different folder outside the aggregate for use in any entity). I believe Evans or Vaughn suggest this. You can start by using the general one until you find an entity that needs different validation rules. – programhammer Aug 25 '15 at 19:41

**A2:** I wouldn't suggest trowing big pieces of code into your domain for validation. We eliminated most of our awkward placed validations by seeing them as a smell of missing concepts in our domain. In your sample code you write I see validation for an e-mail address. A Customer doesn't have anything to do with email validation.

Why not make an ValueObject called Email that does this validation at construct?

My experience is that awkward placed validations are hints to missed concepts in your domain. You can catch them in Validator objects, but I prefer value object because you make the related concept part of your domain.

**C1:** I wouldn't suggest trowing big pieces of code But the validators are really small and concrete and they follow the SRP. but I prefer value object because you make the related concept part of your domain The validators can be seeing as part of the domain, and they can be modeled in the domain, and in my opinion they make validation explicit, when you place validation inside an entity or a value object, the valdiation is hidden (encapsulated indeed). – Jupaol Jun 8 '12 at 19:22

**C2:** About the value object, it makes sense to me, I would be encapsulating the validation where it really belongs, not in the entity, but I think the problems are the same as placing it in the entity, I mean the advantages I listed in the post, they are the same either the validation is inside the entity or a value object. So specifically, what would be the trade-offs when using validation inside a value object over the trade-offs of placing them in individual objects??? – Jupaol Jun 8 '12 at 19:40

**C3:** "My experience is that awkward placed validations are hints to missed concepts in your domain. " - I am not sure of this rule. By the current scenario it works to move the low level validation code to a low level value object. By higher abstraction level validation code it might not work. I need more experience, but thanks the advice. – inf3rno Sep 25 '14 at 2:17

You put validation in the wrong place.

**A3:** You should use ValueObjects for such things. Watch this presentation

<http://www.infoq.com/presentations/Value-Objects-Dan-Bergh-Johnsson> It will also teach you about Data as Centers of Gravity.

There also a sample of how to reuse data validation, like for example using static validation methods ala Email.IsValid(string)

**C1:** thanks a lot Yevhen. As a ddd beginner, your answers are always inspiring. – Arthis Jun 8 '12 at 14:36

**C2:** You put validation in the wrong place I totally respect your opinion and If you could point me concrete advantages (trade-offs) between placing the validation inside a value object vs placing it in individual objects (as I did at the end of my post) I would appreciate it. – Jupaol Jun 8 '12 at 19:47

**C3:** I agree, it can prevent code duplication from my point of view. – inf3rno Sep 25 '14 at 2:13

I am at the beginning of a project and I am going to implement my validation outside my domain entities. My domain entities will contain logic to protect any invariants (such as missing arguments, null values, empty strings, collections, etc). But the actual business rules will live in validator classes. I am of the mindset of @SonOfPirate...

**A4:** I am using FluentValidation that will essentially give me bunch of validators that act on my domain entities: aka, the specification pattern. Also, in accordance with the patterns described in Eric's blue book, I can construct the validators with any data they may need to perform the validations (be it from the database or another repository or service). I would also have the option to inject any dependencies here too. I can also compose and reuse these validators (e.g. an address validator can be reused in both an Employee validator and Company validator). I have a Validator factory that acts as a "service locator":

```
public class ParticipantService : IParticipantService
{
 public void Save(Participant participant)
 {
 IValidator<Participant> validator = _validatorFactory.GetValidator<Participant>();
 var results = validator.Validate(participant);

 //if the participant is valid, register the participant with the unit of work
 if (results.IsValid)
 {
 if (participant.IsNew)
 {
 _unitOfWork.RegisterNew<Participant>(participant);
 }
 else if (participant.HasChanged)
 {
 _unitOfWork.RegisterDirty<Participant>(participant);
 }
 }
 else
 {
 _unitOfWork.RollBack();
 }
 //do some thing here to indicate the errors:generate an exception (or fault) that contains the validation errors. Or return the results
 }
}
```

```
 }
}

}
```

And the validator would contain code, something like this:

```
public class ParticipantValidator : AbstractValidator<Participant>
{
 public ParticipantValidator(DateTime today, int ageLimit, List<string> validCompanyCodes,
 /*any other stuff you need*/)
 {...}

 public void BuildRules()
 {
 RuleFor(participant => participant.DateOfBirth)
 .NotNull()
 .LessThan(m_today.AddYears(m_ageLimit*-1))
 .WithMessage(string.Format("Participant must be older than {0} years of age.",
 m_ageLimit));

 RuleFor(participant => participant.Address)
 .NotNull()
 .SetValidator(new AddressValidator());

 RuleFor(participant => participant.Email)
 .NotEmpty()
 .EmailAddress();
 ...
 }
}
```

```
}
```

We have to support more than one type of presentation: websites, winforms and bulk loading of data via services. Under pinning all these are a set of services that expose the functionality of the system in a single and consistent way. We do not use Entity Framework or ORM for reasons that I will not bore you with.

Here is why I like this approach:

The business rules that are contained in the validators are totally unit testable.

I can compose more complex rules from simpler rules

I can use the validators in more than one location in my system (we support websites and Winforms, and services that expose functionality), so if there is a slightly different rule required for a use case in a service that differs from the websites, then I can handle that.

All the validation is expressed in one location and I can choose how / where to inject and compose this.

**C1:** With this approach, would you have a lot of pairings? Say EmailAddressValidator with EmailAddressValueObject? What about naming? Perhaps go with the name of the first aggregate it was used in (ie. Users\EmailAddressValidator)? If so I think validators and value objects seem to benefit from being merged. You can have general value objects and value objects specific to a particular aggregate. I'm just thinking here...as I'm new in DDD. – programammer Aug 25 '15 at 19:36

**A5:** I cannot say what I did is the perfect thing to do for I am still struggling with this problem myself and fighting one fight at a time. But I have been doing so far the following thing :

I have basic classes for encapsulating validation :

```
public interface ISpecification<TEntity> where TEntity : class, IAggregate
{
 bool IsSatisfiedBy(TEntity entity);
}
```

```
internal class AndSpecification<TEntity> : ISpecification<TEntity> where TEntity: class, IAggregate
```

```
{
 private ISpecification< TEntity > Spec1;
 private ISpecification< TEntity > Spec2;

 internal AndSpecification(ISpecification< TEntity > s1, ISpecification< TEntity > s2)
 {
 Spec1 = s1;
 Spec2 = s2;
 }
}
```

```
public bool IsSatisfiedBy(TEntity candidate)
{
 return Spec1.IsSatisfiedBy(candidate) && Spec2.IsSatisfiedBy(candidate);
}
```

```
}
```

```
internal class OrSpecification< TEntity > : ISpecification< TEntity > where TEntity : class,
IAggregate
```

```
{
 private ISpecification< TEntity > Spec1;
 private ISpecification< TEntity > Spec2;
```

```
internal OrSpecification(ISpecification< TEntity > s1, ISpecification< TEntity > s2)
{
 Spec1 = s1;
 Spec2 = s2;
}
```

```

public bool IsSatisfiedBy(TEntity candidate)
{
 return Spec1.IsSatisfiedBy(candidate) || Spec2.IsSatisfiedBy(candidate);
}

internal class NotSpecification<TEntity> : ISpecification<TEntity> where TEntity : class,
IAggregate
{
 private ISpecification<TEntity> Wrapped;

 internal NotSpecification(ISpecification<TEntity> x)
 {
 Wrapped = x;
 }

 public bool IsSatisfiedBy(TEntity candidate)
 {
 return !Wrapped.IsSatisfiedBy(candidate);
 }
}

public static class SpecsExtensionMethods
{
 public static ISpecification<TEntity> And<TEntity>(this ISpecification<TEntity> s1,
ISpecification<TEntity> s2) where TEntity : class, IAggregate
{
 return new AndSpecification<TEntity>(s1, s2);
}

```

```
}
```

```
public static ISpecification<TEntity> Or<TEntity>(this ISpecification<TEntity> s1,
ISpecification<TEntity> s2) where TEntity : class, IAggregate
```

```
{
```

```
 return new OrSpecification<TEntity>(s1, s2);
```

```
}
```

```
public static ISpecification<TEntity> Not<TEntity>(this ISpecification<TEntity> s) where
TEntity : class, IAggregate
```

```
{
```

```
 return new NotSpecification<TEntity>(s);
```

```
}
```

```
}
```

and to use it, I do the following :

command handler :

```
public class MyCommandHandler : CommandHandler<MyCommand>
```

```
{
```

```
 public override CommandValidation Execute(MyCommand cmd)
```

```
{
```

```
 Contract.Requires<ArgumentNullException>(cmd != null);
```

```
 var existingAR = Repository.GetById<MyAggregate>(cmd.Id);
```

```
 if (existingAR == null)
```

```
 throw new HandlerForDomainEventNotFoundException();
```

```

existingIntervento.DoStuff(cmd.Id
 , cmd.Date
 ...
);

Repository.Save(existingIntervento, cmd.GetCommitId());

return existingIntervento.CommandValidationMessages;
}

```

the aggregate :

```

public void DoStuff(Guid id, DateTime dateX, DateTime start, DateTime end, ...)
{
 var is_date_valid = new Is_dateX_valid(dateX);
 var has_start_date_greater_than_end_date = new Has_start_date_greater_than_end_date(start,
end);

 ISpecification<MyAggregate> specs =
is_date_valid .And(has_start_date_greater_than_end_date);

 if (specs.IsSatisfiedBy(this))
 {
 var evt = new AgregateStuffed()
 {
 Id = id
 , DateX = dateX
 , End = end
 }
 }
}

```

```

 , Start = start

 , ...

};

RaiseEvent(evt);

}

}

```

the specification is now embedded in these two classes :

```

public class Is_dateX_valid : ISpecification<MyAggregate>

{
 private readonly DateTime _dateX;

 public Is_data_consuntivazione_valid(DateTime dateX)
 {
 Contract.Requires<ArgumentNullException>(dateX == DateTime.MinValue);

 _dateX = dateX;
 }

 public bool IsSatisfiedBy(MyAggregate i)
 {
 if (_dateX > DateTime.Now)
 {
 i.CommandValidationMessages.Add(new ValidationMessage("datex greater than now"));

 return false;
 }

 return true;
 }
}

```

```

 }

 }

public class Has_start_date_greater_than_end_date : ISpecification<MyAggregate>
{
 private readonly DateTime _start;
 private readonly DateTime _end;

 public Has_start_date_greater_than_end_date(DateTime start, DateTime end)
 {
 Contract.Requires<ArgumentNullException>(start == DateTime.MinValue);
 Contract.Requires<ArgumentNullException>(end == DateTime.MinValue);

 _start = start;
 _end = end;
 }

 public bool IsSatisfiedBy(MyAggregate i)
 {
 if (_start > _end)
 {
 i.CommandValidationMessages.Add(new ValidationMessage("start date greater than end date"));
 }

 return false;
 }

 return true;
}

```

This allows me to reuse some validations for different aggregate and it is easy to test. If you see any flows in it. I would be real happy to discuss it.

yours,

**C1:** It looks like your process is almost the process I presented which makes me think I am not alone with this tendency, the only difference is that you encapsulated the rules inside the method which at first glance looks good, but I have a question for you, are you heavily writing unit tests for your code? because since you are creating the objects inside you cannot test in isolation the aggregate root method. As another side effect, if the validator requires an external dependency, you would have to use the Service Locator anti-pattern, and to test that you would end up with integration tests – Jupaol Jun 4 '12 at 21:04

**C2:** Your implementation of the specification pattern, actually solves the problem to have to mutate first the entity in order to validate it I will evaluate this kind of design. Just from the top of my head, I'm not sure if I would use a constructor to pass the values, because I intended to have a flexible design where I can inject dependencies to the validators. Check this link based on Misko Hevery [loosecouplings.com/2011/01/...](http://loosecouplings.com/2011/01/) – Jupaol Jun 4 '12 at 21:12

**C3:** So far I was not testing in isolation my aggregate root method. It's a flaw I discovered while running through the "discussion" you had with @jgauffin. I have a class per method IsSatisfiedBy(MyAggregate i) basically, so if I need external dependencies. These would come from Ctor injection. Actually, to me, so far at least, even arguments coming from the command are external dependencies. But I might change in the future. I will definitely be looking into this validation injection to decouple my aggregate root method from the validation. Have a nice day... – Arthis Jun 5 '12 at 6:56

**A6:** I would not call a class which inherits from EntityBase my domain model since it couples it to your persistence layer. But that's just my opinion.

I would not move the email validation logic from the Customer to anything else to follow the Open/Closed principle. To me, following open/closed would mean that you have the following hierarchy:

```
public class User
{
 // some basic validation
 public virtual void ChangeEmail(string email);
}
```

```
public class Employee : User
{
 // validates internal email

 public override void ChangeEmail(string email);
}
```

```
public class Customer : User
{
 // validate external email addresses.

 public override void ChangeEmail(string email);
}
```

You suggestions moves the control from the domain model to an arbitrary class, hence breaking the encapsulation. I would rather refactor my class (Customer) to comply to the new business rules than doing that.

Use domain events to trigger other parts of the system to get a more loosely coupled architecture, but don't use commands/events to violate the encapsulation.

## Exceptions

I just noticed that you throw DomainException. That's a way to generic exception. Why don't you use the argument exceptions or the FormatException? They describe the error much better. And don't forget to include context information helping you to prevent the exception in the future.

## Update

Placing the logic outside the class is asking for trouble imho. How do you control which validation rule is used? One part of the code might use SomeVeryOldRule when validating while another using NewAndVeryStrictRule. It might not be on purpose, but it can and will happen when the code base grows.

It sounds like you have already decided to ignore one of the OOP fundamentals (encapsulation). Go ahead and use a generic / external validation framework, but don't say that I didn't warn you ;)

## Update2

Thanks for your patience and your answers, and that's the reason why I posted this question, I feel the same an entity should be responsible to guarantee it's in a valid state (and I have done it in previous projects) but the benefits of placing it in individual objects is huge and like I posted there's even a way to use individual objects and keep the encapsulation but personally I am not so happy with design but on the other hand it is not out of the table, consider this ChangeEmail(IEnumerable<validators, string email) I have not thought in detail the imple. though

That allows the programmer to specify any rules, it may or may not be the currently correct business rules. The developer could just write

```
customer.ChangeEmail(new IValidator<Customer>[] { new NonValidatingRule<Customer>() },
"notAnEmail")
```

which accepts everything. And the rules have to be specified in every single place where ChangeEmail is being called.

If you want to use a rule engine, create a singleton proxy:

```
public class Validator
{
 IValidatorEngine _engine;

 public static void Assign(IValidatorEngine engine)
 {
 _engine = engine;
 }

 public static IValidatorEngine Current { get { return _engine; } }
```

```
}
```

.. and use it from within the domain model methods like

```
public class Customer
{
 public void ChangeEmail(string email)
 {
 var rules = Validator.GetRulesFor<Customer>("ChangeEmail");
 rules.Validate(email);

 // valid
 }

}
```

The problem with that solution is that it will become a maintenance nightmare since the rule dependencies are hidden. You can never tell if all rules have been specified and working unless you test every domain model method and each rule scenario for every method.

The solution is more flexible but will imho take a lot more time to implement than to refactor the method who's business rules got changed.

**C1:** EntityBase has nothing to do with persistence. It is a POCO adding common logic to GetHashCode, and Equals basically. I do not agree with the way you model the Open/Closed principle. But I totally agree with you about that moving the logic from Customer breaks the encapsulation (I said that in the post), and I am not happy with that but the trade-offs vs placing it outside are bigger and more important from my point of view don't you think? The other approach that I could use is passing the validator objects to my entities methods something like this  
ChangeEmail(IEnumerable<IValidator> v) – Jupaol Jun 4 '12 at 10:26

**C2:** I think it is not clear from my question, but the real problem is: Hiding the domain rules has serious implications in the future maintainability of the application, and also domain rules change often during the life-cycle of the app. Hence implementing them with this in mind would let us extend them easily. Now imagine in the future a rules engine is implemented, if the rules are encapsulated outside of the domain entities will make this change easier. – Jupaol Jun 4 '12 at 10:32

**C3:** The DomainException is just as an example, there are several specific exceptions – Jupaol Jun 4 '12 at 10:33

**C4:** But why do you have to know the email business rules outside the method? The user who enters the email should get a hint from the exception messages about what he entered incorrectly. (and I said that your first code sample do not violate OCP other than it do not have the virtual keyword) – jgauffin Jun 4 '12 at 10:47

**C5:** You do not get my point. DataAnnotations etc where created for the very same reason. But nothing other than the class itself can guarantee that it's in a valid state. If you think that that's a sacrifice that you are willing to take, then by all means: Go ahead. – jgauffin Jun 4 '12 at 12:49

**A7:** From my OO experience (I am not a DDD expert) moving your code from the entity to a higher abstraction level (into a command handler) will cause code duplication. This is because every time a command handler gets an email address, it has to instantiate email validation rules. This kind of code will rot after a while, and it will smell very badly. In the current example it might not, if you don't have another command which changes the email address, but in other situations it surely will...

If you don't want to move the rules back to a lower abstraction level, like the entity or an email value object, then I strongly suggest you to reduce the pain by grouping the rules. So in your email example the following 3 rules:

```
if(string.IsNullOrWhiteSpace(email)) throw new DomainException("...");
if(!email.IsEmail()) throw new DomainException();
if(email.Contains("@mailinator.com")) throw new DomainException();
```

can be part of an EmailValidationRule group which you can reuse easier.

From my point of view there is no explicit answer to the question where to put the validation logic. It can be part of every object depending on the abstraction level. In your current case the formal checking of the email address can be part of an EmailValueObject and the mailinator rule can be part of a higher abstraction level concept in which you state that your user cannot have an email address pointing on that domain. So for example if somebody wants to contact with your user without registration, then you can check her email against formal validation, but you don't have to check her email against the mailinator rule. And so on...

So I completely agree with @pjvds who claimed that this kind of awkward placed validation is a sign of a bad design. I don't think you will have any gain by breaking encapsulation, but it's your choice and it will be your pain.

**A8:** I wrote a blog post on this topic a while back. The premise of the post was that there are different types of validation. I called them Superficial Validation and Domain Based Command Validation.

This simple version is this. Validating things like 'is it a number' or 'email address' are more often than not just superficial. These can be done before the command reaches the domain entities.

However, where the validation is more tied to the domain then it's right place is in the domain. For example, maybe you have some rules about the weight and type of cargo a certain lorry can take. This sounds much more like domain logic.

Then you have the hybrid types. Things like set based validation. These need to happen before the command is issued or injected into the domain (try to avoid that if at all possible - limiting dependencies is a good thing).

Anyway, you can read the full post here: [How To Validate Commands in a CQRS Application](#)

**A9:** The validation in your example is validation of a value object, not an entity (or aggregate root).

I would separate the validation into distinct areas.

Validate internal characteristics of the Email value object internally.

I adhere to the rule that aggregates should never be in an invalid state. I extend this principal to value objects where practical.

Use `createNew()` to instantiate an email from user input. This forces it to be valid according to your current rules (the "user@email.com" format, for example).

Use `createExisting()` to instantiate an email from persistent storage. This performs no validation, which is important - you don't want an exception to be thrown for a stored email that was valid yesterday but invalid today.

```
class Email
```

```
{
```

```
 private String value_;
```

```
// Error codes

const Error E_LENGTH = "An email address must be at least 3 characters long.";
const Error E_FORMAT = "An email address must be in the 'user@email.com' format.";

// Private constructor, forcing the use of factory functions

private Email(String value)

{

 this.value_ = value;

}

// Factory functions

static public Email createNew(String value)

{

 validateLength(value, E_LENGTH);

 validateFormat(value, E_FORMAT);

}

static public Email createExisting(String value)

{

 return new Email(value);

}

// Static validation methods

static public void validateLength(String value, Error error = E_LENGTH)

{

 if (value.length() < 3)

 {
```

```
 throw new DomainException(error);

 }

}

static public void validateFormat(String value, Error error = E_FORMAT)

{

 if /* regular expression fails */

 {

 throw new DomainException(error);

 }

}

}

}
```

Validate "external" characteristics of the Email value object externally, e.g., in a service.

```
class EmailDnsValidator implements IEmailValidator

{

 const E_MX_MISSING = "The domain of your email address does not have an MX record.";

 private DnsProvider dnsProvider_;

 EmailDnsValidator(DnsProvider dnsProvider)

 {

 dnsProvider_ = dnsProvider;

 }

 public void validate(String value, Error error = E_MX_MISSING)

 {
```

```

if (!dnsProvider_.hasMxRecord(/* domain part of email address */))

{
 throw new DomainException(error);
}

}

}

class EmailDomainBlacklistValidator implements IEmailValidator

{

const Error E_DOMAIN_FORBIDDEN = "The domain of your email address is blacklisted.";

public void validate(String value, Error error = E_DOMAIN_FORBIDDEN)

{
 if /* domain of value is on the blacklist */

 {
 throw new DomainException(error);
 }
}
}

```

Advantages:

Use of the `createNew()` and `createExisting()` factory functions allow control over internal validation.

It is possible to "opt out" of certain validation routines, e.g., skip the length check, using the validation methods directly.

It is also possible to "opt out" of external validation (DNS MX records and domain blacklisting). E.g., a project I worked on initially validated the existence of MX records for a domain, but eventually removed this because of the number of customers using "dynamic IP" type solutions.

It is easy to query your persistent store for email addresses that do not fit the current validation rules, but running a simple query and treating each email as "new" rather than "existing" - if an exception is thrown, there's a problem. From there you can issue, for example, a FlagCustomerAsHavingABadEmail command, using the exception error message as guidance for the user when they see the message.

Allowing the programmer to supply the error code provides flexibility. For example, when sending a UpdateEmailAddress command, the error of "Your email address must be at least 3 characters long" is self explanatory. However, when updating multiple email addresses (home and work), the above error message does not indicate WHICH email was wrong. Supplying the error code/message allows you to provide richer feedback to the end user.

**A10:** I'm still experimenting with this concept but you can try Decorators. If you use SimpleInjector you can easily inject your own validation classes that run ahead of your command handler. Then the command can assume it is valid if it got that far. However, This means all validation should be done on the command and not the entities. The entities won't go into an invalid state. But each command must implement its own validation fully so similar commands may have duplication of rules but you could either abstract common rules to share or treat different commands as truly separate.

765. <https://stackoverflow.com/questions/7353491/net-mvc-controller-with-multiple-repositories-and-services>

**T:** .NET MVC Controller with multiple Repositories and Services?

**Q:** Look at my Controller (I'm using Dependency Injection to manager dependencies):

```
public RoleController(IRoleRepository roleRepository, ISiteRepository siteRepository,
IUserRepository userRepository, IDbContext dbContext)
```

```
{
 _roleRepository = roleRepository;
 _siteRepository = siteRepository;
 _userRepository = userRepository;
 _dbContext = dbContext;
```

Having a class with many dependencies is a code smell? Right?

But, In my example I need to associate Users and Sites in a Role, then I need to these dependencies to doing this association.

Some people on a mailing list I was told that having too many dependencies is a sign that something is probably wrong. But I see no other way. I separated my responsibilities, there is something in that situation I do not know how to treat? Is something wrong?

Update:

I need Repositories and DbContext because DbContext is my UnitOfWork, repositories don't save.

This example is a simple CRUD with some other functionalities like Associations in the View with a GRID.

Update 2:

I'm using a architecture where my UI Layer is the MVC.

**C1:** Typically I would only create repositories for aggregate roots, not every entity. I don't know your domain, but my gut tells me you have too many repositories. Additionally, why do you need the repositories AND the dbcontext? Lastly, I typically prefer to do the "orchestration" type business activities in a Service, and let the service deal with the repositories etc. The dependency of the controller then becomes only on the service. – Brook Sep 8 '11 at 19:38

**C2:** @Brook see update. – Acaz Souza Sep 8 '11 at 19:41

**C3:** possible duplicate of In asp.net-mvc, is there a more elegant way using IOC to inject mutiple repositories into a controller? – Omar Sep 8 '11 at 19:49

**C4:** Have a look at: [stackoverflow.com/questions/2329431/...](http://stackoverflow.com/questions/2329431/) – Rookian Sep 8 '11 at 20:08

**C5:** Related: [stackoverflow.com/questions/2420193/...](http://stackoverflow.com/questions/2420193/) – Mark Seemann Sep 8 '11 at 20:10

## 1 Answer

**A1:** I don't believe it's a bad thing, given that you manage dependencies with a good DI framework (i.e. not by using poor man's DI). This way, you explicitly say that the controller will need all these things, because it will. (Note that in many other parts of your application, this might not be a valid argument - the controller is special in the way that it is where you control and direct the program flow, so there's a natural explanation why it needs to see lots of parts of the application...)

However, if you really want to limit the number of dependencies in this specific case, it could make sense to create a MembershipService, which does all the work concerned with Users, Sites and Roles. That would then have a dependency on those three repositories, and your controller would only have a dependency on the membership service.

In response to your update: You could register the unit of work (i.e. the db context) as a "per web request" singleton - this is possible with Castle Windsor and many other DI frameworks. Then you can let your repositories depend on it and do all the changes, and let the controller depend on it for saving, and they will all get the same instance handed to them by the DI framework.

**C1:** see update, the problem is the MVC is my UI Layer. The argument I received is: The Controllers are responsible for responding to requests from users and should not in principle be related to your domain. – Acaz Souza Sep 8 '11 at 23:30

766. <https://stackoverflow.com/questions/32045270/how-can-i-properly-break-a-big-controller-action-to-smaller-pieces-in-asp-net-mvc>

**T:** How can I properly break a big controller action to smaller pieces in asp.net mvc?

**Q:** I am currently working with a team that use mongoDb for the project, it has one super big entity called Project, this project entity contain other classes, and all of this should be inserted in one action as one project, for example:

```
public class Project
{
 public GeneralInfo BuildGeneralInfo { get; set; }

 public List<ResidentialGeneralInfo> ResidentialGeneralInfo { get; set; }

 public List<CommercialOffice> OfficeGeneralInfo { get; set; }

 public List<CommercialOffice> BusinessGeneralInfo { get; set; }

 //etc...
}
```

and in GeneralInfo for example we have:

```

public class GeneralInfo
{
 public string Elevation { get; set; }

 public string ElevationEn { get; set; }

 public string Floors { get; set; }

 public DateTime BuildDate { get; set; }

 public string LandArea { get; set; }

 //etc...
}

```

what I did was create a method as follow:

```

private GeneralInfo InsertGeneralInfo(string Elevation, string ElevationEn, string Floors, DateTime
BuildDate, string LandArea, string ResidentialUnit, string BusinessUnit, string OfficeUnit, string
ArchitectureStyle, string ArchitectureStyleEn, string StructureType, string StructureTypeEn, string
ResidentialUnitInFloor, string BusinessUnitInFloor, string OfficeUnitInFloor, string Yard, string
ParkingCapasity, string HeatCool, string HeatCoolEn, string Foundation)

{
 var generalInfoObj = new GeneralInfo
 {
 Elevation = Elevation,
 ElevationEn = ElevationEn,
 Floors = Floors,
 BuildDate = BuildDate,
 LandArea = LandArea,
 }
}

```

```

ResidentialUnit = ResidentialUnit,
BusinessUnit = BusinessUnit,
OfficeUnit = OfficeUnit,
ArchitectureStyle = ArchitectureStyle,
ArchitectureStyleEn = ArchitectureStyleEn,
StructureType = StructureType,
StructureTypeEn = StructureTypeEn,
ResidentialUnitInFloor = ResidentialUnitInFloor,
BusinessUnitInFloor = BusinessUnitInFloor,
OfficeUnitInFloor = OfficeUnitInFloor,
Yard = Yard,
ParkingCapacity = ParkingCapacity,
HeatCool = HeatCool,
HeatCoolEn = HeatCoolEn,
Foundation = Foundation
};

return generalInfoObj;
}

```

and then used it in my action like this:

```

public ActionResult Create(GeneralInfo generalInfoModel)
{
 var project = new Project();

 project.BuildinGeneralInfo = InsertGeneralInfo(generalInfoModel.Elevation,
generalInfoModel.ElevationEn,
generalInfoModel.Floors, generalInfoModel.BuildDate, generalInfoModel.LandArea,

```

```

 generalInfoModel.ResidentialUnit, generalInfoModel.BusinessUnit,
 generalInfoModel.OfficeUnit,

 generalInfoModel.ArchitectureStyle, generalInfoModel.ArchitectureStyleEn,
 generalInfoModel.StructureType,

 generalInfoModel.StructureTypeEn, generalInfoModel.ResidentialUnitInFloor,
 generalInfoModel.BusinessUnitInFloor,

 generalInfoModel.OfficeUnitInFloor, generalInfoModel.Yard,
 generalInfoModel.ParkingCapasity,

 generalInfoModel.HeatCool, generalInfoModel.HeatCoolEn, generalInfoModel.Foundation);

 return View();
}

}

```

but I feel this might be a naive implementation and there might be far better approach then this for breaking a big controller action, I'd appreciate any help in this regard, and on top of that I think my team shouldn't be using this big entity like that, but I have no control over that, I'd also appreciate any comment as to whether using entity like this is a code smell and bad architecture design.

**C1:** Why are you doing all this? You have an instance of GeneralInfo (the parameter generalInfoModel). All you need is project.BuildinGeneralInfo = generalInfoModel'. All your current code is doing is creating a duplicate of what you already have. – Stephen Muecke Aug 17 '15 at 10:12

**C2:** You're right, what a stupid mistake, I've got a little disappointed in myself actually. – Deckard Aug 17 '15 at 12:07

## 1 Answer

**A1:** If I understand correctly you get object of type GeneralInfo as input parameter and then use another method that creates new object of the same type which is exactly the same as input one, and then you assign it to Project object. It would be the same as if you would just assign the input object to Project object property.

project.BuildinGeneralInfo = generalInfoModel;

Maybe I missed something, but it looks like you over complicated everything.

767. <https://stackoverflow.com/questions/12046690/how-to-reduce-number-of-injected-dependencies-on-controller>

**T:** How to reduce number of injected dependencies on controller

**Q:** I am using MVC3, Entity Framework v4.3 Code First, and SimpleInjector. I have several simple classes that look like this:

```
public class SomeThing
{
 public int Id { get; set; }
 public string Name { get; set; }
}
```

I have another entity that looks like this:

```
public class MainClass
{
 public int Id { get; set; }
 public string Name { get; set; }
 public virtual ATing ATingy { get; set; }
 public virtual BThing BThingy { get; set; }
 public virtual CThing CThingy { get; set; }
 public virtual DThing DThingy { get; set; }
 public virtual EThing EThingy { get; set; }
}
```

Each Thingy (currently) has its own Manager class, like so:

```
public class SomeThingManager
{
 private readonly IMyRepository<SomeThing> MyRepository;

 public SomeThingManager(IMyRepository<SomeThing> myRepository)
 {
 MyRepository = myRepository;
 }
```

```
 }
}
}
```

My MainController consequently follows:

```
public class MainController
```

```
{
```

```
 private readonly IMainManager MainManager;

 private readonly IAThingManager AThingManager;

 private readonly IBThingManager BThingManager;

 private readonly ICThingManager CThingManager;

 private readonly IDThingManager DThingManager;

 private readonly IEThingManager EThingManager;
```

```
 public MainController(IMainManager mainManager, IAThingManager aThingManager,
 IBThingManager bThingManager, ICThingManager cThingManager, IDThingManager
 dThingManager, IEThingManager eThingManager)
```

```
{
```

```
 MainManager = mainManager;

 AThingManager = aThingManager;

 BThingManager = bThingManager;

 CThingManager = cThingManager;

 DThingManager = dThingManager;

 EThingManager = eThingManager;
```

```
}
```

```
...various ActionMethods...
```

```
}
```

In reality, there are twice as many injected dependencies in this controller. It smells. The smell is worse when you also know that there is an OtherController with all or most of the same dependencies. I want to refactor it.

I already know enough about DI to know that property injection and service locator are not good ideas.

I can not split my MainController, because it is a single screen that requires all these things be displayed and editable with the click of a single Save button. In other words, a single post action method saves everything (though I'm open to changing that if it makes sense, as long as it's still a single Save button). This screen is built with Knockoutjs and saves with Ajax posts if that makes a difference.

I humored the use of an Ambient Context, but I'm not positive it's the right way to go. I humored the use of injecting a Facade as well. I'm also wondering if I should implement a Command architecture at this point. (Don't all of the above just move the smell somewhere else?)

Lastly, and perhaps independent of the three above approaches, is should I instead have a single, say, LookupManager with explicit methods like GetAThings(), GetAThing(id), GetBThings(), GetBThing(id), and so on? (But then that LookupManager would need several repositories injected into it, or a new type of repository.)

My musings aside, my question is, to reiterate: what's a good way to refactor this code to reduce the crazy number of injected dependencies?

**C1:** possible duplicate of How to deal with constructor over-injection in .NET – Steven Aug 21 '12 at 7:44

### 3 Answers

**A1:** Using a command architecture is a good idea, since this moves all business logic out of the controller, and allows you to add cross-cutting concerns without changes to the code. However, this will not fix your problem of constructor over-injection. The standard solution is to move related dependencies into a aggregate service. However, I do agree with Mark that you should take a look at the unit of work pattern.

**C1:** Thanks for the references. I like this approach. I'll refactor to an aggregate service for my immediate needs and then take a deeper look at command architecture and unit of work. – Facio Ratio Aug 21 '12 at 17:56

**C2:** @Steven can you provide an example of how this might work with SimpleInjector. I've been following your example at [cuttingedge.it/blogs/steven/pivot/entry.php?id=95](http://cuttingedge.it/blogs/steven/pivot/entry.php?id=95) and it's been a useful approach. How might I apply a facade or aggregate service. – David Clarke Jan 27 '14 at 2:52

**C3:** @DavidClarke: I'm not sure what to show. Take a look at the Unit of Work pattern; that is typically a class that would wrap repositories. To prevent constructor over-injection in the unit of work, you can inject a factory that knows how to resolve repositories. – Steven Jan 27 '14 at 8:12

**C4:** @Steven so when using the command architecture, how do you avoid constructor over-injection? It seems that each action would need at least one handler and most of my controllers have more than 5 actions. The aggregate service described here doesn't seem to apply as surely you shouldn't be "[hiding] the aggregate behavior behind a new abstraction" for a command which already has a single responsibility? Did you mean to suggest Parameter Objects instead? (another concept mentioned in the same link). – ajbeaven Aug 2 '16 at 2:22

**A2:** Have you considered using a unit of work design pattern? There is a great MSDN post on what a unit of work is. An excerpt from that article:

In a way, you can think of the Unit of Work as a place to dump all transaction-handling code. The responsibilities of the Unit of Work are to:

Manage transactions.

Order the database inserts, deletes, and updates.

Prevent duplicate updates. Inside a single usage of a Unit of Work object, different parts of the code may mark the same Invoice

object as changed, but the Unit of Work class will only issue a

single UPDATE command to the database.

The value of using a Unit of Work pattern is to free the rest of your code from these concerns so that you can otherwise concentrate on business logic.

There are several blog posts about this, but the best one I've found is on how to implement it is [here](#). There are some other ones which have been referred to from this site [here](#), and [here](#).

Lastly, and perhaps independent of the three above approaches, is should I instead have a single, say, LookupManager with explicit methods like GetAThings(), GetAThing(id), GetBThings(), GetBThing(id), and so on? (But then that LookupManager would need several repositories injected into it, or a new type of repository.)

The unit of work would be able to handle all of these, especially if you're able to implement a generic repository for most of your database handling needs. Your tag mentions you're using Entity Framework 4.3 right?

Hope this helps!

**C1:** Here is (yet) another variation of the unit of work pattern. – Steven Aug 21 '12 at 7:24

**C2:** Do I create just a single UnitOfWork class that all my controllers use? I already have a GenericRepository<T>. That class would reference every repository? – Facio Ratio Aug 21 '12 at 17:25

**C3:** Yep that's exactly what this would do. This single unit will also manage the concurrency of items when they're being pulled from all the different repos, as well as ensure you only have 1 shared context between them. – Mark Oreta Aug 21 '12 at 17:55

**C4:** I would then end up with a single UnitOfWork class with constructor over-injection. It looks like I need aggregate service(s) no matter what. – Facio Ratio Aug 22 '12 at 2:00

**A3:** I think your main issue is too many layers of abstraction. You are using Entity Framework, so you already have a layer of abstraction around your data, adding two more layers (one per entity) via a Repository and a Manager interface has led to the large number of interfaces your controller depends upon. It doesn't add a whole lot of value, and besides, YAGNI.

I would refactor, getting rid of your repository and manager layers, and use an 'ambient context'.

Then, look at the kinds of queries your controller is asking of the manager layers. Where these are very simple, I see no problems querying your 'ambient context' directly in your controller - this is what I would do. Where they are more complicated, refactor this into a new interface, grouping things logically (not necessarily one per Entity) and use your IOC for this.

768. <https://stackoverflow.com/questions/26934714/how-can-i-measure-the-quality-of-my-software-architecture/26947051#26947051>

**T:** How can I measure the quality of my software architecture? [closed]

**Q:** I have a relatively complex software I have made, and now I want to evaluate how "good" my architecture is. Is it modular? Is it simple? Could it be better? Where are the biggest flaws?

The only metrics I know are Coupling and Cohesion. But I have nothing to compare them to (they are relative metrics right? Or are there any standards stating something like Coupling less than X is good, etc...).

Thanks!

For the ones interested:

Coupling - Measures the degree to which each program module relies on each one of the other modules. The greater the coupling is, more difficult is to modify or exchange some module without affecting other modules.

Cohesion - defines how well defined is some module's responsibilities. If a module has an high cohesion, it means that this module has a well defined task, otherwise, the module does several tasks that don't have much in common, which usually leads to system disorganization.

There are several ways to calculate these metrics, but I know no standard way.

## 1 Answer

**A1:** You can use code smells detection to evaluate your code. You can find further discussion at this question on programmers.stackexchange regarding code smells for architecture.

769. <https://stackoverflow.com/questions/2473942/rhino-mocks-dependency-injection-and-separation-of-concerns>

**T:** Rhino Mocks, Dependency Injection, and Separation of Concerns

**Q:** I am new to mocking and dependency injection and need some guidance.

My application is using a typical N-Tier architecture where the BLL references the DAL, and the UI references the BLL but not the DAL. Pretty straight forward.

Lets say, for example, I have the following classes:

```
class MyDataAccess : IMyDataAccess {}
class MyBusinessLogic {}
```

Each exists in a separate assembly.

I want to mock My.DataAccess in the tests for My.Business.Logic. So I added a constructor to the My.Business.Logic class to take an IMy.DataAccess parameter for the dependency injection. But now when I try to create an instance of My.Business.Logic on the UI layer it requires a reference to the DAL.

I thought I could define a default constructor on My.Business.Logic to set a default IMy.DataAccess implementation, but not only does this seem like a codesmell it didn't actually solve the problem. I'd still have a public constructor with IMy.DataAccess in the signature. So the UI layer still requires a reference to the DAL in order to compile.

One possible solution I am toying with is to create an internal constructor for My.Business.Logic with the IMy.DataAccess parameter. Then I can use an Accessor from the test project to call the constructor. But there's still that smell.

What is the common solution here. I must just be doing something wrong. How could I improve the architecture?

### 3 Answers

**A1:** You can define your classes like this:

```
public class MainForm : Form
{
 private readonly businessLogic;

 public MainForm(IBusinessLogic businessLogic)
 {
 this.businessLogic = businessLogic;
 }

 public class BusinessLogic : IBusinessLogic
```

```

{
 private IDataLayer dataLayer;

 public BusinessLogic(IDataLayer dataLayer)
 {
 this.dataLayer = dataLayer;
 }
}

```

```

public class DataLayer : IDataLayer
{
 public DataLayer(string connectionString)
 {
 }
}

```

Note how the main form doesn't know about the DAL here. Now we do need a piece of code which knows all the classes, so that they can be wired together. This is typically done at the start of the application:

```

public static void Main(string[] args)
{
 var dataLayer = new DataLayer("foo");

 var businessLogic = new BusinessLogic(dataLayer);

 var mainForm = new MainForm(businessLogic);

 Application.Run(mainForm);
}

```

Of course, this is a simplified example. If you have dozens or hundreds of classes in practice, then such start-up wiring can get very big and complicated, especially when cyclic dependencies come into

play. That's why dependency injection frameworks were created to replace that code by XML configuration files, configuration by code, or .NET attributes. The basic idea is the same though.

Examples of dependency injection frameworks for .NET: AutoFac, Castle, Spring.NET, StructureMap, Ninject and the Managed Extensibility Framework.

**C1:** How does using an IoC container affect performance? I like this solution a lot and am currently playing around with Castle. – mikesigs Mar 22 '10 at 0:35

**C2:** @whatispunk: Using an IoC container doesn't have an impact on performance after start-up. If start-up times get too long because of the amount of objects being wired together, you typically have facilities in the container to enable lazy loading (e.g. System.Lazy<T> for the managed extensibility framework). – Wim Coenen Mar 22 '10 at 1:57

**C3:** Makes sense. And in my case, I'm working on a Web app, so start-up times don't really matter. Thanks for your help. – mikesigs Mar 22 '10 at 4:55

**A2:** I answered a question yesterday on how to structure a .NET solution that I think will solve your problem.

The key point for you in my answer should be that none of the "implementation" assemblies have references to other "implementation" assemblies. This should solve your separation of concerns issue.

Further, the structure also almost mandates the use of dependency injection and it is very well suited for unit testing and the use of mocking.

I hope it helps.

**C1:** This sounds like a really great solution, but I think it would be quite an up-hill struggle to convince the rest of my team to restructure our entire application. – mikesigs Mar 18 '10 at 23:54

**A3:** If you want to avoid having to reference the data access dll from the UI dll, then you could extract the data access interfaces/base classes into a third library and have both the other two reference that.

770. <https://stackoverflow.com/questions/21408226/using-viewmodels-instead-dtos-as-the-result-of-a-cqrs-query>

**T:** Using ViewModels instead DTOs as the result of a CQRS query

**Q:** Reading a SO question, I realized that my Read services could provide some smarter object like ViewModels instead plain DTOs. This makes me reconsider what information should be provided by the objects returned by the Read Services

Before, using just DTOs, my Read Service just made flat view mapping of a database query into hash like structure with minimum normalization and no behavior.

However I tend to think of a ViewModel as something "smarter" that can have generated information not provided by the database, like status icon, calculated values, reformatted values, default values, etc.

I am starting to see that the construction of some ViewModel objects might get more complicated and has potential downsides if I made my generic ReadServiceInterface return ViewModels only:

- (1) Should I plan some design restriction for the ViewModels returned by my CQRS? Like making sure that their construction is almost as fast as a plain DTO?
- (2) DTOs by nature are easily serialized and ready to be sent to an external system in a SOA architecture or embedded into a message. Does this mean that using ViewModels will have a negative impact on my architecture?
- (3) Which type of ViewModels should I keep outside my Read Services?
- (4) Should I expect all ViewModels to be retrieved from Read Services?

In the past I implemented some ViewModels that needed more than one query. In a CQRS I suppose, that is a design smell, since everything they provide, should be in only one query.

I am starting a new project, where I thought that any query will return either aggregate objects or DTOs. Since now ViewModels come into play. I am wondering:

- (5) Should I plan that queries within my architecture will yield two type of objects (ViewModels+Aggregates) or three (+DTO)?

**C1:** After making this question, I realized that a subconscious "everything generated from Entities" obsession, and not practicing CQRS+MVVM was the root cause of my anemic models! –  
SystematicFrank Jan 28 '14 at 14:39

## 1 Answer

**A1:** View Models (VM) serve a single master: the View. We're usually consider the VM a pretty dumb object so in this regard, there's no technical difference between a VM and a DTO, only their purpose and semantics are different.

How you build a VM is an implementation detail. Some VM are pre generated and stored in a VM repository. Others are built in real-time by a service (or a query handler) either by querying the db directly or querying other repos/services then assembling the results. There's no right or wrong and no rules about how to do it. It comes down to preference.

In CQRS the important part is separation of commands from queries i.e more than one model. There's no rule about how many queries you should do or if you should return a view model or dto. As long as you have at least one read model dedicated for queries, it's CQRS.

Don't let technicalities complicate your design. Proper design is more about high level structure and not low level implementation. Use CQRS because having a read model simplifies your app, not for other reasons. Aim for simplification and clean code, not for rigid rules that dictate a 'how to' recipe.

771. <https://stackoverflow.com/questions/5355003/storing-c-sharp-gethashcode-in-db-is-unreliable>

**T:** Storing C# GetHashCode() in DB is Unreliable [duplicate]

**Q:** Possible Duplicate:

How do I create a HashCode in .net (c#) for a string that is safe to store in a database?

I'm planning to store hundreds of thousands of URLs in my database. Each row in my UrlInfo table will be immutable with the URL itself being the logical primary key. Since URL's can be fairly lengthy, I've decided to hash the URL as a quick way to find possible matches when adding new rows. The hash isn't my true key, just a way to find possible matches quickly. In addition I'm using a RegEx pattern per domain that distills the essence of the URL into something that can be compared against other URL's. I'm storing the results of the RegEx also as a hash and I'm not concerned if it yields possible duplicates.

Everything has been going great until I learned that C#'s `string.GetHashCode()` method, which I've been using to hash things, is not guaranteed to be unique across implementations of .Net. I noticed this when I tried moving my hash function from ASP.Net to SQLServer CLR code. The web app uses .Net 4.0 and SQLServer 2008 R2, I've learned, uses .Net 3.5. They yielded separate hash results for the same string so now I need to get away from using `string.GetHashCode()` because I don't want to have to worry about this changing when I upgrade my app to future versions of .Net.

So, questions:

Does my architecture smell since I'm storing a hash in my db? Any better ways? Obviously Microsoft doesn't want me to store hash results!

Can someone recommend a good C# replacement algorithm for hashing strings? I saw Jon's here but not exactly sure how to modify to work for strings (loop through each char using ascii codes?).

Are there any string compression algorithms that would be better than using a hash algorithm?

Thanks

## AWESOME RESPONSES BY MANY. THANK YOU VERY MUCH!!!

**C1:** I know this doesn't answer your question, but would be very cautious about using a URL as a key for anything long-term. My experience is that they change for any number of reasons. – n8wrl Mar 18 '11 at 16:33

**C2:** They can, though a URI essentially IS a key to a distributed global system. As long as your use of it can handle things changing, it can be a good approach in many cases. Sadly, it works a lot better in databases that have their own hash indexing. – Jon Hanna Mar 18 '11 at 16:38

**C3:** Hey @n8wrl, for my app it truly is the URI itself that I'm interested in, not necessarily what it stands for. I'm using my secondary RegEx/hash strategy to mitigate the problem with possible variations of URL's. So for instance, I can match these two strings because my RegEx for domain abc is only using param a: `http://www.abc.com/?a=5 <-matches-> www.abc.com?a=b&pagecount=2` – sisdog Mar 18 '11 at 16:49

## 5 Answers

**A1:** You could always use an MD5 hash instead, which is relatively fast:

```

public string GetUrlHash(string url) {

 byte[] hash = MD5.Create().ComputeHash(Encoding.UTF8.GetBytes(url));

 StringBuilder sb = new StringBuilder();
 for (int i = 0; i < hash.Length; i++) {
 sb.Append(hash[i].ToString("X2"));
 }

 return sb.ToString();
}

```

Call it like so:

```
Console.WriteLine(this.GetUrlHash("http://stackoverflow.com/questions/5355003/storing-c-
gethashcode-in-db-is-unreliable"));
```

And get:

```
> 777BED7F83C66DAC111977067B4B4385
```

This should be fairly reliable from an uniqueness standpoint. MD5 is insecure nowadays for password applications but you don't have that problem here.

The only problem is using a string like this as a primary key on a table might be problematic, performance-wise.

The other thing you could do is use the URL shortener approach: use your database's sequence generation feature, and convert the value (make sure you use the equivalent of LONG or BIGINT!) to something like Base36, which gives you a nice, concise string.

**C1:** thx so much for the answer. After a lot of thought today, I ended up with your suggested MD5. I considered (1) a flat VARBINARY field and (2) a BASE36 compression but MD5 is very well known and SQLServer has native support for it with their HASHBYTES function. I'm happy to know that my hash values will be consistent for the life of my immutable objects. – sisdog Mar 18 '11 at 23:34

**C2:** Instead of Encoding.ASCII, that is "incomplete" and "not-reversible" given non-ASCII characters, you should use Encoding.UTF8 – xanatos Mar 18 '11 at 23:48

**C3:** @xanatos true, especially if the URL contains extended characters. I updated the snippet. – kprobst Mar 18 '11 at 23:49

**A2:** A similar question has been asked here:

How do I create a HashCode in .net (c#) for a string that is safe to store in a database?

It may prove to solve your issue.

**C1:** Thanks @Adam, somehow I missed that one in my stackoverflow search. Yea, it confirms what I was thinking. I guess my architecture is still sound but I need to find a good replacement for string.GetHashCode(). – sisdog Mar 18 '11 at 16:42

**C2:** In that question Jon Skeet provides a good algorithm that hashes strings. – as-cii Mar 18 '11 at 16:45

**A3:** As a note, SQL Server from 2008 supports (has) the function HASHBYTES, that given some data (a string for example) can generate a MD2, MD4, MD5, SHA or SHA1 hash.

**A4:** I'd say you probably don't need to store the hash.

Just make sure that you correctly index the URL column in your table (a unique index) and the searches should be fast.

**C1:** I don't know if I can, or want, to do that iggy. These URL's could get long. Some URL's have params hanging off of them that represent text, for instance, from a posted form. Sqlserver won't allow a varchar greater than 900 for an index, I wasn't going to limit myself to 900. – sisdog Mar 18 '11 at 17:32

**A5:** Have you considered zipping down your string and storing a VARBINARY? It could be much smaller, you could build an index directly on it.

**C1:** I thought able this @Alex but it still will grow large as my string grows large. I chose MD5 because it will have a low collision rate and will keep my data smaller. – sisdog Mar 18 '11 at 23:36

772. <https://stackoverflow.com/questions/44616003/show-confirm-dialog-in-flux-architecture>

**T:** Show confirm dialog in Flux architecture

**Q:** I'm trying to understand Flux architecture. I'm using JavaFX and the FluxFX experimental framework.

I'm writing a program which allows user to schedule some task at a specific moment ("in 3 hours", "at 10 o'clock", and so on). The point is that only one task must be scheduled at the same time.

When user hits the "schedule" button, an ScheduleAction is dispatched and the scheduled task is stored in the ScheduleStore. Everything OK. When the user tries to schedule a second task, I would like to ask him/her if he/she wants to cancel the previous task. How can I do that? At this moment, I'm using this approach:

Dispatch the ScheduleAction.

The ScheduleStore receives the action and checks if a scheduled task already exists.

If a task already exists, the store push a message into an EventStream (from ReactFX).

The view is observing the EventStream, and shows the message in a confirm dialog (using a JavaFX Alert).

User's response is dispatched in a ResponseAction.

I think this approach "smells bad". What is the correct way to do something like this?

Thank you very much!

773. <https://stackoverflow.com/questions/3480974/proper-structuring-of-lucene-net-usage-in-an-asp-net-mvc-site>

**T:** Proper structuring of Lucene.Net usage in an ASP.NET MVC site

**Q:** I'm building an ASP.NET MVC site where I plan to use Lucene.Net. I've envisioned a way to structure the usage of Lucene, but not sure whether my planned architecture is OK and efficient.

My Plan:

On Application\_Start event in Global.asax: I check for the existence of the index on the file system - if it doesn't exist, I create it and fill it with documents extracted it from the database.

When new content is submitted: I create an IndexWriter, fill up a document, write to the index, and finally dispose of the IndexWriter. IndexWriters are not reused, as I can't imagine a good way to do that in an ASP.NET MVC application.

When content is edited: I repeat the same process as when new content is submitted, except that I first delete the old content and then add the edits.

When a user searches for content: I check `HttpRuntime.Cache` to see if a user has already searched for this term in the last 5 minutes - if they have, I return those results; otherwise, I create an IndexReader, build and run a query, put the results in `HttpRuntime.Cache`, return them to the user, and finally dispose of the IndexReader. Once again, IndexReaders aren't reused.

My Questions:

Is that a good structure - how can I improve it?

Are there any performance/efficiency problems I should be aware of?

Also, is not reusing the IndexReaders and IndexWriters a huge code smell?

**C1:** It would be awesome if you wrote a short step-by-step tutorial on how you integrated Lucene.NET with your ASP.NET MVC site, preferably as a wiki-style answer on SO. – Petrus Theron Dec 11 '12 at 13:04

**C2:** @FreshCode Good call. My implementation is not perfect, but it works, and I think I'll write it up as soon as my finals end next week. I've been meaning to publish a bunch of ASP.NET MVC helpers anyway, so I'll keep you posted. – Maxim Zaslavsky Dec 12 '12 at 3:26

**C3:** @MaximZaslavsky Did you ever write that tutorial? I would be interested in reading it. – Jean-François Beauchamp Jun 5 '13 at 18:14

## 2 Answers

**A1:** The answer to all three of your questions is the same: reuse your readers (and possibly your writers). You can use a singleton pattern to do this (i.e. declare your reader/writer as public static). Lucene's FAQ tells you the same thing: share your readers, because the first query is reaaalllyyyy slow. Lucene handles all the locking for you, so there is really no reason why you shouldn't have a shared reader.

It's probably easiest to just keep your writer around and (using the NRT model) get the readers from that. If it's rare that you are writing to the index, or if you don't have a huge need for speed, then it's probably OK to open your writer each time instead. That is what I do.

Edit: added a code sample:

```
public static IndexWriter writer = new IndexWriter(myDir);
```

```
public JsonResult SearchForStuff(string query)
{
 IndexReader reader = writer.GetReader();
 IndexSearcher search = new IndexSearcher(reader);
 // do the search
}
```

**C1:** Thanks for your answer. This means that I should just put the IndexReader as a controller public static field? Also, how do I renew the IndexReader (when the index is updated)? :) Or are you saying that it's better to keep the writer around rather than the reader? – Maxim Zaslavsky Aug 17 '10 at 19:44

**C2:** Yes, make it a public static field. Unless you will have multiple processes writing to the same location, I think it is better to persist the writer and use the NRT model to get your readers. If you decide to persist readers though, reader.IsCurrent() will tell you if the reader is current, and reader.Reopen() will reopen it. I added a code sample for the NRT style. – Xodarap Aug 17 '10 at 20:06

**C3:** Isn't it necessary to close the IndexWriter afterwards or frequently committing is enough? – jorgebg Jun 4 '12 at 18:06

**C4:** @jorgebg: you should only need to close the writer when your app shuts down (in the general case) – Xodarap Jun 4 '12 at 23:00

**C5:** @Xodarap - This post was really useful, thanks! In our MVC app we're not writing directly to the index because we didn't want to block, so we're using message queuing to handle the writes. Do you think this is a good strategy? We're making our Reader static and reopening it when it is not current. – Pandincus Aug 14 '12 at 16:15

**C6:** @Pandincus: Yes, I think queuing is a good way to make it non-blocking (as long as you are willing to lose queued data in the event of a crash). – Xodarap Aug 18 '12 at 20:25

**A2:** I would probably skip the caching -- Lucene is very, very efficient. Perhaps so efficient that it is faster to search again than cache.

The OnApplication\_Start full index feels a bit off to me -- should probably be run in its own thread so as not to block other expensive startup activities.

**C1:** thanks for the tips! – Maxim Zaslavsky Jan 29 '11 at 0:49

774. <https://stackoverflow.com/questions/2024265/sharparchitecture-fluentnhibernate-schema-generation>

**T:** SharpArchitecture - FluentNHibernate Schema Generation?

**Q:** I'm trying out SharpArchitecture and want to have FluentNHibernate generate my database schema for my MVC WebSite.

I'm a bit lost on where to do this. I can do it by adding the SchemaUpdate thingy in the global.asax.cs-file right after

NHibernateInitializer.Instance().InitializeNHibernateOnce(InitializeNHibernateSession); in "Application\_beginrequest". (If I place it before that call, SharpArch throws an exception).

This doesn't seem right and it smells bad. It feels like I'm missing something basic in the Sharp Architecture that allows for automatic schema generation to my DB (MSSQL2005). Or am I not? If not, please fill me in on best practices for schema generation with fluent nhibernate and Sharp Architecture.

Thanks in advance!

Edit: I might add that I'm looking on the Northwind sample project in SharpArch, but want to make FNhb generate the schema instead.

## 1 Answer

**A1:** You don't want to do it in Application\_BeginRequest.

To auto-gen the DDL, what you should do is do it in your TDD classes. Create a special class that you can manually call when you need to generate your DDL for your development database.

Something like:

```
private static void CreateDatabaseFromFluentNHibernateMappings()
{
 var mappingAssemblies = RepositoryTestsHelper.GetMappingAssemblies();
```

```

SchemaExport schema = new SchemaExport(NHibernateSession.Init(new SimpleSessionStorage(),
mappingAssemblies, NHIBERNATE_CFG_XML));

schema.Execute(true, true, false);

}

```

This will generate and execute the DDL based on your mappings to the database you specify in your NHibernate config file (in the NHIBERNATE\_CFG\_XML). The database, albeit empty, should already exist.

You can also create another method in your class that can update the schema of the development database as you develop in case you have added new entities, properties, etc.

```

private static void UpdateExistingDatabaseFromFluentNHibernateMappings()

{
 var mappingAssemblies = RepositoryTestsHelper.GetMappingAssemblies();

 SchemaUpdate schema = new SchemaUpdate(NHibernateSession.Init(new SimpleSessionStorage(),
mappingAssemblies, NHIBERNATE_CFG_XML));

 schema.Execute(true, true);

}

```

This will update an existing database with the changes you have made in FNH without destroying the existing database. Very useful, especially when you might have test data already in the database.

And finally, You can use NDbUnit to preload a database based on test data defined in XML in your project and under SCM. Great when you have a team working on the same database and you want to preload it with data, thus everyone starts with the same blank slate.

Using NDbUnit:

```

private static void LoadTheTestDataintoDb()

{
 const string connectionstring = // your connection string to your db

 NDbUnit.Core.INDbUnitTest sqlDb = new
 NDbUnit.Core.SqlClient.SqlDbUnitTest(connectionstring);

```

```

sqlDb.ReadXmlSchema(/* your XML schema file defining your database (XSD) */);

sqlDb.ReadXml(/* Your XML file that has your test data in it (XML) */);

// Delete all from existing db and then load test data allowing for identity inserts

sqlDb.PerformDbOperation(NDbUnit.Core.DbOperationFlag.CleanInsertIdentity);

}

```

This requires you to use NDbUnit. Thanks to Stephen Bohlen for it!

I hope this helps; I wrote this kinda quickly, so if I confused you, let me know.

**C1:** Thank you Todd! I was starting to think about doing a separate console application just to generate the schema, but doing it with the rest of my tests seems like a good idea. Thanks for all the great code examples, they'll sure help a lot! – Jens Pettersson Jan 8 '10 at 15:28

775. <https://stackoverflow.com/questions/7167632/how-do-i-wrap-funcdynamic-myclass-property/7167670#7167670>

**T:** How do I wrap Func<dynamic, MyClass> property

**Q:** This is simplified setup - I have API (I have no control on the API), which exposes a Func property like this:

```
public Func<dynamic, MyClass> FuncProperty { get; set; }
```

Usually it's used like this:

```

api.FuncProperty = s =>

{
 do1();
 do2();
 return new MyClass(); //simplified
}

```

Similar code is used all over the place (of course the content in {} is different), and I want to add common functionality to all these, I'd like to create a "wrapper" method, which I can use like this:

```
api.FuncProperty = MyWrapperMethod()
```

```
s =>
{
 do1();
 do2();
 return new MyClass();
});
```

I know I can edit all these calls to look like:

```
api.FuncProperty = s =>
{
 DoMyCommonFunctionality();
 //... as before
}
```

But if my common functionality is something like:

```
using(var disposable = SetSomeState())
{
 //the stuff which previously was in the lambda
}
```

then, using the latter approach is kind of ugly.

That's why even if it's only for learning purposes, how should my wrapper's method signature look like? And how should I use it?

### 3 Answers

**A1:** If I understand you right, it should also return a Func<dynamic, MyClass>, like this:

```
public static Func<dynamic, MyClass> MyWrapperMethod(Func<dynamic, MyClass> func)
{
```

```

// Validation if you want

return d =>

{

 using(var disposable = SetSomeState())

 {

 return func(d);

 }

};

}

```

That's an example with the using statement you wanted.

Note that calling MyWrapperMethod does not call the delegate you pass into it. Instead, it returns a delegate which, when called, will call the delegate you passed. This sort of deferred execution can be confusing, but I believe it's what you want here.

C1: exactly what I want, thanks. – Sunny Milenov Aug 23 '11 at 21:27

**A2:** You could do something like this:

```

public Func<dynamic, MyClass> MyWrapperMethod(Func<dynamic, MyClass> func)

{

 if (func == null)

 throw new ArgumentNullException("func");

 return s => {

 DoMyCommonFunctionality();

 // Execute original function

 return func(s);

 };

}

```

}

Note that it looks like you're using delegate properties to simulate methods. This smells like a very bad architecture to me.

**C1:** Thanks, that what I need. Small explanation: it's not smell - I used property to simplify. Actually, I'm using Nancy ([github.com/NancyFx/Nancy/wiki/Documentation](https://github.com/NancyFx/Nancy/wiki/Documentation)), and this is not a property but an indexer with the defined routes, and the actions for each of them. I wanted to wrap NDC logging around each of the calls. – Sunny Milenov Aug 23 '11 at 21:34

**C2:** I see, so the example was somewhat misleading. – cdhowie Aug 23 '11 at 21:38

**C3:** It sums up what I need, I didn't want to go deep and explain. And you answered exactly what I need :). Thanks again. Btw, I would not mind someone editing the question to the way it should be more clear. – Sunny Milenov Aug 23 '11 at 21:42

**A3:** There are multiple ways of doing this:

#### Suggestion One

Creating a different signature for your delegate:

```
public Func<HelperObject<dynamic>, MyClass> FuncProperty { get; set; }
```

Then your method changes like so:

```
api.FuncProperty = h =>
{
 //h.Model is the dynamic
 //h.CommonHelperFunction()
 return new MyClass();
};
```

And then invoke like so:

```
api.FuncProperty(new HelperObject(someDynamic));
```

## Suggestion Two

Create an extension method on dynamic to give you the data you need.

```
public static MyHelperClass CreateHelper(this object obj)
{
 return new MyHelperClass();
}
```

And you could then use it like so:

```
api.FuncProperty = s =>
{
 var helper = (s as object).CreateHelper();
 return new MyClass();
};
```

## Suggestion Three

Remove the delegate as a property from your object and change it to a method abstraction:

```
public MyClass ExecuteFunc(Func<dynamic, MyClass> selector)
{
 Func<MyClass> helper = () =>
 {
 DoCommonFunctionality();
 return selector(x.Model);
 };
}
```

```
 return helper();
}

```

Then you would call like so:

```
api.ExecuteFunc(x =>
{
 return new MyClass();
});
```

**C1:** Thanks, but I do not have control on the API. – Sunny Milenov Aug 23 '11 at 21:28

776. <https://stackoverflow.com/questions/31720825/typescript-how-to-access-object-defined-in-other-class/31724489#31724489>

**T:** TypeScript How to access object defined in other class

**Q:** I have a project that uses Aurelia framework. I want to make global\static object that should be accessed across couple files. But when I try to access it from a different file it says that my object is undefined. Here is what it looks like:

FirstFile.ts

```
export function showA() {
 console.log("Changed a to " + a);
}

export var a = 3;
```

```
export class FirstFile {
 public ModifyA() {
 a = 7;
 showA();
 }
}
```

It says that a = 7. Then I use it in other file like this.

SecondFile.ts

```
import FirstFile = require("src/FirstFile");

export class SecondFile {

 showA_again() {

 FirstFile.showA();

 }
}
```

I execute showA\_again() in my view file called SecondFile.html

```
<button click.trigger="showA_again()" class="au-target">Button</button>
```

When I click button, I see in console that variable "a" is still 3. Is there any way to store variables between files?

**C1:** And where do you call the ModifyA()? I can't see this method being called anywhere. – Buzinas Jul 30 '15 at 15:35

**C2:** This is bad. Don't do this. Add a to the class itself. – Matthew James Davis Aug 3 '15 at 12:45

## 1 Answer

**A1:** I'd recommend you to inject FirstFile into SecondFile. Now your code has a smell of bad architecture.

To answer your question: probably you are looking for static (playground sample)

```
export class FirstFile {

 static showA = function() {

 console.log("Changed a to " + FirstFile.a);

 }

 static a = 3;
}
```

```
public ModifyA() {
 FirstFile.a = 7;
 FirstFile.showA();
}
}
```

```
export class SecondFile {
 showA_again() {
 FirstFile.showA();
 }
}
```

**C1:** Good answer. There are other ways to do this, but I like this one. – Matthew James Davis Aug 3 '15 at 12:46

**C2:** @MatthewJamesDavis Could you provide an example? It would be great to see other options. – Artiom Aug 3 '15 at 13:15

**C3:** probably not worth it, this is probably the best way – Matthew James Davis Aug 3 '15 at 14:59

777. <https://stackoverflow.com/questions/12041371/low-latency-communication-between-machines-using-a-shared-file/12041478#12041478>

**T:** Low latency communication between machines using a shared file

**Q:** We would like to (continuously) write to a log file on one linux machine, and continuously read from it on another machine. We're looking for low latency updates (this is for real-time plotting) and easy setup. What the best way to achieve this?

I have tinkered with nfs, sshfs, and tail -f, but updates only come in at 1Hz. I assume these filesystems don't support the select syscall, and so top polls at its internal rate.

## 1 Answer

**A1:** This smells like a bad architecture choice.

Is it for RPC? If so, why don't you just create a webservice?

If it's just for transferring data, try memcached.

**C1:** We have a robot using orocos that generates streams of data. Orocros has built-in support for dumping the streams out to files. We also use KST2, a graphing application that can do live plotting of data in a file. Latency is good locally, but if the file is being shared over the network performance is bad, partly because KST has to poll for changes to the file instead of using the select syscall. memcached looks interesting, but I'm looking for something that will just work transparently with the tools we already have, and still be fast. – Andrew Wagner Aug 22 '12 at 10:02

778. <https://stackoverflow.com/questions/49197359/solid-are-the-single-responsibility-principle-and-the-open-closed-principle-mutually-exclusive>

**T:** SOLID - are the Single Responsibility Principle and the Open/Closed Principle mutually exclusive?

**Q:** The Single Responsibility Principle states that:

A class should have one, and only one, reason to change.

The Open/Closed Principle states that:

You should be able to extend a classes behavior, without modifying it.

How can a developer respect both principles if a class should have only one reason to change, but should not be modified?

Example

The factory pattern is a good example here of something that has a single responsibility, but could violate the open/closed principle:

```
public abstract class Product
```

```
{
}
}
```

```
public class FooProduct : Product
{
}
}
```

```
public class BarProduct : Product
{
}
}
```

```
public class ProductFactory
{
 public Product GetProduct(string type)
 {
 switch(type)
 {
 case "foo":
 return new FooProduct();
 case "bar":
 return new BarProduct();
 default:
 throw new ArgumentException(...);
 }
 }
}
```

What happens when I need to add ZenProduct to the factory at a later stage?

Surely this violates the open/closed principle?

How can we prevent this violation?

**C1:** @Ravi butunclebob.com/ArticleS.UncleBob.PrinciplesOfOOD from Uncle Bob, who is renowned amongst the developer community. – seriesOne Mar 9 at 15:57

**C2:** Can you outline a contradiction? An example might be handy. – 0b101010 Mar 9 at 17:04

**C3:** @0b101010 see update. – seriesOne Mar 14 at 23:07

**C4:** In your example, I don't see how adding ZenProduct would be a contravention of either principle, as you're merely performing routine maintenance/improvement - neither principle suggests that once the class is written it can never be changed, and indeed this sort of change is one of the key reasons to use a factory in the first place. However if you believe that this is the case then you should make GetProduct() a virtual method, thereby still satisfying both principles – LordWilmore Mar 15 at 10:17

**C5:** @LordWilmore The OCP states that "A class should be closed for modification". Therefore modifying it to add ZenProduct violates the principle. I agree that extending the factory would prevent this violation, however it's a lot of overhead, plus you'd also have to violate the OCP elsewhere, because you'd have to modify a class to use the new factory. – seriesOne Mar 15 at 10:22

**C6:** I believe the keyword here is 'should'. So as a real life example, if this is your own code then get in there and change it. But if you're providing this to another team/customer, then they may need to have the ability to alter this behaviour without having to ask you, the provider, to make that change, and in this specific case can be achieved by making the method virtual. OCP is very contentious IMHO and if you are working on your own complete set of code then it's the least interesting of the SOLID principles – LordWilmore Mar 15 at 10:24

**C7:** This feels like a discussion of the semantics of 'extend a classes behaviour'. Adding the new type to the factory is modifying existing behaviour, it's not extending behaviour, because we haven't changed the one thing the factory does. We may need to extend the factory but we have not extended its behaviour. Extending behaviour means introducing new behaviour and would be more along the lines of an event each time an instance of a type is created or authorising the caller of the factory - both these examples extend (introduce new) behaviour. – qujck Mar 15 at 11:55

**C8:** @qujck doesn't introducing new behaviour to the class violate the SRP? – seriesOne Mar 15 at 11:56

**C9:** @seriesOne yes it would, but your example isn't adding new behaviour – qujck Mar 15 at 11:58

#### 4 Answers

**A1:** This feels like a discussion of the semantics of 'extend a classes behaviour'. Adding the new type to the factory is modifying existing behaviour, it's not extending behaviour, because we haven't changed the one thing the factory does. We may need to extend the factory but we have not extended its behaviour. Extending behaviour means introducing new behaviour and would be more along the

lines of an event each time an instance of a type is created or authorising the caller of the factory - both these examples extend (introduce new) behaviour.

A class should have one, and only one, reason to change.

The example in the question is a factory for creating Product instances and the only valid reason for it to change is to change something about the Product instances it creates, such as adding a new ZenProduct.

You should be able to extend a classes behavior, without modifying it.

A really simple way to achieve this is through the use of a Decorator

The decorator pattern is often useful for adhering to the Single Responsibility Principle, as it allows functionality to be divided between classes with unique areas of concern.

```
public interface IProductFactory
```

```
{
```

```
 Product GetProduct(string type);
```

```
}
```

```
public class ProductFactory : IProductFactory
```

```
{
```

```
 public Product GetProduct(string type)
```

```
{
```

```
 \\\ find and return the type
```

```
}
```

```
}
```

```
public class ProductFactoryAuth : IProductFactory
```

```

{
 IProductFactory decorated;

 public ProductFactoryAuth(IProductFactory decorated)
 {
 this.decorated = decorated;
 }

 public Product GetProduct(string type)
 {
 \\ authenticate the caller
 return this.decorated.GetProduct(type);
 }
}

```

The decorator pattern is a powerful pattern when applying the SOLID principles. In the above example we've added authentication to the ProductFactory without changing the ProductFactory.

**C1:** What a coincidence. I'm watching a pluralsight tutorial on the decorator pattern right now! – series0ne Mar 16 at 15:49

**A2:** I think it depends on your interpretation of the SRP. This stuff is always somewhat subjective. Ask 100 people to define "single responsibility" and you'll probably get 100 different answers.

Using the scenario in Ravi's answer, a typical solution might be to have a ReportGenerator class which exposes a GeneratePdf method. It could then be later extended with an additional GenerateWord method if required. Like yourself though, I think this has a whiff about it.

I would probably refactor the GeneratePdf method into a PdfReportGenerator class and then expose that through the ReportGenerator. That way the ReportGenerator only has a single responsibility; which is to expose the various report generation mechanisms (but not contain their logic). It could then be extended without expanding upon that responsibility.

I'd say that if you find a conflict, it might well be an architectural smell that warrants a quick review to see if it can be done in a better way.

**A3:** A class should have one, and only one, reason to change.

This basically means, your class should represent single responsibility and shouldn't be modified thereafter to accommodate new feature.

For example, if you have class, which is responsible to print report in pdf format. Later, you wanted to add new feature to support printing report in other formats. Then instead of modify the existing code, you should extend it to support other format, which also implies extend a classes behavior, without modifying it

**C1:** I agree with this, but there are still LOTS of examples where the principles contradict each other.  
– series0ne Mar 9 at 16:31

**C2:** @series0ne Probably, but I couldn't recall any example right now, where they would contradict each other. :-) – Ravi Mar 9 at 16:35

**C3:** Please take a look at the update. I've added an example. – series0ne Mar 14 at 23:10

**A4:** I have a class StudentOrganiser class which takes IStudentRepository dependency. Interfaces exposed by IStudentRepository is say GetStudent(int studentId)

Class obeys SRP because it does not have any logic related to manage the connection with repository source.

Class obeys OCP because if we want to change repository source from SQL to XML, StudentOrganiser need not to undergo any changes => open for extension but closed for modification.

Consider if StudentOrganiser was designed to not take dependency of IStudentRepository, then method inside class itself must be taking care of instantiating new StudentSqlRepository() If later on requirement would have come to also support StudentXMLRepository on the basis of certain run time condition, your method would have ended with some case switch kind of paradigm and thus violating SRP as method is also indulged in actual repository deciding factor. By injecting repository dependency we taken off that responsibility from class. Now StudentOrganiser class can be extended to support StudentXMLRepository without any modification.

**C1:** I think you might be a little confused here. You are not extending StudentOrganiser by injecting a different IStudentRepository implementation. – 0b101010 Mar 9 at 19:21

**C2:** @0b101010 : I am clear :) updated my answer to explain the point – Rahul Agarwal Mar 10 at 4:22

779. <https://stackoverflow.com/questions/20146479/mysql-count-all-rows-in-name-specific-tables-which-are-older-than-1-day/20147063#20147063>

**T:** MySQL - Count all rows in name specific tables, which are older than 1 day

**Q:** This is the statement I am using to get the count of all rows from tables where name of the table includes word 'devices'.

```
SELECT SUM(TABLE_ROWS) FROM INFORMATION_SCHEMA.TABLES
WHERE TABLE_NAME like '%devices%'
```

And above works wonderfully. However I need to get the count of only those rows which had changes during the last 24 hours.

This should be easy to do, because each "%devices%" table has a column named dateofinstall where I store the unix timestamp (epoch).

So naturally I wanted to use the following statement:

```
SELECT SUM(TABLE_ROWS) FROM INFORMATION_SCHEMA.TABLES
WHERE TABLE_NAME like '%devices%'
and dateofinstall >= unix_timestamp(CURRENT_TIMESTAMP - INTERVAL 1 DAY)
```

However this doesn't seem to work!

Any other way of getting the count of all rows in name specific tables, which are older than 1 day?

--

FOUND A CORRECT ANSWER (thanks to user: Alma Do):

This builds a new query, which upon execution returns count within 24 hours.

```

SELECT
 CONCAT('SELECT SUM(rowscount) FROM (',
 GROUP_CONCAT(sqlcount SEPARATOR ' UNION ALL '),
 ') as initunion')
FROM
 (SELECT
 CONCAT('SELECT COUNT(1) AS rowscount FROM `',
 TABLE_SCHEMA,
 '`',
 TABLE_NAME,
 '` WHERE dateofinstall>= unix_timestamp(CURRENT_TIMESTAMP - INTERVAL 1 DAY)') as
 sqlcount
 FROM
 INFORMATION_SCHEMA.TABLES
 WHERE
 TABLE_NAME like '%devices%') as initcount;

```

## 1 Answer

**A1:** You can not do that directly. That is because - even if TABLE\_ROWS holds data that relied to actual table data, it can not be used with conditions in any case and INFORMATION\_SCHEMA itself does not contains any table data, only metadata.

However, there's a way to do this with building SQL query by another SQL query. It will be like:

```

SELECT
 CONCAT('SELECT SUM(rowscount) FROM (',
 GROUP_CONCAT(sqlcount SEPARATOR ' UNION ALL '),
 ') as initunion')
FROM

```

```

(SELECT
CONCAT('SELECT COUNT(1) AS rowscount FROM ',
TABLE_SCHEMA,
'.' ,
TABLE_NAME,
' WHERE dateofinstall<NOW()-INTERVAL 24 HOUR') as sqlcount
FROM
INFORMATION_SCHEMA.TABLES
WHERE
TABLE_NAME like '%devices%') as initcount;

```

-the resulting string will be valid SQL and you will be able to execute that via prepared statements.  
For example:

```

SET group_concat_max_len = 32000;
SET @sql = (SELECT
CONCAT('SELECT SUM(rowscount) FROM (',
GROUP_CONCAT(sqlcount SEPARATOR ' UNION ALL '),
') as initunion')
FROM
(SELECT
CONCAT('SELECT COUNT(1) AS rowscount FROM ',
TABLE_SCHEMA,
'.' ,
TABLE_NAME,
' WHERE dateofinstall<NOW()-INTERVAL 24 HOUR') as sqlcount
FROM
INFORMATION_SCHEMA.TABLES
WHERE
TABLE_NAME like '%devices%') as initcount);

```

```
PREPARE stmt FROM @sql;
```

```
EXECUTE stmt;
```

-note, that GROUP\_CONCAT() has restriction for length of returned string, so you may want to adjust group\_concat\_max\_len for your session.

Also, please, note, that in common case building one query by another query is an architecture smell (because of unpredictable SQL length, at least), but in your case this is acceptable since you will not have too many tables, obviously.

**C1:** First of all thank you for trying to help. I've executed the first example and it did built a new query as you've mentioned. I've executed this new sql query, but the result of the new query is still showing total number of all rows, not those within last 24 hours. Second sql you've prepared is giving me an error in sql syntax. – jjj Nov 22 '13 at 14:40

**C2:** Ok, I've figured it out, I just needed to add the proper 24 hour interval statement to your first example. Fantastic. – jjj Nov 22 '13 at 14:43

**C3:** @jjj my SQL was a sample. Yes, you should adjust it to your issue – Alma Do Nov 22 '13 at 14:43

**C4:** @jjj also found why second was an error: mistype @s instead of @sql in PREPARE, fixed – Alma Do Nov 22 '13 at 14:48

780. <https://stackoverflow.com/questions/33812896/comparison-of-virtual-function-pointers-in-c>

**T:** Comparison of Virtual Function Pointers in C++

**Q:** Say I want to check to see whether a subclass has implemented one of its parent's virtual functions (never mind whether this smells of bad architecture... it's an exercise). If I wanted to see if two regular functions were identical, I could just check &f == &g.

```
// Plain old functions
```

```
void f() {}
```

```
void g() {}
```

```
...
```

```
std::cout << "&f " << &f << "\n"; // "1" OK, for some reason func ptrs are converted
```

```
std::cout << "&g " << &f << "\n"; // "1" to booleans when printed. I can dig it.
std::cout << "&f == &g " << (&f == &g) << "\n"; // "0" Good, &f and &g are unequal as expected.
But with virtual member functions, behavior is different.
```

```
// Base class with a virtual
```

```
struct A {
 virtual void f() {}
};
```

```
// Subclass which implements f
```

```
struct B : public A {
 void f() {}
};
```

```
// Subclass which doesn't implement f
```

```
struct C : public A {};
```

```
...
```

```
std::cout << "&A::f " << &A::f << "\n"; // "1"
std::cout << "&B::f " << &B::f << "\n"; // "1"
std::cout << "&C::f " << &C::f << "\n"; // "1" ... okay ... annoying, but alright.
```

```
std::cout << "&A::f == &B::f " << (&A::f == &B::f) << "\n"; // "1" DANGER - why does &A::f ==
&B::f if &f != &g?
```

```
std::cout << "&A::f == &C::f " << (&A::f == &C::f) << "\n"; // "1"
std::cout << "&B::f == &C::f " << (&B::f == &C::f) << "\n"; // "1"
```

std::cout << "(void\*)&A::f" << (void\*)&A::f << "\n"; // "0x4084b0" Here's what I was actually looking for.

std::cout << "(void\*)&B::f" << (void\*)&B::f << "\n"; // "0x4084bc" Good - the B::f differs from A::f as it should

std::cout << "(void\*)&C::f" << (void\*)&C::f << "\n"; // "0x4084b0" Perfect.

std::cout << "(void\*)&A::f == (void\*)&B::f" << ((void\*)&A::f == (void\*)&B::f) << "\n"; // "0"

std::cout << "(void\*)&A::f == (void\*)&C::f" << ((void\*)&A::f == (void\*)&C::f) << "\n"; // "1"

std::cout << "(void\*)&B::f == (void\*)&C::f" << ((void\*)&B::f == (void\*)&C::f) << "\n"; // "0"

These are the comparison results I want

So my question is marked by DANGER in the code above. Why does `&A::f == &B::f` if `&f != &g`? Is there a way to do the comparison I want without casting to `void*` (which gives off noisy compiler warnings thanks to `-Wpmf-conversions`)?

**C1:** The fact that `&C::f` prints 1 seems a little bit curious. I'd be interested what the overload function is that gets called... Another interesting aspect is that clang++ won't even compile your casts to pointer. – Mats Petersson Nov 19 '15 at 20:59

**C2:** I'm starting to believe this is not possible. In the sense that a pointer to a virtual function is not a pointer to a function in itself, it is a the index into the vtable, so you can call the "correct" function regardless of what the actual class is. – Mats Petersson Nov 19 '15 at 21:09

**C3:** If you don't mind code that is pretty undefined, but since clang won't compile the code, what you have posted is also unportable, one way to solve it is to take a peek inside the vtable. [But it gets messy if you have more than one baseclass] – Mats Petersson Nov 19 '15 at 21:11

**C4:** @MatsPetersson, I was kind of wondering the same thing as you mentioned in your second comment. It seems like the cast to `(void*)` causes the address of the real function to be pulled out of the vtable, which I was hoping was standard but couldn't find it in documentation. I suppose this must be a g++ thing, and also the un-portable bit, but I'll keep looking. – stett Nov 19 '15 at 21:14

781. <https://stackoverflow.com/questions/23294877/writing-a-closure-in-coffeescript-with-using-do/23295391#23295391>

**T:** writing a closure in coffeescript with using "do"

**Q:** I am trying to set the property of my Backbone view class using a HTML select in Coffeescript and what I've realised is that I need to inject this(@) into the callback/handler via a javascript closure to maintain scope. But I can't seem to figure out how to do this as using "do" just executes the function on page load

```
dropdown = $('<select />').on 'change', do(myView = @) -> myView.prop = @.value
```

thanks for your help!

## 2 Answers

**A1:** The do notation does compile to an IIFE, you still need the actual handler function:

```
dropdown = $('<select />').on 'change', do(myView = @) -> (e) -> myView.prop = @.value
```

# or wrap the whole handler assignment:

```
do(myView = @) ->
 dropdown = $('<select />').on 'change', (e) -> myView.prop = @.value
```

Or you just use lexical this:

```
dropdown = $('<select />').on 'change', (e) => @.prop = e.target.value
```

```
dropdown = $('<select />').on 'change', (e) => @.prop = dropdown.val()
```

**C1:** perfect, thanks!! – user3573121 Apr 25 '14 at 14:32

**A2:** The standard way of doing it in Backbone is the following:

```
class MyView extends Backbone.View
```

events:

```
'change select': 'onChange'
```

```
onChange: (e) ->
```

```
 el = e.currentTarget
```

```
 @prop = el.value
```

Having said that, setting some properties on the view is also a smell, and hints on a missing model.

Setting some property outside of the view is a definite smell and invites re-assessment of the architecture.

C1: yep, missed events:, editing – Roman Apr 25 '14 at 19:09

782. <https://stackoverflow.com/questions/41898862/mvvm-and-passing-parameters-with-ioc>

T: MVVM and passing parameters with IoC

Q: Using Prism.Unity, I'm having trouble understanding how am I supposed to construct certain objects without passing parameters because that way I would break the benefits of IoC as I would have to specify a concrete class.

What I'm trying to build for now is quite simple: a view showing a list of items, and those items have some commands related to themselves.

Creating the host view which contains the following:

```
<DataGrid ItemsSource="{Binding Maquinas}" IsSynchronizedWithCurrentItem="True"
AutoGenerateColumns="False"
CanUserAddRows="False" CanUserDeleteRows="False" IsReadOnly="True"
BorderThickness="1">

<DataGrid.Columns>

 <DataGridTextColumn Header="Zona" Binding="{Binding Area}" Width="140"/>

 <DataGridTextColumn Header="Nombre" Binding="{Binding Descripcion}" Width="350"/>

 <DataGridTemplateColumn Header="Acciones">

 <DataGridTemplateColumn.CellTemplate>

 <DataTemplate>

 <StackPanel Orientation="Horizontal">

 <Button Width="30" Height="30" Command="{Binding VerMaquinaCommand}"
Margin="0" ToolTip="Ver máquina"/>

 </StackPanel>

 </DataTemplate>
 </DataGridTemplateColumn.CellTemplate>
 </DataGridTemplateColumn>
 </DataGrid.Columns>
</DataGrid>
```

```

</DataGridTemplateColumn.CellTemplate>

</DataGridTemplateColumn>

</DataGrid.Columns>

</DataGrid>

```

And getting the components is quite simple:

```

public class MaquinasListaViewModel : BindableBase, IMaquinasListaViewModel,
INavigationAware

{
 [Dependency]
 public IMaquinasListModel Model { get; set; }

 public ObservableCollection<IMaquinasListaMaquinaViewModel> Maquinas { get; } = new
 ObservableCollection<IMaquinasListaMaquinaViewModel>();

 public MaquinasListaViewModel(IEventAggregator eventAggregator)

 {
 eventAggregator.GetEvent<RefreshEventArgs>().Subscribe(Iniciar, ThreadOption.UIThread, false,
 obj => obj.ViewModel == this);

 Iniciar();
 }

 public void Iniciar(RefreshEventArgs args = null)
 {
 foreach (Maquina m in Model.ObtenerTodas())
 {
 // How do I create here MaquinasListaMaquinaViewModel passing them the info on which
 // Maquina are based

 // This was my attempt but fails on DI because I create the instance myself so I force the type.

 // I can't resolve a IMaquinasListaMaquinaViewModel associated with a particular Maquina,
 // unless I first resolve it and then inject the value on a property? But then I could have an
 // invalid VM.

 // Maquinas.Add(new MaquinasListaMaquinaViewModel(m, Model, _eventAggregator,
 // _navigationService));
 }
 }
}

```

```
 }
 }
```

But how I resolve a IMaquinasListaMaquinaViewModel letting it know which Maquina is it about?

What is wrong with my architecture? Because I feel like something smells bad...

**C1:** Where does the Maquina object come from in the first place? If this is something that you select in some list or navigate to at runtime it doesn't make much sense to resolve the view model from a container. Then you could create a specific instance of the view model class - for example using a factory - and inject it with the model. You could still resolve the other dependencies of the view model class, like the IEventAggregator, using the container. – mm8 Jan 27 '17 at 19:54

**C2:** @mm8 the model creates all the Maquina objects and serves them to the.viewmodel of the list view. So you say that if I create the object in a factory with Maquina as parameter 1 and eventAggregator as parameter 2, how do I pass the first one from the factory but get the other one injected? – Pinx0 Jan 27 '17 at 20:10

**C3:** I still don't understand how the Model property of the view model is currently set and from where?  
– mm8 Jan 27 '17 at 20:15

**C4:** @bb8 The Model property is set by Unity DI as it has the [Dependency] over it. – Pinx0 Jan 27 '17 at 20:22

783. <https://stackoverflow.com/questions/11148913/is-mef-a-service-locator>

**T:** Is MEF a Service locator?

**Q:** I'm trying to design the architecture for a new LOB MVVM project utilising Caliburn Micro and nHibernate and am now at the point of looking into DI and IOC.

A lot of the examples for bootstrapping Caliburn Micro use MEF as the DI\IOC mechanism.

What I'm struggling with is that MEF seems to be reasonably popular but the idea of the Mef [Imports] annotations smells to me like another flavour of a Service Locator?

Am I missing something about MEF whereby almost all the examples I've seen are not using it correctly or have I completely not understood something about how it's used whereby it side steps the whole service locator issues?

**C1:** Ok, so I have just learned about the [ImportingConstructor] attribute that would enable "proper" constructor based DI. But the question still stands, is MEF+[Imports] = Service Locator = Antipattern?  
– Adam Hardy Jun 22 '12 at 1:05

## 2 Answers

**A1:** I suppose if you were to just new up parts that had property imports and try to use them, then you could run into some of the same problems described here: Service Locator is an Anti-Pattern

But in practice you get your parts from the container, and if you use [Import] without the additional allowDefault property, then the part is required and the container will blow up on you if you ask for the part doing the import. It will blow up at runtime, yes, but unlike a run of the mill service-locator, its fairly straightforward to do static analysis of your MEF container using a test framework. I've written about it a couple times here and here.

It hasn't been a problem for me in practice, for a couple of reasons:

I get my parts from the container.

I use composition tests.

I'm writing applications, not framework code.

**C1:** Hey Jim, thanks for your input. I starting to get the feeling that I won't fully grasp MEF as an architectural tool until I jump in and get some coding done. To illustrate my current lack of understanding, your comments above sound to me like: To solve the IOC\Decoupling problem, we used MEF which solved those issues but caused composition problems so complex a whole testing framework needed to be implemented to solve them. – Adam Hardy Jun 22 '12 at 3:16

**C2:** Not really. When getting started, the tests help you learn how everything works. After you know how everything works, its more about catching bone headed mistakes. If it were true that the presence of a test framework implies that a system is too complex, then what does that say about any system which has tests? Anyway, I say go ahead and try it, or try something else. MEF wasn't the first composition framework I tried, but it is my current favorite. – Jim Counts Jun 22 '12 at 4:01

**C3:** All true comments, Thanks Jim. I'll be jumping in soon. – Adam Hardy Jun 22 '12 at 6:11

**A2:** MEF is not a Service Locator, on its own. It can be used to implement a Service Locator (CompositionInitializer in the Silverlight version is effectively a Service Locator built into MEF), but it can also do dependency injection directly.

While the attributes may "smell" to you, they alone don't cause this to be a service locator, as you can use [ImportingConstructor] to inject data at creation time.

Note that the attributes are actually not the only way to use MEF - it can also work via direct registration or convention based registration instead (which is supported in the CodePlex drops and .NET 4.5).

**C1:** Yes, I understand it's not a Service locator by itself (the heading probably doesn't describe my intention properly), it's just that I'm currently trying to get across it and all the examples I'm finding to date mostly use [Import] and [Export] and are pretty simplistic. Substitute the [Import] with Singleton IOC.Resolve() in those examples and that's Service locator in my book. Thanks for the comments Reed, you've given me some more reading to do. – Adam Hardy Jun 22 '12 at 3:08

784. <https://stackoverflow.com/questions/9299813/rx-subjects-are-they-to-be-avoided>

**T:** RX Subjects - are they to be avoided?

**Q:** I've had a mini-discussion on the topic in another thread, and would like to have people's input on the "bad" sides of subjects.

People who frequent the RX forum know that E.Meijer does not like Subjects. While I have a deepest respect to RX creator's opinion, I have been using Subjects quite extensively in multiple projects for a couple of years and haven't had any architectural problem or a bug because of them.

The only "pitfall" with Subjects I can name is that they are not "reusable" - after you have completed an observable on a Subject, you need to re-instantiate it, before new subscribers can receive events from it.

"Code smell" and "Don't like them" need to be supported by "pragmatic" examples - can you bring to our attention possible situations when using a Subject can lead to a bug or a problem? Or maybe you think they are easy and harmless altogether - then try to define an area where they are to be used.

## 4 Answers

**A1:** Erik Meijer is thinking in a purely functional way - Subjects are the mutable variables of Rx. So, in general usage he's right - using Subjects is sometimes a way to cop out of Thinking Functionally, and if you use them too much, you're trying to row upstream.

However! Subject are extremely useful when you're interfacing with the non-Functional world of .NET. Wrapping an event or callback method? Subjects are great for that. Trying to put an Rx "interface" onto some existing code? Use a Subject!

**C1:** Sounds reasonable. Except that I would suggest there are already ways to wrap Events ie Observable.FromEvent(Pattern) which again is more preferable to subjects. – Lee Campbell Feb 16 '12 at 11:16

**C2:** I believe he doesn't just mean simply wrapping the events and async calls, but using data from them. For instance, wrapping the BeginRead/EndRead pair of async calls - EndRead only returns the number of bytes read, to get the actual data you have to access the mutable byte array passed in to BeginRead. – Tyson Feb 25 '12 at 0:15

**C3:** Nice explanation. – axel22 Jun 28 '14 at 16:34

**C4:** I am actually inclined to thinking that putting a Subject upfront as a part of a public API is a terrible idea because you're exposing a vulnerable object that has dual responsibility and thus violates the principle of separation of concerns to a client, who could potentially call any of the OnNext, OnCompleted, OnError lambdas on it. – Water Cooler v2 Jul 17 '16 at 3:17

**C5:** @PaulBetts: I am also curious as to learn what you mean by wrapping an event using a subject? Could you please provide a code snippet? – Water Cooler v2 Jul 17 '16 at 3:18

**A2:** Seems like a lot of commenters are talking past each other.

Last time I used a Subject was when I needed to pass a delegate to a middleware in an initialisation call so it could call me back when something happened. The delegate had the familiar event args signature, but I couldn't use FromEvent because there was no event.

I didn't feel bad about it - I didn't see any other choice.

Basically I used Subjects only when I'm originating some event and putting it into the Rx world, or when I need a handle to some future subscriber that hasn't arrived yet. Subjects let me link what I've got now to a later subscriber.

**C1:** I infer from your comment that the Observable.FromEvent method did not cater to regular delegates at the time. Or may be they still dont and they do mandate that the thing be an event' rather than simply a delegate. I have to check that one out. But could you please post some code to show what you did? I am curious to understand the way you used Subject<T>. – Water Cooler v2 Jul 17 '16 at 3:34

**A3:** I use Subject/Publish whenever reactive combinators are being duplicated due to lazy eval.

However, for casual use I feel Subjects are a bit heavy - OnNext might be potential bottle neck - shows up as a hotspot during profiling, perhaps because of concurrency checks while pushing a value to subscribers.

I feel it's also cleaner for Observables you know are hot by definition.

**A4:** One reason that I would be wary of using a `Subject<T>` as a part of the public API is that it mixes concerns; an observer is a concern distinct from the observable.

What if some miscreant observer calls `OnNext` or `OnCompleted` or `OnError` on the `Subject<T>` where it was only supposed to be an observer?

Even if it isn't a part of the API, and you tuck it away in your server as a private backing field, just the very fact that it has a dual role is disturbing. In the case of using it as a backing field, you are still only expecting it to perform one role / concern -- that of an observable. However, it has the potential to do two things and that's just mentally disturbing.

785. <https://stackoverflow.com/questions/4323561/linq-queries-in-ui-code-do-you-regard-this-as-a-no-no>

**T:** Linq queries in UI code: do you regard this as a no-no? [closed]

**Q:** Ah, I'm getting a warning saying my question 'appears subjective and is likely to be closed'. But I think it's a pertinent and important question about architectural design.

All my programming years I have been told that SQL statements being created and executed directly within UI code (for example an ASP.NET page codebehind) are a massive code smell and that data access and presentation concerns should be at opposite ends of the application's layers.

Nowadays I have a shiny data access layer using NHibernate entities via the Repository pattern. And I'm finding myself writing Linq queries directly in my UI code!

Part of me thinks this is the same as writing SQL queries in UI code, but just dressed up in smarter clothes.

The other part of me says that the Linq queries are the tip of a sophisticated abstraction layer separating the UI code from the internals of the database, and that if I didn't use Linq queries in the page then I would have to add one-off 'report' methods to my Repository like `GetAllFoosWithRedNosesAndSleighBells()`, which I also think of as an anti-pattern.

What do you think? I'll give the answer to whoever makes the strongest argument (in my subjective view, as are all answers on Stack Overflow).

**C1:** It all depends, if it is only a few queries, coding in the UI might be ok, but think of the times you need to have the same functionality outside the UI or on another UI, having a common data layer might be easier to maintain and use. Blah blah blah, all very subjective :) – leppie Dec 1 '10 at 11:00

### 3 Answers

**A1:** Personally i have used LINQ to objects in the UI layer - but all i am doing is simply manipulating a list of objects that have already been delivered to the UI layer via some mechanism.

As for using LINQ to query your NHibernate based data layer - i wouldn't do it at the UI layer, quite simply the UI layer is for presentation. Instead you should use a pattern like MVVM/MVC/MVP/whatever rocks your boat, and put the LINQ query into a component that feeds the UI layer, i.e. put it in the Model if using the MVVM pattern.

**C1:** Thanks for the useful distinction between Linq to the DAL and Linq to Objects in this context. Your point is excellent, but if the Linq query is in your model component, then you need a means to call it from the UI layer - i.e. a method. If the purpose of the page is to create a list based on user criteria, then you will need an ugly method call to the model component with a big list of parameters. Syntactically, Linq is much cleaner. – David Dec 1 '10 at 11:22

**C2:** @David - there are established ways to communicate a user action in the UI to the handler in another place such as the Model. E.g. in a MVVM app we do we "publish" (populate) ICommand objects from the model to the VM, which the View binds to. When the user executes an action (like a button click) then it is actually handled in the model, no ugly method calls required. The model executes a LINQ query, updates the VM, then via the magic of databinding the View also updates. – slugster Dec 1 '10 at 11:33

**C3:** Of course this all becomes a bit harder if you are not using something as nice and seamless as WPF. Keeping a nice pristine UI layer is great to strive for but sometimes compromises are necessary - if you were doing this in plain old ASP.NET then it would be a lot easier to justify having your LINQ queries in the "UI" layer. – slugster Dec 1 '10 at 11:38

**C4:** Thanks. In your MVVM app, how are the user's search criteria communicated to the model? Via some property in the ICommand? – David Dec 1 '10 at 13:38

**C5:** I was writing a response, and realized that it was pretty much the same as slugster's. One of the nice things about pulling your LINQ queries out of the UI and putting them behind non-visual classes is that it makes it easier to write unit tests, and load testing scripts. Here is a link to the article that was my "aha" moment in understanding MVVM (it's using WPF, and their implementation relies on WPF databinding. It won't be as pretty in asp.net, but I think the ideals are sound): [msdn.microsoft.com/en-us/magazine/dd419663.aspx](http://msdn.microsoft.com/en-us/magazine/dd419663.aspx) – JMarsch Dec 1 '10 at 16:22

**C6:** I'm marking this as the answer partly because of the quality of the answer itself, and partly because of the quality of the comments underneath it. – David Mar 2 '11 at 11:26

**A2:** Well, from my personal experience, using linq in aspx codebehind is not something like using SQL in codebehind. Linq is a universal language which as you mentioned, abstracts the data with which you are working. So in reality, you are not working directly with database, but the linq provider does, which is not implemented in your codebehind right? The biggest advantage of Linq is that you can query any type of data in one universal, integrated query language. Not just database but collection of objects, arrays, xml and of course the database too. One of the idea behind abstracting DAL and GUI is that you will have the ability to change database without changing any GUI code and LINQ already accomplish that for us. You can write linq queries in codebehind and you can always switch to another database without breaking your code. So personally I don't think writing linq queries in code behind is a bad practice. You can always write helper classes for query reuse. Of course it's always a better idea to create a business layer between GUI and DAL, but it requires much more work and in many situations is not practical.

P.S. Linq2Sql, EF or any other ORM is technically a DAL

**C1:** With you on the business layer. But in cases like a search page (just querying to get objects based on the user's criteria), I don't think there's a need for a business layer in between. It's a bit of a grey area I think. – David Dec 1 '10 at 11:13

**C2:** You are right, but if you introduce business layer in your project, it's not a good idea to work directly with DAL from GUI. A better approach would be to pass search parameters to BLL and let BLL build and execute the query. But of course, it's an overhead :) – Davita Dec 1 '10 at 11:16

**A3:** LINQ to SQL or EF queries would be best to keep in the repository, IMHO. LINQ to object queries, say like this:

```
var coll = new string[] { "A", "B", "CD", "EF" };
```

```
var item = coll.Where(i => i.Length > 1);
```

Is really equivalent to this:

```
foreach (var item in coll)
```

```
{
```

```
 if (item.Length > 1)
```

```
 //Do something
```

```
}
```

And so I don't think this is essentially a code smell. If anything, it helps with maintainability because it reduces the iterative logic to one line of code and is readable. Additionally, if you prefer not to have LINQ in code, you could move them to another layer by creating extension methods like:

```
public static class StringExtensions
{
 public static string[] GetByLength(this string[] a, int length)
 {
 return a.Where(i => i.Length > length);
 }
}
```

And then these code samples become more reusable, if reusability is an issue. This is good, of course, if you don't think LINQ to object queries are a code smell in the first place :-)

In regards to your latter point where you refer to GetAllFoosWithRedNosesAndSleighBells(), if this method is actually pulling data from the database, adding another method to the repository would be best because it hurts maintainability if part of the database queries are in the data access layer, and another part in the UI, and so on. That can become messy.

HTH.

786. <https://stackoverflow.com/questions/39225088/is-the-singleton-pattern-still-bad-when-we-talk-about-it-in-a-framework-context/39278425#39278425>

**T:** Is the singleton pattern still bad when we talk about it in a framework context?

**Q:** Using the singleton pattern is usually a code smell.

However, it seems that using "singletons" in a framework such as Laravel is a popular solution to a lot of problems.

It's also worth noting that singletons in Laravel aren't really the same thing as a singleton class in the following sense:

The class being used as a singleton is unaware of this, there are no static methods in there, nor is there anything that would prevent you from creating a new instance of that class manually.

When using Laravel singletons, the container keeps track of the objects you want to use as singleton and hands these to you upon request.

Am I correct in my understanding that what is called a singleton in Laravel isn't in fact a singleton, but an implementation inspired by the singleton pattern, and therefore isn't as much as a bad practice as a real singleton because it gets rid of some of the downsides (harder to test, global state...)?

This question is loosely related to this question about design patterns in PHP but it appeared appropriate to me to create a separate question.

## 1 Answer

**A1:** Yes, it is still bad. It is still an anti-pattern.

The fact, that you see many people resorting to this, simply indicate the flaws in any given system. It applies to applications, frameworks and libraries.

And saying that "our singletons are different" is just wrong. And, if you were writing proper unit tests, you would be testing your code in isolation, without having to initialize various parts of a framework.

P.S.

You seem to have wrong opinion of what "code smell" is. Code smell is when you have variables named \$a1, \$bzzz, code smell is when your functions have 8 parameters. Anit-pattern is not a code smell. It is a mistake in architecture.

**C1:** I don't see an issue in testing a class that is bound as a singleton in a DI container in isolation. Your implementations shouldn't care what instance they are receiving. – Jonathan Oct 29 '16 at 11:35

787. <https://stackoverflow.com/questions/23147010/can-i-get-a-php-object-to-run-code-if-a-method-is-not-found/23147051#23147051>

**T:** Can I get a PHP object to run code if a method is not found?

**Q:** I have a master class, DBAPI which contains all the interaction with the database. It's not singleton per se, but is designed to only be instantiated once as \$DBAPI.

When I alter the database, I obviously have to add functions to DBAPI to let the site use the new functionality, however, since there are a lot of different actions that can be taken, instead of including everything in a single massive class file, I've split them out by functionality/permission level as traits, and the DBAPI class file is dynamically created by adding traits flagged based off of permission level (read only, read-write etc.). Since the only time the file needs to be created is when new traits are added, I only create the class file if it doesn't exist for that specific user permission level, otherwise I use the already generated file. (If there's a better way to do this I'm all ears).

The issue I'm running into now is that if I add some functions in a new trait, the previously generated classes are obviously not aware of it, and I don't find out about that until I try to use the function in the code somewhere and it fails. It's pointless to write wrappers around every single function call made to check if it is a function first- is there some way to get the DBAPI class to do some action if code attempts to access a method it can't find?

for example, if code calls some function \$DBAPI->newfunction() \$DBAPI handles the exception itself, running some code that will attempt to update itself, which will cause newfunction() to run if it can be found.

## 1 Answer

**A1:** (N. B. This architecture has a really bad code smell. I'm sure there's a better way to do this.)

PHP classes can implement the `__call` magic method that is used when there is no matching method name.

```
function __call($name, $arguments) {
 // Code to run...
}
```

**C1:** That is exactly what I'm looking for. I don't know what to do about the code architecture though.... – serakfalcon Apr 18 '14 at 3:49

**C2:** @serakfalcon One option for the architecture would be to use multiple classes, each representing access to some type of item in the database or some level of permission. You could follow that all the way up to a full-fledged ORM, but you don't necessarily need that. Possibly more simply, you might create a class with the core database stuff and subclass it for each type of data, then use the subclasses for data access instead of the single monolithic DBAPI class. – Moshe Katz Apr 18 '14 at 3:54

**C3:** OK that's good advice I will have to think about how I could do that. I definitely don't need an ORM for this project, but obviously need something between that and just running the queries directly. – serakfalcon Apr 18 '14 at 3:58

788. <https://stackoverflow.com/questions/36766688/extend-audiocontext-in-typescript>  
**T:** Extend AudioContext in TypeScript

**Q:** I would like to extend (in OOP terms) the built-in AudioContext class in TypeScript:

```
class LiveAudioContext extends AudioContext {
 constructor() {
 super();
 }

 public setPlaybackRate(rate: number) {
 console.log(`Set rate to ${rate}.`);
 }
}
```

This is valid TypeScript, accepted by both the compiler and IntelliSense. At runtime however, I get a TypeError, for which Chrome adds the following error message as well:

```
var liveCtx = new LiveAudioContext();
```

Failed to construct 'AudioContext': Please use the 'new' operator, this DOM object constructor cannot be called as a function.

Fair enough, I know how it would be possible to solve the issue in the compiled Javascript output. However, having to manually fix an error caused by the compiler after each build is just unsuitable for production use.

How could I accomplish this extension correctly, so that it is functional in the compiled output as well, and off-the-shelf?

Edit: of course, creating a wrapper class that effectively redefines every single method and property works, but I find it to be smelling -- more like, stinking, and badly -- from an architectural point of view:

```

class LiveAudioContext {

 private internalContext: AudioContext;

 public createBuffer() {

 return this.internalContext.createBuffer.apply(this.internalContext, arguments);
 }

 public createBufferSource() {

 return this.internalContext.createBufferSource.apply(this.internalContext, arguments);
 }

 ...
}

```

**C1:** Some built-ins are not extensible. I believe the Proxy API is meant to handle this use case, but that relegates you to a more recent browser. – ArcSine Apr 21 '16 at 13:21

## 1 Answer

**A1:** I believe that the following question provides a good solution: How to handle warnings for proprietary/custom properties of built-in objects in TypeScript

Essentially you extend the existing interface, and apply your new methods directly on the browser's objects.

789. <https://stackoverflow.com/questions/13480484/kiss-design-patterns/13480743#13480743>

**T:** KISS & design patterns [closed]

**Q:** I'm presented with a need to rewrite an old legacy desktop application. It is a smallish non-Java desktop program that still supports the daily tasks of several internal user communities.

The language in which the application is both antiquated and no longer supported. I'm a junior developer, and I need to rewrite it. In order to avoid the app rewrite sinkhole, I'm planning on starting out using the existing database & data structures (there are some significant limitations, but as painful

as refactoring will be, this approach will get the initial work done more quickly, and avoid a migration, both of which are key to success).

My challenge is that I'm very conflicted about the concept of Keep It Simple. I understand that it is talking about functionality, not design. But as I look to writing this app, it seems like a tremendous amount of time could be spent chasing down design patterns (I'm really struggling with dependency injection in particular) when sticking with good (but non-"Group of Four") design could get the job done dramatically faster and simpler.

This app will grow and live for a long time, but it will never become a 4 million line enterprise behemoth, and its objects aren't going to be used by another app (yes, I know, but what if....YAGNI!).

### The question

Does KISS ever apply to architecture & design? Can the "refactor it later" rule be extended so far as to say, for example, "we'll come back around to dependency injection later" or is the project dooming itself if it doesn't bake in all the so-called critical framework support right away?

I want to do it "right"....but it also has to get done. If I make it too complex to finish, it'll be a failure regardless of design.

## 2 Answers

**A1:** I'd say KISS certainly applies to architecture and design.

Over-architecture is a common problem in my experience, and there's a code smell that relates:

### Contrived complexity

forced usage of overly complicated design patterns where simpler design would suffice.

If the use of a more advanced design pattern, paradigm, or architecture isn't appropriate for the scale of your project, don't force it.

You have to weigh the potential costs for the architecture against the potential savings... but also consider what the additional time savings will be for implementing it sooner rather than later.

**C1:** Thank you. I want to be careful not to be lazy and just find reasons not to learn a pattern and the supporting frameworks...but on the other hand, the reality is that there are only 24 hours in the day, and just getting something working. – user1549195 Nov 20 '12 at 21:27

**A2:** yes, KISS, but see <http://www.amazon.com/Refactoring-Patterns-Joshua-Kerievsky/dp/0321213351> and consider refactoring towards a design pattern in small steps. the code should sort of tell you what to do.

**C1:** Wow, if there's a way to get the work done quickly but ALSO not burn my bridges, that would be just about perfect. Thanks for pointing me to what looks to be a great book that I didn't previously have on my radar. – user1549195 Nov 20 '12 at 22:06

790. <https://stackoverflow.com/questions/941104/how-to-make-a-property-protected-and-internal-in-c/941147#941147>

**T:** How to make a property protected AND internal in C#?

**Q:** Here is my shortened abstract class:

```
abstract class Report {
```

```
 protected internal abstract string[] Headers { get; protected set; }
}
```

Here is a derived class:

```
class OnlineStatusReport : Report {
```

```
 static string[] headers = new string[] {
 "Time",
 "Message"
 }
```

```
protected internal override string[] Headers {
 get { return headers; }
 protected set { headers = value; }
}
```

```
internal OnlineStatusReport() {
 Headers = headers;
}
}
```

The idea is, I want to be able to call Report.Headers from anywhere in the assembly, but only allow it to be set by derived classes. I tried making Headers just internal, but protected does not count as more restrictive than internal. Is there a way to make Headers internal and its set accessor protected AND internal?

I feel like I'm grossly misusing access modifiers, so any design help would be greatly appreciate.

**C1:** Code compiles fine for me. – Noldorin Jun 2 '09 at 18:27

**C2:** @Noldorin: protected internal is protected OR internal. – Mehrdad Afshari Jun 2 '09 at 18:28

**C3:** @Mehrdad: Yes, I knew that. What's the point? – Noldorin Jun 2 '09 at 18:30

**C4:** @Noldorin: The point is, apparently, compiling fine is not what the OP wants... – Mehrdad Afshari Jun 2 '09 at 18:31

**C5:** "The idea is, I want to be able to be able to call Report.Headers from anywhere in the assembly, but only allow it to be set by derived classes." - Is that not the case with the posted code? Maybe I'm misunderstanding it, after all. – Noldorin Jun 2 '09 at 18:33

**C6:** @Noldorin: He means (as I understand) he wants to be able to access the member only if both conditions are true: The class is a derived class AND it's in the same assembly. That is, it's not accessible by non-derived classes in the same assembly. protected internal doesn't achieve it. – Mehrdad Afshari Jun 2 '09 at 18:35

**C7:** @Mehrdad: Ok, so you could be right, though I've read and read the full post and think it's far from clear. If that is indeed what he wants, I would recommend against it purely from the design point of view - does he really need to do that? – Noldorin Jun 2 '09 at 18:38

**C8:** @Noldorin: I think not, but I can't really be 100% sure. There are really cases where protected AND internal makes sense. Anyhow, I think (with the current design, at least), the posted code fails to achieve what the OP asks for. – Mehrdad Afshari Jun 2 '09 at 18:41

**C9:** The code works, I'm just unhappy about having to use "protected internal". The only reason Headers can't be accessed outside the assembly by derived classes is simply because Report is internal.  
– Sam Pearson Jun 2 '09 at 18:43

**C10:** Wow! The authority is here! – Mehrdad Afshari Jun 2 '09 at 18:48

**C11:** It just seems like it would be better to have Headers be internal, while its set accessor could be 'proternal.' Then the access of Headers could be more easily and directly seen than having to glance at the access level of the abstract class. Err, I feel like I'm just whining now. Thanks everyone for your help and comments, and thanks for the article link Eric. – Sam Pearson Jun 2 '09 at 18:53

## 7 Answers

**A1:** What's wrong with making the getter public? If you declare the property as

```
public string[] Headers { get; protected set; }
```

it meets all of the criteria you want: all members of the assembly can get the property, and only derived classes can set it. Sure, classes outside the assembly can get the property too. So?

If you genuinely need to expose the property within your assembly but not publicly, another way to do it is to create a different property:

```
protected string[] Headers { get; set; }
internal string[] I_Headers { get { return Headers; } }
```

Sure, it's ugly decorating the name with that I\\_ prefix. But it's kind of a weird design. Doing some kind of name mangling on the internal property is a way of reminding yourself (or other developers) that the property they're using is unorthodox. Also, if you later decide that mixing accessibility like this is not really the right solution to your problem, you'll know which properties to fix.

**C1:** It works only if the type of protected property is public, like string[]. If the type of protected property is itself internal - the compilation fails with message Inconsistent accessibility: property type 'Library.A' is less accessible than property 'Library.OnlineStatusReport.Headers' – DarkWalker Nov 29 '13 at 10:36

**A2:** It's not possible in C#.

Just for the sake of completeness, this is supported in IL (family and assembly access modifier).

**C1:** Are there any post-build-event tools that allow modifying IL code after compilation to get the desired result? – DarkWalker Nov 29 '13 at 10:35

**A3:** You could use an internal explicit implemented Interface:

```
internal interface IReport
```

```
{
```

```
 string[] Headers { get; }
```

```
}
```

```
abstract class Report : IReport
```

```
{
```

```
 protected abstract string[] Headers { get; protected set; }
```

```
 string[] IReport.Headers
```

```
{
```

```
 get { return Headers; }
```

```
}
```

```
}
```

```
class OnlineStatusReport : Report
```

```
{
```

```
 static string[] headers = new string[] { "Time", "Message" };
```

```
 protected internal override string[] Headers
```

```
{
```

```
 get { return headers; }
```

```
 protected set { headers = value; }
```

```
}
```

```
internal OnlineStatusReport()
{
 Headers = headers;
}
}
```

Now you get internal access in the assembly where IReport is defined, which should be exactly what you want.

Implementing interfaces explicitly isn't a well known strategy, but it solves a lot of problems.

**A4:** I would keep the access modifier as protected and have an internal helper method.

```
protected override string[] Headers {
 get { return headers; } // Note that get is protected
 set { headers = value; }
}
```

```
internal SetHeadersInternal(string[] newHeaders)
{
 headers = newHeaders;
}
```

But somehow, this smells like it should be refactored somehow. Internal is always something I'd use sparingly because it can lead to a very messy architecture where everything is somehow using everything else within the assembly, but of course there's always exceptions.

**A5:** The CLR supports the concept of protected AND internal (known as family-and-assembly accessibility) and C# SHOULD implement/expose this concept. C# should probably allow the following:

```
internal string[] Header { get; protected set; }
```

Doing so should INTERSECT/AND both visibility modifiers for the property setter and allow you to read Headers from anywhere within the same assembly but only set it from derived classes within the same assembly.

**C1:** The CLR supports the concept of protected AND internal (known as family-and-assembly accessibility) and my answer above suggests that C# SHOULD implement/expose this concept and interpret the proposed syntax as such. Notice I put the internal modifier on the property and the protected modifier on the setter (not the same as putting both "protected internal" on the setter). Thanks for commenting, I have edited my answer to emphasize this idea and avoid future confusions.  
– Jorge Garcia Oct 11 '13 at 15:40

**C2:** It should support in some way... but I am sure not like it is here... try to suggest internal AND protected constructor? constructor which should be accessed only from library (assembly) and should not be accessed from any derived type in other libraries. Maybe we can differ "protected internal" and "internal protected" modifiers. So 2nd one means that it is "internal" first and only then "protected". And original means available in any derived class ("protected") and as well everywhere internally (as it is now). – Maxim Feb 15 '16 at 2:25

**A6:** It's a common belief that you cannot make some members both protected AND internal.

And it's true that you cannot do so in a single line, as many, including myself, would wish, but with some cleverness it is 100% do-able.

```
//Code below is 100% tested
```

```
/* FROM ProtectedAndInternal.dll */
```

```
namespace ProtectedAndInternal
```

```
{
```

```
 public class MyServiceImplementationBase
```

```
{
```

```
 protected static class RelevantStrings
```

```
{
```

```
 internal static string AppName = "Kickin' Code";
```

```
 internal static string AppAuthor = "Scott Youngblut";
```

```

 }

 }

public class MyServiceImplementation : MyServiceImplementationBase
{
 public void PrintProperties()
 {
 // WORKS PERFECTLY BECAUSE SAME ASSEMBLY!
 Console.WriteLine(RelevantStrings.AppAuthor);
 }
}

```

```

public class NotMyServiceImplementation
{
 public void PrintProperties()
 {
 // FAILS - NOT THE CORRECT INHERITANCE CHAIN
 // Error CS0122: 'ProtectedAndInternal.MyServiceImplementationBase.Relevant' is
 // inaccessible due to its protection level
 // Console.WriteLine(MyServiceImplementationBase.RelevantStrings.AppAuthor);
 }
}

```

**C1:** The inner class doesn't have to be static to be used for protected internal. I used your idea, but in the parent class, I had instances of the inner class that I used to access my "protected internal" members. – Thick\_propheT Jun 30 '14 at 16:49

**A7:** Since C# 7.2 there is construct private protected (link). It does not allow reading from the field (thus does not do exactly what the OP intends), but worth taking a look.

**C1:** It could indeed allow reading if used in combination with internal: internal override string[]  
Headers { get { return headers; } private protected set { headers = value; } } would be internal-only  
read and internal-and-protected-only write. Other combinations would be possible too. – Jon Hanna  
Nov 27 '17 at 15:47

791. <https://stackoverflow.com/questions/7498540/osgi-java-modularity-and-jigsaw/7499297#7499297>

**T:** OSGi, Java Modularity and Jigsaw

**Q:** So as of yesterday morning I hadn't a clue as to what OSGi even was. OSGi was just some buzzword that I kept seeing cropping up over and over again, and so I finally set aside some time to brush up on it.

It actually seems like pretty cool stuff, so I'd like to start off by stating (for the record) that I'm not anti-OSGi in any respect, nor is this is some "OSGi-bashing" question.

At the end of the day, it seems that OSGi has - essentially - addressed JSR 277 on Java Modularity, which recognized that there are shortcomings with the JAR file specification that can lead to namespace resolution and classloading issues in certain corner cases. OSGi also does a lot of other really cool stuff, but from what I can ascertain, that's its biggest draw (or one of them).

To me - as a fairly new (a few years now) Java EE developer, it is absolutely mind-boggling that we are in the year 2011 and currently living in the era of Java 7, and that these classloading issues are still present; particularly in enterprise environments where one app server could have hundreds of JARs on it, with many of them depending on different versions of one another and all running (more or less) concurrently.

My question:

As interested as I am in OSGi, and as much as I want to start learning about it to see where/if it could be of use to my projects, I just don't have the time to sit down and learn something that large, at least now.

So what are non-OSGi developers to do when these problems arise? What Java (Oracle/Sun/JCP) solutions currently exist, if any? Why was Jigsaw cut from J7? How sure is the community that Jigsaw will get implemented next year in J8? Is it possible to get Jigsaw for your project even though its not a part of the Java platform yet?

I guess what I'm asking here is a combination of panic, intrigue and a facepalm. Now that I finally understand what OSGi is, I just don't "get" how something like Jigsaw has taken 20+ years to come to fruition, and then how that could have been canned from a release. It just seems fundamental.

And, as a developer, I am also curious as to what my solutions are, sans OSGi.

Also, Note: I know this isn't a "pure programming"-type question, but before some of you get your noses bent out of shape, I wanted to state (again, for the record) that I deliberately put this question on SO. That's because I have nothing but the utmost respect for my fellow SOers and I'm looking for an architectural-level answer from some of the "Gods of IT" that I see lurking around here every day.

But, for those of you who absolutely insist that a SO question be backed with some code segment:

```
int x = 9;
```

(Thanks to anybody who can weigh-in on this OSGi/Jigsaw/classloader/namespace/JAR hell stuff!)

**C1:** Well, Java 9 is here as of yesterday, with Jigsaw. Nice to read: The Top 10 Jigsaw and Java 9 Misconceptions Debunked – David Tonhofer Sep 23 '17 at 15:42

### 3 Answers

**A1:** First understand that Jigsaw's primary use case is to modularise the JRE itself. As a secondary goal it will offer a module system that may be used by other Java libraries and applications.

My position is that something like Jigsaw is probably necessary for the JRE only, but that it will create far more problems than it claims to solve if used by other Java libraries or apps.

The JRE is a very difficult and special case. It is over 12 years old and is a frightful mess, riddled with dependency cycles and nonsensical dependencies. At the same time it is used by approximately 9 million developers and probably billions of running systems. Therefore you absolutely cannot refactor the JRE if that refactoring creates breaking changes.

OSGi is a module system that helps you (or even forces you to) create software that is modular. You cannot simply sprinkle modularity on top of an existing non-modular codebase. Making a non-

modular codebase into a modular one inevitably requires some refactoring: moving classes into the correct package, replacing direct instantiation with the use of decoupled services, and so on.

This makes it hard to apply OSGi directly to the JRE codebase, yet we still have a requirement to split the JRE into separate pieces or "modules" so that cut-down versions of the JRE can be delivered.

I therefore regard Jigsaw as a kind of "extreme measure" to keep the JRE code alive while splitting it up. It does not help code to become more modular, and I'm convinced that it will actually increase the maintenance required to evolve any library or application that uses it.

Finally: OSGi exists whereas Jigsaw does not exist yet and may never exist. The OSGi community has 12 years of experience in developing modular applications. If you are seriously interested in developing modular applications, OSGi is the only game in town.

**C1:** Is this you, too? slideshare.net/mfrancis/... almost the same contents. – Jin Kwon Feb 26 '13 at 12:21

**C2:** There is also JBoss Modules: docs.jboss.org/author/display/MODULES/Introduction It is also used by Ceylon (ceylonlang.org). See this thread on the Ceylon user forum: groups.google.com/forum/?hl=de#!topic/ceylon-users/RmDskLDNkug – OlliP Oct 24 '13 at 16:00

**C3:** Does the final statement: "If you are seriously interested in developing modular applications, OSGi is the only game in town" still hold? – Adam Arold Jul 24 '15 at 10:54

**C4:** @AdamArold I believe so. Jigsaw still doesn't exist in any released version of Java. JSR 376 (Java Platform Module System) is still forming its expert group and hasn't even started on a first draft yet. Java 9 is not due for more than a year, and even when released is not guaranteed to have modularity (it slipped from Java 7, then from Java 8, and could easily slip again). Finally, the published requirements for JSR376 state that OSGi interop is required... so adopting OSGi remains a safe choice, and today the only practical choice. – Neil Bartlett Jul 26 '15 at 21:26

**C5:** I see. For me it seems like that microservice architectures are taking over bypassing the need for module systems. Combined with tools like Eureka it seems to work. – Adam Arold Jul 27 '15 at 1:56

**C6:** @AdamArold Okay that's a bit of a different question! You could say that OSGi is a microservices architecture, but I know what you're saying. For me, the idea of modelling every service as a process is a much more complex problem, in terms of management and security and comms overhead. OSGi is simpler and faster. Having said that, it's very easy to use OSGi Remote Services to transition services in and out of the process barrier, so I believe it's a good choice for an implementation technology for microservices. – Neil Bartlett Jul 27 '15 at 6:43

**C7:** I haven't tried it yet. Do you have any pointers in that topic? (OSGi Remote Services) – Adam Arold Jul 27 '15 at 8:27

**A2:** It's simple, if you want to do real component-based development in Java today then OSGi is the only game in town.

In my opinion, Jigsaw is a combination of a compromise of what's doable in the JDK and previous bad relationship between SUN and the OSGi guys. Maybe it will ship with Java 8, but we have to wait and see.

OSGi is no panacea if you are working in a typical enterprise setting and you will need to become familiar with how class loading works as a number of well-known libraries (looking at you, Hibernate) made assumptions about class visibility that are no longer valid inside OSGi.

I like OSGi, but I wouldn't try and retrofit it to an existing system. I'd also weigh the pros and cons in terms of greenfield development - I would recommend looking at the Apache or Eclipse products that simplify life for OSGi and not doing it all yourself.

If you're not doing OSGi, then you're out of luck if you've come up with a system that has dependencies on different versions of the same library - all you can do is try and avoid the problem, though needing multiple versions of a library seems like a architecture 'smell' to me.

**C1:** Yeah I figured there was a lot of 'bad blood' between Sun and the OSGi Alliance. I can't imagine Oracle is going to let things slide out of their control, though. You're really telling me that there are no plans to truly remedy (not hack) this JAR hell stuff anytime soon? That blows my mind! – IAmYourFaja Sep 21 '11 at 11:59

**C2:** @Mara It's not really fair to say there is bad blood. After all, Sun was one of the co-creators of OSGi around 12 years ago (JSR 8). Sun also rejoined the OSGi Alliance as a full member, about a year before the Oracle acquisition. They also developed quite a lot of software on top of OSGi, pre-Oracle. The most obvious example being Glassfish. However it is fair to say that there is friction between certain individuals at Sun/Oracle and OSGi. – Neil Bartlett Sep 21 '11 at 20:39

**A3:** I love your use of the phrase "corner cases" to describe the current situation.

there are shortcomings with the JAR file specification that can lead to namespace resolution and classloading issues in certain corner cases

Anyhow, since many years I've been interested in tools and techniques that supports the creation of and, even better, enforce, code that is cleaner, more decoupled, more coherent and more maintainable than what probably would have been the result without them. Test Driven Design and Junit was such a combination.

After having spent a couple of months moving a substantial part of our code base to OSGi, I would say that OSGi is an even better tool in this regard. And that is really a sufficient reason to move to OSGi. In the long run it will save you a lot of money.

And, as a bonus, it'll give you a chance to do a lot of cool stuff. Imagine, during a demo, seamlessly upgrading the authentication module, without traffic loss, to support OAuth ... it's suddenly a joy again to create stuff!

792. <https://stackoverflow.com/questions/34138823/is-there-an-access-modifier-that-limits-to-a-solution/34138970#34138970>

**T:** Is there an access modifier that limits to a solution?

**Q:** In my .NET solution, I have two projects: one main project and a project for running tests against the main project. In my project, I have several methods that I'd like to keep "private", but would also like to run tests for. Is there an access method that could limit these functions to just inside of my solution?

**C1:** One could argue that you should only test your public API, but you could use internal and InternalsVisibleTo to allow the test project to see them. – juharr Dec 7 '15 at 16:52

#### 4 Answers

**A1:** You are looking for the InternalsVisibleTo attribute.

This attribute lets you specify other assemblies that should have access to types and methods that are internal to your assembly. So, in your main project AssemblyInfo.cs file (or any other source file), you can specify that your test project is a 'friend assembly' and should have access to the internals of your main project:

```
[assembly:InternalsVisibleTo("MainProject.Tests")]
```

On a side note, as pointed out by Alexei, if your MainProject is signed with a strong name key, any 'friend' assembly must also be signed. This is explained here

Although, as mentioned in another comment. Best practice is to test your assembly by using its public API.

**C1:** Side note: InternalsVisibleTo approach does not work for many people due to strong signing requirements. – Alexei Levenkov Dec 7 '15 at 17:05

**A2:** You can use `InternalsVisibleTo` attribute to make internal types and methods visible to selected assemblies.

However, you should try to design your API so that it can be tested using only the public interface.

**A3:** You should seriously think back about the architecture of your solution. This is a smell that often shows that your class does too much things at once.

A simple fix is to extract this responsibility (those private methods) to another class where they then become public and are testable out of the box...

**A4:** No, there is no way to limit access to "just solution".

The reason is solution is simply group of projects. One project can be in any number of solutions. So even if you "limit" access to projects included in one solution you/someone else can create another solution that somehow will need to magically get access to methods.

Additionally built assembly does not include any information on what solution it was part of - so there is no information at run time to check access.

To your particular problem - `InternalsVisibleTo` (as shown in other answers) will give access to internal methods to projects you allow (requires strongly signed assemblies) or refactor your code to avoid need for testing private methods.

793. <https://stackoverflow.com/questions/13739056/how-does-spring-3-autowire-beans-which-use-each-other/13739655#13739655>

**T:** How does Spring 3+ autowire beans, which use each other?

**Q:** For example, I have

```
@Service
```

```
public class UserSerice {
```

```
 @Autowired
```

```
private HouseService houseService;
}
```

and

```
@Service
public class HouseService {
 @Autowired
 private UserSerice userService;
}
```

How will Spring autowire this? And is this a good practice to configure beans this way?

### 3 Answers

**A1:** Since it's not a constructor injection, spring can safely instantiate both objects and then satisfy their dependencies. Architecture-wise such case is so called 'code smell'. It's the sign that something is wrong in the composition. Maybe you need to move logic, maybe you need to introduce third class, it depends.

**C1:** Thanks! Since what version of Spring `@Autowired` is not a constructor injection? – omickron Dec 6 '12 at 11:30

**C2:** @omickron from the very beginning :) When Autowired is applied to a field or accessor method, it's setter injection and performed after instantiation. When constructor is marked as Autowired then it's constructor injection. As for me, I prefer picocontainer way, when constructor autowiring is done by type automatically indeed, without any annotations, though it's less common in spring world – xeye Dec 6 '12 at 13:08

**C3:** thanks! I've understood. – omickron Dec 6 '12 at 16:21

**A2:** Circular dependencies (spring-framework-reference):

For example: Class A requires an instance of class B through constructor injection, and class B requires an instance of class A through constructor injection...throws a `BeanCurrentlyInCreationException`.

it is not recommended... One possible solution is to edit the source code of some classes to be configured by setters rather than constructors...

PLUS:

I debugged the circular dependencies in setter way. The sequence seems that:

-> Start to create bean A

-> Start to create bean B

-> Inject A to B, although A is not created fully from perspective of Spring lifecycle

-> Bean B creation finish

-> Inject bean B to A

-> Bean A created

**C1:** hmm.. But I don't use constructor injection, if I'm not mistaken. I use `@Autowired` annotation – omickron Dec 6 '12 at 11:23

**C2:** @omickron I added the bean creation sequence. – 卢声远 Shengyuan Lu Dec 6 '12 at 13:19

**C3:** So, there is no `BeanCurrentlyInCreationException` in that way, is it? – omickron Dec 6 '12 at 16:23

**C4:** No, it's setter, not constructor. – 卢声远 Shengyuan Lu Dec 7 '12 at 1:57

**A3:** Google for these terms

Flyweight pattern

Circular dependency in java

Just like 2 java objects can refer each other , it is perfectly valid to have such configuration.

794. <https://stackoverflow.com/questions/752123/what-is-the-best-way-to-query-data-from-multiple-tables-and-databases/752148#752148>

**T:** What is the best way to query data from multiple tables and databases?

**Q:** I have 5 databases which represent different regions of the country. In each database, there are a few hundred tables, each with 10,000-2,000,000 transaction records. Each table is a representation of a customer in the respective region. Each of these tables has the same schema.

I want to query all tables as if they were one table. The only way I can think of doing it is creating a view that unions all tables, and then just running my queries against that. However, the customer tables will change all the time (as we gain and lose customers), so I'd have to change the query for my view to include new tables (or remove ones that are no longer used).

Is there a better way?

## EDIT

In response to the comments, (I also posted this as a response to an answer):

In most cases, I won't be removing any tables, they will remain for historic purposes. As I posted in comment to one response, the idea was to reduce the time it takes a smaller customers (one with only 10,000 records) to query their own history. There are about 1000 customers with an average of 1,000,000 rows (and growing) a piece. If I were to add all records to one table, I'd have nearly a billion records in that table. I also thought I was planning for the future, in that when we get say 5000 customers, we don't have one giant table holding all transaction records (this may be an error in my thinking). So then, is it better not to divide the records as I have done? Should I mash it all into one table? Will indexing on customer Id's prevent delays in querying data for smaller customers?

**C1:** sounds as though you're creating tables based on what customers you gain, if this is the case, then you do not have a sound database design. – Nathan Koop Apr 15 '09 at 15:06

I bet you have all sorts of crazy dynamic queries. I would recommend one customer table that defines an ID, region, name etc. and then a transaction table that uses that customer ID and all the data. you can then write queries with WHERE CustomerID=@x and .... this is a much better design – KM. Apr 15 '09 at 15:20

## 5 Answers

**A1:** I think your design may be broken. Why not use one single table with a region and a customer column?

If I were you, I would consider refactoring to one single table, and if necessary (for reverse compatibility for example), I would use views to provide the same info as in the previous tables.

Edit to answer OP comments to this post :

One table with 10 000 000 000 rows in it will do just fine, provided you use proper indexing. Database servers are built to cope with this kind of volume.

Performance is definitely not a valid reason to split one such table into thousands of smaller ones !

**C1:** The idea was that when customers query their own history (say one with only 10,000 records), they don't take the pain of querying 1,000,000,000 rows. If I were to add all records to one table, it would approach 1,000,000,000 records, that just seems unmanageable. – scottm Apr 15 '09 at 15:10

**C2:** no it's not. With proper indexing, this should work just fine. And if the clients needs direct access to the database (but not to the other clients data of course), you can handle that with views. – Brann Apr 15 '09 at 15:11

**C3:** +1 This system is broken. Don't write another line of code until you scrap this heap and have a "Come to Jesus" with your manager on why this sucks. Me? I'd pack up my desk and leave immediately. – Chris Ballance Apr 15 '09 at 15:11

**C4:** easy test to see if the design is good: do you change data or schema when a customer is added/deleted. if you change the schema then it is bad, if you change data then it is good. +1 – KM. Apr 15 '09 at 15:17

**C5:** @mike, the schema is always the same. Currently, a new table (with the same schema as the others) is added when a new customer is added. The new customers transactions go into the new table. The other tables stay the same. – scottm Apr 15 '09 at 15:22

**C6:** @scotty: adding a new table = modifying the database schema – Brann Apr 15 '09 at 15:23

**C7:** @Brann, understood. Thanks – scottm Apr 15 '09 at 15:24

Is there going to be any effect when 1000's of customers are querying the same giant table, or SQL just that good? I understand, now, that the indexes will prevent single queries (for smaller customer) from running slower. – scottm Apr 15 '09 at 15:28

**C8:** Indeed, SQL is really that good. In one of my jobs, we had 1000s of customers, all using the same set of giant tables (using some variation on "WHERE client\_id=?"). With proper indexing, this is much faster (not to mention ease-of-use and ease-of-maintenance) than UNIONing per-client tables. – Piskvor Apr 15 '09 at 15:48

**C9:** +1. Using views to simulate the existing tables while you migrate the rest of your code across is a good idea. – j\_random\_hacker Apr 15 '09 at 15:49

**C10:** @scotty: As a rough guide, "SELECT \* WHERE some\_indexed\_field = 'blah'" takes logarithmic time -- if it takes 1ms to find the row(s) in a table with 1000 rows, it will take around 2ms for 2000 rows, 3ms for 4000, ..., ~20ms to find them in a table with 1 billion rows. – j\_random\_hacker Apr 15 '09 at 15:57

**A2:** Agree with Brann,

That's an insane DB Schema Design. Why didn't you go with (or is an option to change to) a single normalised structure with columns to filter by region and whatever condition separates each table within a region database.

In that structure you're stuck with some horribly large (~500 tables) unioned view that you would have to dynamically regenerate as regularly as new tables appear in the system.

**C1:** There definitely is that option. This is still all in the planning phases, customers can't actually query the data yet. – scottm Apr 15 '09 at 15:26

**A3:** The architecture of this system smells like it needs a vastly different approach if there are a few hundred tables and each has the same schema

Why are you adding or removing tables at all? This should not be happening under any normal circumstances.

**A4:** 2 solutions 1. write a stored procedure who build the view for you by parsing all table names in the 5 databases and build the view with union as you would do it by hand.

create a new database with one table and import each night per example all the records of all the tables in this one.

**A5:** Sounds like your stuck somewhere between a multi and single tenant database schema. Specifically your storing it as "light"multi-tenant (separate tables vs separate databases) but querying it as single-tenant, one query to rule them all.

In the short term have your data access layer dynamically pick the table to query and not union everything together for one uber query.

In the long term pick one approach and stick too it. One database and one table or many databases.

Here are some posts on the subject.

What are the advantages of using a single database for EACH client?

<http://msdn.microsoft.com/en-us/library/aa479086.aspx>

**C1:** Thanks for the comment, I'll check it out. At this point, I think I'm going to switch to a single table. I just couldn't wrap my head around the idea of querying billions of records. – scottm Apr 15 '09 at 15:35

**C2:** Billions of records can be a problem as well, you just have to pick you poison. good luck :) – jason saldo Apr 15 '09 at 16:05

795. <https://stackoverflow.com/questions/6917470/company-architecture-has-us-defining-same-enum-in-three-places/6917582#6917582>

**T:** Company architecture has us defining same Enum in three places?

**Q:** Our company architecture is touted as being loosely coupled and providing great separation of concerns. But, I'm wondering if we're "doing it right".

For example, let's say we have a Car object in our business / client layer. This Car has a "CarEnum" on it. When we are ready to save the Car to our database, we will map the Car to a CarDTO, which also has a CarEnum with the exact same options that are in the business layer Enum. When our DTO gets to the server code (in another solution), the DTO is mapped to yet another model with yet another CarEnum with the exact same definition as the business and DTO Enum.

This feels wrong.

I didn't expect "good architecture" to involve defining the same Enum in three places. I thought code was supposed to be DRY. Is this good architecture or is this just forcing weird cargo cult programming on the entire company? What is a better alternative architecture?

**C1:** Are you passing the CarEnum to the DTO? – user195488 Aug 2 '11 at 19:29

**C2:** Well, not exactly. The CarEnum is being mapped to a CarDTOEnum with the same definition as CarEnum. – TaylorOtwell Aug 2 '11 at 19:29

**C3:** hmm, seems like you could benefit from a global Enum definition – user195488 Aug 2 '11 at 19:30

### 3 Answers

**A1:** Having the "same" enum defined in 3 places is definitely an architecture\design smell.

It's common to have an assembly for "shared types". This typically contains things like: interfaces, DTOs, Exceptions and enums that make sense across layers. It importantly contains no behavior\logic as such. This assembly can then be shared by your different layers without fear of coupling.

**A2:** That is not loose coupling -- rather, all the places where CarEnum are defined are tightly coupled. If someone doesn't believe this, just ask them what would happen if you went and added a new option between existing ones in one of the files and didn't touch the other ones. That is the definition of loosely coupled code -- you can change details in one place without it affecting other places.

Whenever you duplicate definitions like this, it should be refactored and extracted into it's own file. Now all those 3 places are tightly coupled with the new file, but not with each other.

**A3:** If there is separation required between the layers (i.e. physical boundary) then this is a good thing. If there isn't, it's the architecture astronauts at it again.

**C1:** What do you mean by "physical boundary"? – TaylorOtwell Aug 2 '11 at 20:03

**C2:** Anything where the objects pass over either a process boundary or over a network boundary.

Example network boundary: publishing your business tier via services to your web ui. Example process boundary: between IIS applications/worker processes. – Deleted Aug 2 '11 at 20:05

796. <https://stackoverflow.com/questions/7768994/what-are-some-open-source-tools-to-check-a-software-architectures-robustness/7773557#>

**T:** What are some open source tools to check a software architecture's robustness?

**Q:** I think it is a tough question but I want to verify the architecture of my software is robust enough.

I've plans to execute these tools on my code:

Gendarme

FxCop

StyleCop

Visual Studio's code metrics

Visual Studio's code analysis

But I want some tools to check (among others):

the relations between assembly's' dependencies

too strong coupling between my objects

and so forth.

In a word, I want open source tools to highlight any architectural glitches of my project.

I understand the best tool is an experienced architect, but even the best carpenter needs a good hammer ;)

**C1:** Did you run Code Analysis and Code Metrics on your code through Visual Studio? – qJake Oct 14 '11 at 14:19

**C2:** Yes, but I forgot to put it in the list. I edit my post – JiBéDoublev Oct 14 '11 at 14:22

**C3:** Not free or open source, but did you look at nDepend? – Oded Oct 14 '11 at 14:23

**C4:** I think one problem is that there is no definition for 'robust' there is only something that might be appropriate for what you're trying to do. For example, software cannot know how important extensibility is to you (it might not be). Or how important it is to have low latency, or an audit trail. You can of course check against rules like "do not have more than 4 parameters to a method" but that doesn't test robustness, just compliance with rules of thumb. – George Mauer Oct 14 '11 at 14:31

### 3 Answers

**A1:** The built-in Visual Studio tools are good, if you have the advanced editions.

You can also look at nDepend, which is a tool to do static analysis and point out areas of your system that have a high number of dependencies or coupling, among many other features. nDepend is a commercial product, but has a free academic license and is free to use if you are working on open-source development -- so this may or may not meet your criteria.

Be aware that all of these tools have a learning curve, and you are probably not going to have a "silver bullet" that tells you exactly what to change on your system, but they can be really useful to improve performance and maintainability, and reduce risk.

**C1:** Absolutely, nDepend is excellent – George Mauer Oct 14 '11 at 14:28

**C2:** -1... none of the tools so far - including nDepend - deliver an architectural check as the OP asks for. – TomTom Oct 14 '11 at 14:31

**C3:** I think it depends on how you define "check" -- nDepend absolutely does provide detailed visual reports of the exact issues the poster mentioned, namely dependencies and tight coupling. – Guy Starbuck Oct 14 '11 at

**A2:** I think you are asking a bit too much from the tools. Software architecture is a lot like the architecture of buildings, there is no right way to do it (there can be wrong ways) and to ask a tool to measure this is close to impossible.

There are a huge number of tools that can measure smaller aspects (comments, naming conventions, performance, etc) but you will not find a tool that can tell you whether you have architected the solution correctly.

**C1:** +1. Sorry, there is no artificial intelligence - the moment you get into architecture reviews you need a brain and experience and the requirements to see whether your architecture is sensible. This is not toolable. – TomTom Oct 14 '11 at 14:30

**C2:** I'm not looking for the Holy Grail of architecture's maker/corrector but tools that tell me there's bad smell at some place. The final architectural decision will be mine ;) – JiBéDoublevé Oct 14 '11 at 14:31

**A3:** The tools you've enumerated so far are static code analysis tools that can help visualize some of the emergent architectural patterns, but won't be able to do much more than that. They are wonderful for helping reduce developer error, prove program correctness (to a degree), and tease out bad smells and good practices.

Yet, there are many dimensions to architecture that these won't measure. Scalability, performance, deployment footprint, uptime, runtime characteristics, etc.

Many of these tools simply don't know anything about the business context either. That's more of a measure of success.

[defined-in-other-class/31724489#31724489](#)

**T:** TypeScript How to access object defined in other class

**Q:** I have a project that uses Aurelia framework. I want to make global\static object that should be accessed across couple files. But when I try to access it from a different file it says that my object is undefined. Here is what it looks like:

FirstFile.ts

```
export function showA() {
 console.log("Changed a to " + a);
}

export var a = 3;
```

```
export class FirstFile {
 public ModifyA() {
 a = 7;
 showA();
 }
}
```

It says that a = 7. Then I use it in other file like this.

SecondFile.ts

```
import FirstFile = require("src/FirstFile");

export class SecondFile {
 showA_again() {
 FirstFile.showA();
 }
}
```

I execute showA\_again() in my view file called SecondFile.html

```
<button click.trigger="showA_again()" class="au-target">Button</button>
```

When I click button, I see in console that variable "a" is still 3. Is there any way to store variables between files?

**C1:** And where do you call the ModifyA()? I can't see this method being called anywhere. – Buzinas Jul 30 '15 at 15:35

**C2:** This is bad. Don't do this. Add a to the class itself. – Matthew James Davis Aug 3 '15 at 12:45

## 1 Answer

**A1:** I'd recommend you to inject FirstFile into SecondFile. Now your code has a smell of bad architecture.

To answer your question: probably you are looking for static (playground sample)

```
export class FirstFile {
```

```
 static showA = function() {
 console.log("Changed a to " + FirstFile.a);
 }
```

```
 static a = 3;
```

```
 public ModifyA() {
 FirstFile.a = 7;
 FirstFile.showA();
 }
}
```

```
export class SecondFile {
 showA_again() {
 FirstFile.showA();
 }
}
```

}

**C1:** Good answer. There are other ways to do this, but I like this one. – Matthew James Davis Aug 3 '15 at 12:46

**C2:** @MatthewJamesDavis Could you provide an example? It would be great to see other options. – Artiom Aug 3 '15 at 13:15

**C3:** probably not worth it, this is probably the best way – Matthew James Davis Aug 3 '15 at 14:59

798. <https://stackoverflow.com/questions/41778805/can-i-have-circular-dependencies-in-composer/41779968#41779968>

**T:** Can I have circular dependencies in Composer?

**Q:** I'm writing a package A that is required by some other package B which I'm not publishing for now. At some point A will be changed to use itself B. Chances are they should be both in the same package then, but I'd prefer keeping the two things separate, just for cleanliness' sake, and, more importantly, because B is only a dev dependency to A.

package A requires-dev B

package B requires A

I'm curious if this is possible. I'm also curious if it's the same for:

package A requires B

package B requires A

...and...

package A requires B

package B requires C

package C requires A

... or more complex cases. What problems will I encounter?

Thank you.

**C1:** I apologize if I didn't try doing it, but I don't want to pollute packagist with random tests (I don't know if I'm allowed to do that...) – Wes Jan 21 '17 at 11:34

**C2:** You could create 3 other dummy packages and try it yourself. Reviewing your design to prevent this dependency chain should be the preferred way. – Jeroen Heier Jan 21 '17 at 13:10

**C3:** Packages are not "dependencies" from composer's point of view, but form application's. Downloading does not depend on previously dowloaded files like "I can't download this, because I need sth else first". – shudder Jan 21 '17 at 13:51

## 1 Answer

**A1:** A wider, not php-specific answer here: circular dependencies are never a good idea.

You see, you "separate" things into different packages/modules/you-name-it in order to give them a useful structure. To create a "model" that helps you dealing with the complexity of your code.

In other words: you want to define an architecture. And circular dependencies are most often seen as "bad smell" in designs.

Thus you shouldn't ask "would it work?", but "is there a better way to handle this?"

799. <https://stackoverflow.com/questions/24665136/boundaries-intercommunication-restrictions-java-ee/25838692#25838692>

**T:** Boundaries intercommunication restrictions Java EE

**Q:** Applying the Boundary-Control-Entity (BCE) pattern in Java EE:

@Stateless //1st boundary

```
public class A {}
```

@Stateless //2nd boundary

```
public class B {}
```

Until now, all it's ok, now, let's suppose that for some reason I need use some services exposed by B on A. So, A now looks like:

@Stateless

```
public class A {
```

```
@Inject
B b;
//... call some B's methods
}
```

But, according to the BCE pattern stands for

Control elements can communicate with each of the other two kinds, but entities and boundary elements should not communicate directly.

Obviously for JPA Entities they need to communicate each other (otherwise, "JOINS" won't be possible). Then, I end with some questions related:

- 1) Why communication between boundaries is forbidden?
- 2) Under Java EE, we can use @Remote interfaces, Will this still violates the statement?:

```
@Stateless
public class A {
 @Inject
 RemoteB b; //now uses a remote dependency
}
```

```
@Stateless
@Remote(RemoteB.class)//implements a remote interface
public class B {}
```

- 3) How Java EE solves the pattern.

## 2 Answers

**A1:** First of all, my advice is to use architecture as a guideline on how to structure your application, but never as a law - so always adapt it to your needs and do what is sensible, easy and fits to your situation.

The idea behind the boundary is, that it serves as the only externally visible contract to your business logic behind it, which may change and whose details are hidden. And it's reasonable to keep the dependence on other boundaries as low as possible - yet controls can make use of and can be called by many boundaries as it is needed.

Adam Bien, one of the Java EE gurus, emphasizes in his workshops and talks one this pattern, as he explains in this example. Another good article is this one.

**C1:** It's curious that my confusion was given by a statement of Adam Bien, please check this link > [youtu.be/naLTswlNKgE?t=14m](https://youtu.be/naLTswlNKgE?t=14m) , he does not give the explanation, can you explain me WHY it is Not OK? – Sergio Jul 10 '14 at 16:35

**C2:** Well I'm not an expert on that pattern, but as I stated in my 2nd paragraph, you want the boundaries to be entry point to your controls, but not coupling them with other boundaries. – Alexander Rühl Jul 10 '14 at 17:42

**C3:** Well, I asked it to Adam Bien, He will solve this the 5th AirHacks session :) > [gist.github.com/AdamBien/e1855469d4c507427ef9](https://gist.github.com/AdamBien/e1855469d4c507427ef9) , I will update this question ASAP. – Sergio Jul 11 '14 at 19:43

**A2:** If some boundaries needs intercommunication is a bad smell that maybe your design needs a refactor, for example, extract common behavior in a control and use it in both. In the case of using @Remote the boundaries are highly coupled not just with the Interface but also by the DTOs used (and DTOs always duplicate state). In a SOA/microservices oriented architecture if you need this intercommunication you should prefer low coupling, that means, using json/xml messages.

Java EE lets you use jax-rs to achieve low coupling

5th AirHacks session

800. <https://stackoverflow.com/questions/15909061/require-unimplemented-interfaces-as-parameters-to-business-layer>

T: Require unimplemented interfaces as parameters to business layer?

Q: Does it smell bad to require a consumer to implement an interface just to pass parameters?

Just to help visualize, my specific situation is an ASP.NET C# MVC website, with the following assembly contents:

MyWebAssembly.Web

    Controllers

    MyWebAssembly.Models

        PurchaseViewModel : IBillingAddress

        SubscribeViewModel : PurchaseViewModel

        AddCreditsViewModel : PurchaseViewModel

MyWebAssembly.BLL

    IBillingAddress

        BeginPurchase(IBillingAddress, etc.)

MyWebAssembly.Data

    Models

I have roughly 100 ViewModels that were tightly coupled with my business logic. I've extracted these to interfaces (as shown above) to avoid adding yet another layer of identical models to automap, now that I'm finally separating my business layer from the website.

I suppose it's a fine first step in this process. This allowed me to move the business logic out of the assembly, but I feel dirty, like all I did is shuffle code around. Not all of my ViewModels are this coupled, but IBillingAddress is just one of multiple examples.

Do you think it's bad form to require a consumer to implement an interface just to pass parameters? I feel like I'm back in Win32 API days when I do that. Should I just pass 10 more standard type parameters to my business method? Is there some obvious pivot to my architecture I'm overlooking?

Edit:

I'm still giving this some thought. Perhaps one of the reasons that this example confuses me is because BillingAddress seems like a relatively fixed interface to depend on. It makes more sense to expose it and build it into a ViewModel. I guess if it were a potentially moving target (like ICustomer, for example) a mapped interaction would make more sense. Your advice is still desired.

801. <https://stackoverflow.com/questions/3679634/is-setting-properties-on-the-window-object-considered-bad-practice>

**T:** Is setting properties on the Window object considered bad practice?

**Q:** I'm writing a quite complex JavaScript application that has an MVC architecture that I'm implementing using Prototype's Class support and the Module pattern. The application uses AJAX and the Observer pattern. I create my controller instance when the DOM has loaded, pass it a view and some models created from JSON data and away it goes.

However, I've found that I have to set my controller instance as a property on the Window object—i.e. declare it without using var—because I have an AJAX success callback that refreshes the view object owned by the controller and at this point in the code my nice little MVC world is not in scope.

I investigated passing in the view object as a parameter to the function containing the AJAX code, but this got really messy and would have led to some horrible violations of the MVC pattern, such as coupling the model and the view. It was horrendous.

Is doing things like storing my controller instance directly on Window considered bad form? It smells a bit like using a global variable to me, but I can't see any way around it.

**C1:** Can you post a small code sample? – Ryan Doherty Sep 9 '10 at 18:57

**C2:** I can't I'm afraid. I'm at home and the code is at work and more importantly, I think I would have to post a significant amount of code to illustrate the point - I don't like reading "wall of text" questions so I wouldn't want to inflict it on others! – John Topley Sep 9 '10 at 19:00

**C3:** Why would the MVC be out of scope? Should not at least a reference to it be captured in a closure by your AJAX callback? – MooGoo Sep 9 '10 at 19:04

**C4:** I'm not too proficient with closures. Essentially the AJAX function is within the controller and it gets invoked by a model function that itself gets invoked by an update to another model instance (hence the Observer pattern). I'm using Prototype's onSuccess callback and this at that point refers to Window. – John Topley Sep 9 '10 at 19:15

**C5:** Then simply put something like var that = this right before the callback code, then change all references to this in the callback to that. Alternatively, use Prototype's Function.bind to fix the value of this – MooGoo Sep 9 '10 at 19:33

### 3 Answers

**A1:** Setting properties on the window object is equivalent to creating global variables. That is, sometimes doing it is inevitable, but you should try to keep it to a bare minimum, as it ends up polluting the global namespace.

In your case, creating a single property is not so bad. If you want to be extra careful about it, you can explicitly create a namespace for any stuff you need global access to:

```
// In init:
```

```
var mynamespace = {};
```

```
...
```

```
// Once the controller is available:
```

```
var namespace = window.mynamespace;
namespace.controller = controller;
namespace.foo = bar; // Set other stuff here as well.
```

**C1:** Thanks. For some reason I hadn't thought to use a namespace, even though I'm using one elsewhere. – John Topley Sep 10 '10 at 9:39

**A2:** I would say it's bad practice. You can always, and easily, create a namespace for your application and put globals in there, if you must.

**A3:** They are useful when you want to call a global function whose name is not known beforehand.

```
var funcName = "updateAns" + ansNum;
window[funcName]();
```

They can be used to a) avoid evil evals in most cases. b) avoid reference errors to global variables.

`x = x + 1` will generate a reference error if a global `x` is not defined. `window.x = window.x + 1` will not

802. <https://stackoverflow.com/questions/933723/what-is-component-driven-development/960839#960839>

**T:** What is Component-Driven Development?

**Q:** Component-Driven Development term is starting to get used widely, esp. in connection with Inversion of Control.

What is it?

What problems does it solve?

When is it appropriate and when not?

## 7 Answers

**A1:** What is it?

I think the definition in your answer covers this question well. Although, I question why the definition includes that a component needs to explicitly define its dependencies. A canonical example of a component is an ActiveX control - do they need to explicitly define their dependencies?

What problems does it solve?

Management of complexity. It seeks to address that by allowing you to only ever think about the implementation of the component. One should only need to author components, one should not to have to think about how to combine or manage them. That is done by some framework or infrastructure external to the component, and unimportant to the component author.

When is it appropriate and when not?

Not necessarily appropriate in a trivial or throw-away application. The bad smell in a component architecture, is if you are spending time on thinking or working on the infrastructure to manage and combine components, rather than the components themselves.

C1: Nice answer, thanks. Strictly speaking ActiveX components are control components which are almost a program (that could employ IoC internally), while in CDD we are talking mostly about class-level components. Yet, still ActiveX have some explicitly defined dependencies - some kind of host, Windows OS. Re throw-away applications: R&D and architecture prototypes are a throw-away applications, yet I find it much easier to develop with CDD there. Depends on the scale probably. – Rinat Abdullin Jun 7 '09 at 8:17

**A2:** I am not sure it is a "widespread" terminology, but in VCS (Version Control System), I know of two ways to manage a set of files needed to build a program:

system-based approach, where the all set has a common life cycle and must be tagged as a all component-based approach, where individual set of files have their own life cycle, and where a meta-label references all the labels of the components to designate the all system by composition and dependencies between those components.

The applicative architecture is used to identify those components:

functional domain and applications

third party libraries

frameworks

That is where IoC comes in, since it is at the base of any framework. The problem it solves is allow you to better identify the part of your application:

Suppose you design a PLR (Profit and Loss) application, in charge to compute the gain and losses (position) of a trader.

You would quickly realize it is not a single application, but a composition of several:

GUI

launcher

dispatcher (to dispatch the computation across several server, because one would not have enough memory to compute all!)

and so forth

You can then identify a computation framework (Ioc) which would enable you to plug-in your different modules, which then are called at the right time by your framework.

Or you can identify purely technical frameworks (KPI, logs, exception managements) which can then be used by any of your other functional components.

In term of project management, that also allows you to develop each part independently, while assuring a global coordination through the VCS.

**A3:** Component-Based Development is nothing really new. I don't know of Component-Driven Development, but I am going to assume it's CBD. It's how Unix is designed, bunch of substitutable small programs each doing one thing very well. In desktop arena, Delphi's VCL has been successful at using components with rich reusable components and third party market like no other. We are now seeing the revival of the CBD as some technologies are maturing. For example simple web apps are evolving to SOA and RESTful WS. All Java guys been talking about is modularity and IoC.

The answer you are looking for likely will be found in Why and what of Inversion of Control by Ke Jin.

Besides, the imperative nature of these classic OO programming languages tend to miss the forest (high-level architectures/structures) for the trees (low-level logic control procedural code). Development and maintenance engineers taking over an existing application have to rely on its out of date design/architecture documents and low level code comments/patterns.

The component-based development (CBD) paradigm tackles the two issues above by shifting plumbing logic into frameworks that manipulate components and set up applications based on users/developers provided declarative descriptions. Contrary to the common confusion, such declarative descriptions are not meant to be application setup scripts. Rather, their fundamental intention is to explicitly express application architectures/structures without mandating their imperative plumbing procedures (namely describe the what instead of the how). The goal of CBD paradigm is to support effective and flexible application compositions by these frameworks and having application developers focus on business logic and domain issues without concerning low-level plumbing complexities.

CBD frameworks that combine the declarative application descriptions and the IoC technique are referred to as IoC frameworks. Contrary to their predecessors, IoC frameworks are non-invasive and use the dependency/configuration injection/setting scenario.

According to Wikipedia, Component-Based Development is an alias for Component-based software engineering (CBSE).

[It] is a branch of software engineering, the priority of which is the separation of concerns in respect of the wide-ranging functionality available throughout a given software system.

This is somewhat vague, so let's look at more details.

An individual component is a software package, or a module, that encapsulates a set of related functions (or data).

All system processes are placed into separate components so that all of the data and functions inside each component are semantically related (just as with the contents of classes). Because of this principle, it is often said that components are modular and cohesive.

So, according to this definition, a component can be anything as long as it does one thing really well and only one thing.

With regards to system-wide co-ordination, components communicate with each other via interfaces. [...] This principle results in components referred to as encapsulated.

So this is sounding more and more like what we think of good API or SOA should look like.

The provided interfaces are represented by a lollipop and required interfaces are represented by an open socket symbol attached to the outer edge of the component in UML.

alt text [http://upload.wikimedia.org/wikipedia/en/2/25/Component-based\\_Software\\_Engineering\\_%28CBSE%29\\_-\\_example\\_2.gif](http://upload.wikimedia.org/wikipedia/en/2/25/Component-based_Software_Engineering_%28CBSE%29_-_example_2.gif)

Another important attribute of components is that they are substitutable, so that a component could be replaced by another (at design time or run-time), if the requirements of the initial component (expressed via the interfaces) are met by the successor component.

Reusability is an important characteristic of a high quality software component. A software component should be designed and implemented so that it can be reused in many different programs.

Substitutability and reusability is what makes a component a component. So what's the difference between this and Object-Oriented Programming?

The idea in object-oriented programming (OOP) is that software should be written according to a mental model of the actual or imagined objects it represents. [...]

Component-based software engineering, by contrast, makes no such assumptions, and instead states that software should be developed by gluing prefabricated components together much like in the field of electronics or mechanics.

**A4:** Here's my definition after doing some research.

Component-Driven Development is an approach in software development in which code is fragmented into reusable and testable components that are combined together to form application foundation for delivering business functionality. The combination and management of components is usually delegated to Inversion of Control Container.

A component itself is a class that implements some service contract and explicitly defines the dependencies that it needs in order to fulfill this contract. Actual implementation is hidden from everybody else outside the component.

Related links:

[Component-Driven Development and IoC Container](#)

**A5:** I view Component-Based Software Engineering as an approach to developing software systems through the use of pluggable components; with a component being "a unit of composition with contractually specified interfaces and explicit context dependencies only", which "can be deployed independently and is subject to third-party composition." (Clemens Szyperski, "Component software : beyond object-oriented programming")

CBSE facilitates code reuse and rapid assembly of flexible/adaptable software systems.

There's a substantial research that has been focused on this topic for years. The flagship event (ACM SIGSOFT Symposium on Component Based Software Engineering) is in the 14th year now and there are quite a few new trends emerging.

Also, if you want a good example of reusable, pluggable and extensible components, heavily in use by industry today, take a look at MS Enterprise Library.

**A6:** If you're interested in combining components (or other reusable assets) into applications you should also take a look at the software product lines methodology.

In a software product line the dependencies between components (or lower-level code elements) are explicitly managed outside those components. This is typically done using a feature model that contains rules such as

These two components must not be used together (mutual exclusivity)

If this component is used then this other component must be used or (interdependency)

Any combination of some specified set of components may be used (optionality)

Other more complex rules are possible depending on the complexity of the dependencies you wish to model.

Another approach that is sometimes used instead of feature modelling is to use a code generator to configure the different components that are to be assembled into the finished application. It's also possible to combine feature modelling with code generation.

Aside from Code Generation, some other terms you might search for as domain-specific modelling, model-driven software development, software family.

**A7:** You will never understand what is really Component-Driven Development, until you try to use Unity 3D. It is not ActiveX or anything you ever seen before, what you have seen before has another Component meaning.

Component-Driven development, about every one talking lately, means, you have 2 things:

Object - which is just like an object in OOP programming or real world object.

Object's Component - which is like part of Object's functionality or one of it's Abilities.

Thus: Component - is not an Object. It is - Functionality of an Object.

So, in standard OOP programming, when you need to extend Base Object with new Functionality, you have to make new Derived Object by Inheriting Base Object.

In Component-Driven development, when you need extended Object, you just create Empty Object and fills it with different Components, without any Inheritance. In Component-Driven development there is no Classes, there is Prefabs instead - which is predefined Objects with predefined Components, with Children Objects.

As i said you will never understand untill you try. With component-driven development you dont have to always use programming, you may use graphical editors instead, and also it frees you from Inheritance Hell of typical OOP. Components itself programmed with usual programming, but higher level system, including objects, mostly only need to use and combine Components in Editor and receive customized objects behaviour.

Thus: Component-Driven Development gives you:

Great power to create your programm's logic, by using just an Editor, without programming.

Frees your mind from OOP Inheritance Hell. Makes development more simple and fast.

Makes your programm highly customizable and scalable without even touching code. Less errors and bugs.

Easier maintain your programm's code, by just reprogramming specific components, without much effecting rest system.

etc...

I also wanna add, that Component-based(driven) programming is not replacement for OOP programming, it is on TOP of OOP or usual programming. Usual programming still used in CBP for low level Component's implementation. I think this article also have good and short explanation of CBP: <http://acmantwerp.acm.org/wp-content/uploads/2010/10/componentbasedprogramming.pdf>

803. <https://stackoverflow.com/questions/10596741/can-you-have-multiple-delegate-methods-for-the-same-function/10596819#10596819>

**T:** Can you have multiple delegate methods for the same function

**Q:** For example, could you have two delegats for MKMapViewDelegate and have them both implement - mapView:sender:viewForAnnotation:annotation?

**1 Answer**

**A1:** The MKMapView can only have one delegate at a time. Of course you can switch the delegate when you need to, or you could have the delegate call the other object that you intend to use as a delegate.

But I think this smells of a bad architecture. Ask yourself: Why do you even want more than one delegate? You very probably don't.

804. <https://stackoverflow.com/questions/8778021/importing-modules-to-a-package/8778226#8778226>

**T:** Importing modules to a package

**Q:** Is there anyway I can import modules to a package level?

for example, consider the following package:

```
- conf
 - __init__.py
 - general.py
```

Now I have another package:

```
- conf2
 - __init__.py
```

I would like to be able to use import conf2.general. That means, somehow importing the general.py module to conf2 package.

EDIT:

I have added the following import to conf2/\_\_init\_\_.py: from conf import general

Now, I can use from conf2 import general and it works fine. However, what I would like to achieve is import conf2.general. Is that possible?

**C1:** I've amended my answer to also answer the edited question. – Joe Jan 8 '12 at 13:57

## 2 Answers

A1: Contents of conf2/\_\_init\_\_.py:

```
from conf import general
```

to demonstrate the extra info from the edit, also:

```
import conf.general
```

To demonstrate:

```
$ find .
```

```
.
```

```
./conf
```

```
./conf/__init__.py
```

```
./conf/general.py
```

```
./conf2
```

```
./conf2/__init__.py
```

```
$ python
```

```
Python 2.6.1 (r261:67515, Aug 2 2010, 20:10:18)
```

```
[GCC 4.2.1 (Apple Inc. build 5646)] on darwin
```

```
Type "help", "copyright", "credits" or "license" for more information.
```

```
>>> import conf2
```

```
>>> conf2.general
```

```
<module 'conf.general' from 'conf/general.pyc'>
```

again, to answer the edit:

```
>>> conf2.conf.general
```

```
<module 'conf.general' from 'conf/general.pyc'>
```

C1: Got it. Is there anyway to make it work with "import conf2.general" ? – Ohad Jan 8 '12 at 13:51

If you use import conf2.general then it's imported as conf2.general, and that's what it gets called in the module dict. The from ... import ... syntax is what you want, I think. – Joe Jan 8 '12 at 13:54

I do want to import it as conf2.general. The problem is that when using import conf2.general I get error: "ImportError: No module named general" – Ohad Jan 8 '12 at 13:56

I don't think that's possible. – Joe Jan 8 '12 at 14:03

**A2:** Maybe, you can have some luck with mangling `__path__` variable of the conf2 (in the `conf2/__init__.py`). Here an example where I use PIL.Image instead of conf.general:

```
from PIL import Image

import PIL

__path__.insert(0, PIL.__path__[0])
```

Still, the whole idea seems odd to me and smells like bad architecture solution unless you are doing something unusual. And all modules of PIL are now in the conf2, not just Image...

805. <https://stackoverflow.com/questions/16340131/how-do-eclipse-core-plugins-update-eclipse-ui-plugins>

**T:** How do eclipse core plugins update eclipse ui plugins?

**Q:** In Eclipses plugin architecture, a core or model plugin exists to handle backend, and a ui plugin handles presentation. The UI plugin depends on the core plugin, but the core plugin does not depend on the UI plugin. So the core plugin does not see any types that are in the UI plugin.

How can I notify my debug SWT widgets of changes that occur in the core plugins? SelectionListener will not be valid because I want my widgets to update immediately as new changes come in, not when something is selected in the window workbench. I do not see how a general/simple even listener can be registered to the model object as that is where the model object is created. The GUI is event based, so unless it somehow just wakes up every few milliseconds and seeks out the last IDebugTarget and registers one of its views as a listener, I don't see how this is going to work. And that would be a bad design smell (manual polling).

**C1:** Don't you just want to raise an event when anything interesting happens in core and then register event listeners to core from UI so that the UI gets notified when anything interesting happens? –

Andrew Eisenberg May 2 '13 at 22:14

**C2:** Yes. However I ran into an egg before the chicken problem wrt adding the listener to the core. I saw no practical hook from the UI to run when the launch was completed. What I discovered was to 1) create an activator from my plugin and override the start method. 2) add DebugPlugin.getDefault().getLaunchManager().addLaunchListener(this) to start so that I can listen to new launches being created and 3) get my custom debug target from launch.getDebugtarget() and 4) inject the custom event listeners (ones that push what model objects I want, when I want them) to my core/debug target. – Zombies May 3 '13 at 5:37

**C3:** OK then, you need to be more specific. Show some code snippets of what you are trying to do. What events are you trying to listen to? What plugins are involved? What model are you interacting with? – Andrew Eisenberg May 3 '13 at 5:45

806. <https://stackoverflow.com/questions/43260955/swift-ios-keep-view-controller-running-in-background-after-pop/43261268#43261268>

**T:** Swift IOS keep view controller running in background after pop

**Q:** My app consists of two views. The first one is a GMSMapView and the second one is used to connect to a Bluetooth device that sends coordinates.

After the Bluetooth device is connected, I use a delegate to send the information back to the map view and move a marker around. To transition between views I was previously using segues, this didn't stop the Bluetooth view controller and the data made its way like I wished to the map view.

I ran into the problem of my map view being reinitiated so I decided to use a navigation controller. Now I use a push segue to get to my second view, and pop to come back to the same instance of the first one. Great, that worked! The issue I have now is that popping the second view seems to stop it completely from running in the background like it used to. Is there a way to keep it running in the background like it did before?

What I'm currently using to pop the second view is

```
self.navigationController?.popViewControllerAnimated(true)
```

Any idea would be appreciated! Thanks!

**C1:** Is there any way to have the same transition without having the view controller destroyed? Meaning, is there a way to transition from first view to second view and then back while retaining the instance of the first view? – lhbortho Apr 6 '17 at 16:46

**C2:** Yes, and I've given an answer that tells you what it is — but I've also warned you that this is a bad idea and indicates that your app architecture is probably wrong. – matt Apr 6 '17 at 16:50

**C3:** Also, it looks like you are using Swift 2.x. That version of Swift is now officially dead. You need to update. – matt Apr 6 '17 at 16:51

**C4:** Thanks for the input. Swift version is correlated to what xCode version you are running right? Currently have a very old MacBook air (the only one at my work place) so I'll have to see if it can even make the jump – lhbortho Apr 6 '17 at 17:26

**C5:** Xcode 8.3 will run only under Sierra, alas. But Xcode 8.2 will allow you to update to Swift 3, and will run on El Capitan. The jolt to your code — the differences between Swift 2 and Swift 3 — will be very dramatic and far-reaching, so the sooner you make this transformation, the better. – matt Apr 6 '17 at 17:52

## 1 Answer

**A1:** A popped view controller does not "stop running". It is returned to you, and if you don't retain it, it is completely destroyed.

If you don't want that to happen, retain it when it is returned. You are currently ignoring the returned view controller:

```
self.navigationController?.popViewControllerAnimated(true)
```

Instead, keep a reference to it:

```
self.mySecondViewController =
```

```
self.navigationController?.popViewControllerAnimated(true)
```

Be warned, however, that this is a very unusual architecture. You will not be able to use the storyboard segue to push again, because it will push a different copy. It would be better to abandon your navigation controller architecture entirely, as it is completely unsuited to the idea of a view controller persisting after it is popped. If you want an architecture where two view controllers persist simultaneously, you would be better off using a UITabBarController — or, even better, reorganize your app completely. The notion that you need the view controller to persist after being popped is a "bad smell": it means that you have put the functionality in the wrong place. Put the functionality in a place that does persist, rather than forcing the view controller to persist in some artificial way.

**C1:** Thanks for the answer Matt, I am completely new to iOS so the is exactly the kind of answer I was looking for. I will try to find another way to have my two views be persistent. Perhaps I can move my Bluetooth functionalities back to my main view controller so I do not need to have a second view controller running at the same time. – lhbortho Apr 6 '17 at 17:25

**C2:** "Perhaps I can move my Bluetooth functionalities back to my main view controller so I do not need to have a second view controller running at the same time" Good idea! That's just the sort of thing I'm encouraging you to try doing. – matt Apr 6 '17 at 17:50

**C3:** I previously tried doing just that but with no success. Using a UITabBarController looks like it would be easy to get working but it might not be using it the correct way. I'll give the right way a little more effort before go to a UITabBarController though. Thanks! – lhbortho Apr 6 '17 at 18:00

807. <https://stackoverflow.com/questions/17087761/wrapper-to-template-class-inherited-by-another-class/19235162#19235162>

**T:** wrapper to template class inherited by another class

**Q:** template <class CollectionItem>

class Collection

{

void A();

// Many other utility functions

}

class ICollection

{

virtual void B() = 0;

}

class Base : public Collection<BaseItem>, public IBase

{

virtual void B();

}

Is there any way of offering Collection functions via ICollection interface without wrapping all the functions in Base class? ICollection : public Collection<CollectionItem> is not an option.

Bounty Update: OK, so the original idea was to have Interface to all Collection classes. Before we continue, every CollectionItem also has Interface, let's call it ICollectionItem and ICollection only knows about ICollectionItem.

So what I did was create another template class as Interface to Collection template class - ICollection (pure virtual) accepting ICollectionItem(s). Collection class inherits this interface.

Every Collection class (inheriting Collection<CollectionItem> class) would also inherit it's Interface Collection class. That Interface then virtual inherits ICollection<ICollectionItem>. I'll just post the code :)

Here is the code:

```
template <class ICollectionItem>

class ICollection

{

public:

 virtual const ICollectionItem* At(const int idx) = 0;

};

template <class CollectionItem, class ICollectionItem>

class Collection

 : public ICollection,

 public virtual ICollection<ICollectionItem> // Weak point

{

private:

 List<CollectionItem*> fContainer;

public:

 Collection(void) {}

 virtual ~Collection() {}

 virtual const ICollectionItem* At(const int idx); // Casting GetAt result

 virtual const TCollectionItem& GetAt(const int idx) const
```

```
virtual ListIterator<TCollectionItem>*> GetIterator(void) const;
virtual ListIterator<ICollectionItem>*> Iteratator(void) const; // Weak point
}
```

Example usage:

```
class IBaseItem
{
public:
 virtual int Number() = 0;
}
```

```
class BaseItem
: public IBaseItem
{
public:
 virtual int Number();
 void SetNumber(int value);
}
```

```
class IBase
: public virtual ICollection<IBaseItem>
{
public:
 virtual IBaseItem* ItemByName(String name) = 0;
 virtual ~IBase() {}
}
```

```

class Base
 : public Collection<BaseItem, IBaseItem>,
 public IBase
{
public:
 BaseItem* GetItemByName(String name);
 virtual IBaseItem* ItemByName(String name);
}

```

Weak points:

First is at using virtual inheritance ... lots written about it, not much to talk about, or is it?

Unable to access Iterator using ICollection interface. See ListIterator function, only first one can be implemented, the second one would require some kind of new List of IBaseItem. I decided to live with that and just use for loop.

Even tho I somehow managed to get what I wanted (With wrapping and casting), I would still like to hear an second opinion. I don't like using virtual inheritance, specially in such delicate situations - using Collections for application Base creation.

**C1:** So you have an IBase pointer to an instance of Base? And you want to call the Collection< T > functions from the IBase pointer without casting it to Base first? – Goz Jun 13 '13 at 13:07

**C2:** Yes, I want to call Collection <T> functions using IBase pointer. – krizajb Jun 13 '13 at 13:08

**C3:** How about Collection<BaseItem> : public IBase? – Ralph Tandetzky Jun 13 '13 at 13:09

**C4:** Hmm .. might be possible, but would mean of having access to Base via two interfaces, IBase and another interfaces implemented by Collection. There are many other interfaces like IBase offering specific access. – krizajb Jun 13 '13 at 13:15

**C5:** I like @RalphTandetzky's idea. Sounds like a Collection is something that provides the IBase interface, right? Collection<BaseItem> : public virtual IBase may also be appropriate, especially if IBase has no data members. – aschepler Jun 13 '13 at 13:19

## 7 Answers

**A1:** Hmm...So you wanna to reuse the Collection class's utility functions, and you want to design a class which will implement an interface defined by IBase. As you mentioned above,"wrapping all the functions in Base class" is a way to offer Collection functions.

(1) Via inheritance, derived class has a good knowledge of Collection

```
class Derived: public Collection<DerivedType>,public IBase{};
```

or

```
template <typename T>
```

```
class Derived: public Collection<T>,public IBase{};
```

(2) Via inheritance, derived class knows little about Collection, but through IBase

```
class IBase : public Collection<BaseItem>{}
```

```
class Derived: public IBase{};
```

By (1), If you want to call Collection functions using IBase pointer, you have to wrap the functions. By (2), any Derived instance is "a kind of" IBase which is "a kind of" Collection. So you can use IBase pointer to call Collection functions.

So, the key point is that the objects pointed by the IBase pointer should have the method you want to call. Wrap it or inherit it. I can not see any other solution than these two ways.

**C1:** What is designed class? Btw I can't wrap everything since it's a bit more complicated. Will update the current scenario tomorrow. – krizajb Oct 8 '13 at 19:53

**A2:** Edit: the idea is refined based on your example: Here is an idea:

```
//generic interface can be kept as it is
template <class ICollectionItem>
class ICollection
{
public:
 virtual const ICollectionItem* At(const int idx) = 0;
};

class Empty
```

```
{
};

template <class CollectionItem , class BaseClass = Empty>
class GenericCollection
 : public BaseClass
{
public:
 const CollectionItem* At(const int idx);
 // At and ItemByName are standard functions for a collection
 CollectionItem* ItemByName(String name);
 //note that here nothing has to be declared as virtual
};
```

//example usage:

```
class IBase
 : public virtual ICollection<IBaseItem>
{
public:
 virtual IBaseItem* ItemByName(String name) = 0;
 virtual ~IBase() {}
};
```

```
class Base
 : public GenericCollection<BaseItem, IBase >
{
public:
```

```
//nothing to be implemented here, all functions are implemented in GenericCollection and defined
as virtual in IBase
```

```
//The definition of the functions has to be the same:
```

```
};
```

In collection you can implement whatever and in the interface you can define what ever you want to be virtual from your collection. The only thing is that you need to have some standard in naming convention for functions.

Hope this helps, Raxvan.

**C1:** Updated it, the example is a bit confusing , too much inheritance :), Your implementation could work also i think if all the functions have the same name , there is no need to have two names for a function that is supposed to do the same thing regardless if it is in an interface or a simple class – Raxvan Oct 9 '13 at 13:29

**C2:** In my scenario it doesn't work, that's for sure :) Will analyze your code .. and yes, I agree it's a bit confusing .. that's why I'm here. Erm .. Can you please add some inline implementation of getters, thanks! – krizajb Oct 9 '13 at 13:32

**C3:** After a closer look to your code, i think what you are trying to do is to have a collection of BaseItem that can be work as an interface collection of but with IBaseItem, also all the functions to be in place, am i right ? – Raxvan Oct 9 '13 at 13:39

**C4:** Argh, can you ask differently? :D Let me give you s quick example: I want to have ILayers ("containing" ILayer items) implemented by Layers (containing Layer items). ILayers always return ILayer and Layers always return Layer (can also return ILayer .. but not really needed). – krizajb Oct 9 '13 at 13:45

**C5:** ok , now i understand your problem, let me think for a viable solution :) – Raxvan Oct 9 '13 at 13:52

**A3:** From your comments in another answer, it seems you want a collection of interfaces, and an implementation of this interface. The simplest I can advise you is the following:

```
template<typename T>

class ICollection

{

public:

 virtual iterator<T>* begin() const = 0;

};
```

```
template<typename T, typename TBase>
class Collection : public ICollection<TBase>
{
public:
 iterator_impl<T>* begin() const { return whatever; }
};
```

Example:

```
class IItem {};
class Item : public IItem {};

class Base : public Collection<Item, IItem> {};
```

old answer:

Is there any way of offering Collection functions via IBase interface without wrapping all the functions in Base class ?

If I understood your problem, you want to use it like this:

```
void myfunc() { // ... IBase* obj = ...; obj->A(); obj->B(); }
```

I think here is a misunderstanding here: if you want A() to be callable from an IBase, then you have to add it to Ibase declaration.

If you want to use the Collection functions on an object, then you should cast this object to a Collection, via dynamic\_cast for example.

Furthermore, if you have such a function:

```
void fun(IBase* base) { /* ... */ }
```

you cannot cast to a Collection\*, since there are no relationship between these two classes, unless you have another way to be sure base is a Collection:

```
void fun(IBase* base) { if(base && base->isABaseItemCollection()) { // Valid, since the real type
was checked before Collection* collection = (Collection*)base; // ... } }
```

On a side note: you can generate bases almost automatically:

```
template class Base : public Collection, public U {};
```

```
typedef Base BaseCollection;
```

**C1:** I edited my answer. – Synxis Oct 11 '13 at 8:42

**C2:** I'm developing in Qt, there is an easy way creating Iterator from QList. But how can I return iterator of IItems if I only have QList of Items? – krizajb Oct 11 '13 at 21:31

**C3:** Maybe I didn't make myself clear, to point out the problem. With my current solution I can only offer Iterator for Items, not IItems. I wish to have it both. And possibly without using virtual inheritance. – krizajb Oct 11 '13 at 21:41

**A4:** According to comment/chat:

You have something like:

```
class IAnimal { /*...*/ };
class Cat : public IAnimal { /*...*/ };
class Dog : public IAnimal { /*...*/ };

class Cats
{
```

```

std::vector<Cat*> cats;

public:
 Cat* at(size_t index) { return cats[index]; }

 /*...*/
};


```

```

class Dogs
{
 std::vector<Dog*> dogs;

public:
 Dog* at(size_t index) { return dogs[index]; }

 /*...*/
};


```

And you want to factorize some code using something like

```

class IAnimals
{
public:
 std::vector<IAnimals*> animals; // or getter/setter which works with IAnimals.

 /* some common factorized code */

};


```

```

// And so

class Cats : public IAnimals { /* */ };

class Dogs : public IAnimals { /* */ };


```

I propose, instead of creating class IAnimals, to use template functions as:

```
template <typename TAnimals>
```

```

void foo(TAnimals& animals)

{
 Ianimals* animal = animals.at(42);

 // ...

 animal->eat(food);

 // ...
}

```

You have to give compatible "interface" (names) to the type used in template.

**C1:** I need to have separated interface for each Item, e.g. class Cat : public ICat, class Dog : public IDog – krizajb Oct 14 '13 at 13:08

**C2:** with class ICat : public IAnimal, I don't see any problem (except the name as here Cat is too generic, as it should be several type of 'cat'). If this inheritance is not possible, you may use auto\* animals = animals.at(42) in my foo example (with C++11). if c++11 is not an option, you may use some typedef ICat AnimalType inside classes and then use something like typedef typename TAnimals::AnimalType AnimalType to have "correct type"... – Jarod42 Oct 14 '13 at 13:40

**C3:** That inheritance is possible, but not usable in my case :) Every Item has its own properties, there may or may not be any common properties between different Items. Never heard about auto\*. But it seems that I just can't explain my problem good enough, even tho current code is included. – krizajb Oct 14 '13 at 14:00

**A5:** You say, and I quote:

I want to call Collection functions using IBase pointer

I really don't see what is to be done here besides dynamic\_cast. It does exactly what you want it to do.

```

void fun(IBase * base) {

 auto * coll = dynamic_cast<Collection<BaseItem>*>(base);

 if (coll) {

 coll->A();

 }
}

```

```
}
```

Your Collection class must have a virtual destructor.

You can, of course, offer a templated version, if you'd need different baseitems in different scenarios for some reasons. This has bad code smell and I think your architecture is bad at this point, but oh well.

```
template <typename T> void fun(IBase * base) {
 auto * coll = dynamic_cast<Collection<T>*>(base);
 if (coll) {
 coll->A();
 }
}

void test(IBase * p) {
 fun<BaseItem5>(p);
}
```

If you have some other specific scenario in mind, please edit your question to say what you mean.

**C1:** I will update the current scenario and let me know if there is anything to be optimized. It has its weak points and it uses virtual inheritance. It does use casting and wrapping, but the main problem is that I can not implement functions like Iteration (which was worked around with for looping). – krizajb Oct 8 '13 at 19:54

**A6:** I can not see any other solution than calling some Collection method in Base implementation of IBase virtual methods.

```
class Base : public Collection<BaseItem>, public IBase
{
 virtual void B()
 {
 A();
 }
```

```
 }
}
```

**C1:** Maybe you missed understood me, I have access to B(), but I don't have access to A() and I would like to avoid writing wrapper for it. – krizajb Jun 13 '13 at 13:32

**C2:** @krizajB: Maybe I am still not understanding well but when you are in Base, you have access to both. – Kevin MOLCARD Jun 13 '13 at 13:34

**C3:** Not when I want to access Base via IBase interface. – krizajb Jun 13 '13 at 13:34

**C4:** I still do not understand, IBase is just an interface so it does not "access" to anything, it even do not anything by itself. It is in Base implementation that you do the job. – Kevin MOLCARD Jun 13 '13 at 13:36

**C5:** IBase is interface that does not know anything about the template class, there for It does't provide any kind of access to template functions. When I say access Base via IBase I mean IBase provides access to Base which implements IBase functions. IBase is pure virtual interface. – krizajb Jun 13 '13 at 13:40

**A7:** Maybe you could have an operator() in IBase that would be delegated to Base?

```
class CollectionBase {};
template <class Item> class Collection: public CollectionBase {};
```

```
class IBase
{
public:
 virtual CollectionBase* operator()() = 0;
};
```

```
class Base : public Collection<BaseItem>, public IBase
{
public:
 virtual Collection<BaseItem>* operator()() { return this; }
};
```

**C1:** you should not necessarily use operator overload for this, might be just a virtual function.  
Otherwise I totally agree. – Slava Jun 13 '13 at 13:16

**C2:** Hmm .. still getting same error, i.e. class IBase has no member named 'A' – krizajb Jun 13 '13 at 13:22

**C3:** @Slava Indeed the op() is not a necessity, but I suggested it as it offers the interface of the collection somewhat "transparently" – piwi Jun 13 '13 at 13:22

**C4:** @piwi What exactly do you expect operator () to do here? – Sebastian Redl Jun 13 '13 at 13:23

**C5:** @SebastianRedl My bad it would require to offer the interface of Collection in CollectionBase – piwi Jun 13 '13 at 13:27

808. <https://stackoverflow.com/questions/11613748/implement-activerecord-for-webservice-client>

**T:** Implement ActiveRecord for Webservice client

**Q:** I'm writing a webservice client with C#/MVC 4 that communicates with a REST-Webservice, using JSON.net on the client side. Everything is working fine so far, but I want to improve the architecture to make the handling more fluid.

I wrote a connector class and initialize it like this:

```
var conn = new MyConnector("admin", "admin", "http://localhost:9000");
```

Then I have a POCO class like this:

```
public class MyRecord
{
 [JsonProperty("record_id")]
 public string RecordId;
 ...
}
```

I'm saving changes by performing a PUT request to the Webservice. It looks like:

```
var updated = conn.UpdateRecord("MyRecordId", new NameValueCollection { {"title", "new_title"}});
```

What I want to do is to implement it more like ActiveRecord:

```
var myRecord = conn.GetRecord("myRecordId");
myRecord.title = "Foo";
myRecord.save();
```

That means that the MyRecord-class must be aware of the connection handler. That seems bad design to me, because MyRecord is basically a plain object. Another choice would be to pass the connection handler to the save-method, but that smells, too.

Any suggestions for improving it?

## 1 Answer

**A1:** If you want a "plain record" you should not implement the activerecord pattern. That is a contradiction. It sounds to me like you are more interested in the repository pattern.

As references have a look at: Is Repository pattern as same as Active Record pattern?

or for a broader perspective of your options:

<http://msdn.microsoft.com/en-us/magazine/dd569757.aspx>

**C1:** You're right - I'm using the Repository pattern for database access so far, but probably it's the best solution to extend it even to webservices. Thanks! – schneck Jul 23 '12 at 14:19

809. <https://stackoverflow.com/questions/818326/php-isset-do-you-need-it-in-a-form-check/818332#818332>

**T:** php isset do you need it in a form check?

**Q:** I trying to understand if a isset is required during form processing when i check  
\$\_REQUEST["input\_name"] if no value is passed it doesn't cry about it and php doesn't throw out an error if you are trying to access a array item which doesn't exist....i can use  
if(\$\_REQUEST["input\_name"]).. what about "empty" even in those cases i can use if()

THnks

**C1:** If PHP isn't whining about accessing things which don't exist, change its configuration so that it does - if you're not developing and testing with the most pedantic error level (E\_ALL & E\_STRICT), then you are going to write crappy, non-portable and possibly unsafe code. – Rob May 4 '09 at 0:16

## 5 Answers

**A1:** if(\$\_REQUEST["input\_name"])

will throw a notice (error) if "input\_name" doesn't exist, so isset() is recommended.

**C1:** isset() does suppress the warning, but \$\_REQUEST is a sucky way to go about capturing form input in most cases. – karim79 May 3 '09 at 23:46

**A2:** I wouldn't recommend using the \$\_REQUEST superglobal for capturing form input, unless you're testing a form. Use \$\_GET or \$\_POST instead, unless you have a really good reason.

Also, isset() and array\_key\_exists() both do the same trick with regard to array keys, although array\_key\_exists() is clearer in an arrays context.

I recommend using:

```
error_reporting(E_ALL); //E_ALL - All errors and warnings
```

within your development environment, as that can expose where better practices might be applied, such failure to declare variables before they are used, etc.

**C1:** Magic values aren't fun. You can just do error\_reporting(E\_ALL); - E\_ALL is a valid constant. – Samir Talwar May 4 '09 at 0:14

**C2:** Yea, E\_ALL is clearer and also more reliable in case the constant is changed in the future (no pun intended). – Calvin May 4 '09 at 0:29

**C3:** -1 for 30719. Use the define. – jmucchiello May 4 '09 at 1:31

**C4:** Changed to the more fun E\_ALL – karim79 May 4 '09 at 7:30

**C5:** I am using error\_reporting(65535) just for sure that everything is switched on;) For example E\_STRICT is not included in E\_ALL (I don't understand the logic behind it). – István Ujj-Mészáros Nov 19 '10 at 7:21

**A3:** There are different type of error levels. Checking a variable that is not set only throws a notice. Your error reporting is probably set to ignore those. It is best practice to always use isset when you want to check if a variable has been set, although it does have its gotchas.

Doing only what you are doing above, for example, if `$_REQUEST["input_name"]` is the string "0", it will evaluate to false. Also it is not a good idea to use `$_REQUEST` to begin with, as it can be affected by stuff like cookies and such and it's usually a code smell for bad architecture.

**C1:** +1; it's important to check whether or not the value is set, rather than inadvertently rely on PHP coercing the value into a boolean properly – Rob May 4 '09 at 0:15

**A4:** using `$_REQUEST` is pretty much a hack. You should be using `$_POST` or `$_GET` (depending on what you are doing) and you should use `isset()`.

Every book I've read on PHP seems to say that.

**A5:** Generally, at least for testing, set error reporting to `E_ALL` (all errors and warnings) either in your `php.ini` or in code using `error_reporting(E_ALL)`; (Look into adding `E_STRICT` too.) Better to get an obvious notice about an error up front, than to have something subtle go wrong that you don't catch till later.

Avoid using `$_REQUEST`, which is too vague (it includes GET, POST AND cookie values), and use the `$_POST` or `$_GET` if those are what you really mean, and do check with `isset($_POST["input_name"])`

The short answer is "Yes." :)

810. <https://stackoverflow.com/questions/769329/bypassing-disabling-delphis-reference-counting-for-interfaces/769504#769504>

**T:** Bypassing (disabling) Delphi's reference counting for interfaces

**Q:** For one particular issue in the architecture of an application I'm working on, interfaces seem to be a nice solution. Specifically, some "business objects" depend on a bunch of settings that are pulled from the database in the actual app. Letting those business objects ask for an interface (through Inversion of Control), and letting a central `TDatabaseSettings` object implement those interfaces, allows for better isolation, and thus for much easier unit testing.

However, in Delphi, interfaces seem to come with an, in this case, unpleasant bonus: reference counting. This means that if I do something like this:

type

```

IMySettings = interface
 function getMySetting: String;
end;

TDatabaseSettings = class(..., IMySettings)
 //...
end;

TMyBusinessObject = class(TInterfacedObject, IMySettings)
 property Settings: IMySettings read FSettings write FSettings;
end;

var
 DatabaseSettings: TDatabaseSettings;
 // global object (normally placed in a controller somewhere)

//Now, in some function...

O := TMyBusinessObject.Create;
O.Settings := DatabaseSettings;
// ... do something with O
O.Free;

```

On the last line (O.Free), my global DatabaseSettings object is now also freed, since the last interface reference to it (which was contained in O) is lost!

One solution would be to store the 'global' DatabaseSettings object with an interface; another solution would be to override the reference counting mechanism for the TDatabaseSettings class, so I can continue to manage the DatabaseSettings as a normal object (which is much more consistent with the rest of the app).

So, in summary, my question is: how do I disable the interface reference counting mechanism for a particular class?

I've been able to find some info that suggests overriding the IInterface methods `_AddRef` and `_Release` for the class (TDatabaseSettings in the example); has anyone ever done that?

Or would you say I shouldn't do this (confusing? just a bad idea?), and find a different solution to the architectural problem?

Thanks a lot!

## 6 Answers

**A1:** Ok, you can bypass it, but the question is if you really want that. If you want to use interfaces, you better use them completely. So as you have experienced it, you get problems if you mix class and interface variables.

```
var
```

```
// DatabaseSettings: TDatabaseSettings;
DatabaseSettings : IMySettings;
```

```
//Now, in some function...
```

```
O := TMyBusinessObject.Create;
O.Settings := DatabaseSettings;
// ... do something with O
O.Free;
```

You now have a second reference to the interface and losing the first will not free the object.

It is also possible to keep both the class and the object:

```
var
```

```
DatabaseSettings: TDatabaseSettings;
```

```
DatabaseSettingsInt : IMySettings;
```

Be sure to set the interface right after the object has been created.

If you really want to disable reference counting, you just have to create a new descendant of TObject that implements IInterface. I have tested the example below in D2009 and it works:

```
// Query Interface can stay the same because it does not depend on reference counting.
```

```
function TMyInterfacedObject.QueryInterface(const IID: TGUID; out Obj): HResult;
```

```
begin
```

```
 if GetInterface(IID, Obj) then
```

```
 Result := 0
```

```
 else
```

```
 Result := E_NOINTERFACE;
```

```
end;
```

```
constructor TMyInterfacedObject.Create;
```

```
begin
```

```
 FRefCount := 1;
```

```
end;
```

```
procedure TMyInterfacedObject.FreeRef;
```

```
begin
```

```
 if Self = nil then
```

```
 Exit;
```

```
 if InterlockedDecrement(FRefCount) = 0 then
```

```
 Destroy;
```

```
end;
```

```
function TMyInterfacedObject._AddRef: Integer;
begin
 Result := InterlockedIncrement(FRefCount);
end;
```

```
function TMyInterfacedObject._Release: Integer;
begin
 Result := InterlockedDecrement(FRefCount);
 if Result = 0 then
 Destroy;
end;
```

FreeRef just lowers the refcount just like \_Release. You can use it where you normally use Free.

C1: Thanks a lot for the very extensive reply, it's much appreciated! Yes, I should probably think a bit more before I go down the dark path of disabling reference counting. – onnodb Apr 20 '09 at 18:25

C2: Ok, I tested it in D2009 and it worked like a charm ;-). – Toon Krijthe Apr 20 '09 at 18:41

C3: Am I right that your example doesn't actually completely disable reference counting, but instead makes the reference count start off at 1? I guess you could also accomplish that by explicitly calling "TMyInterfacedObject.\_AddRef" right after object creation, and then doing a "\_Release" where you would normally call "Free"? – onnodb Apr 20 '09 at 19:45

C4: No, it treats FreeRef just like any \_Release. So it does not mind which happens first. If all interfaces are out of scope and FreeRef is called, the object is freed. – Toon Krijthe Apr 20 '09 at 19:51

**A2:** Don't descend from TInterfacedObject, instead descend from TSingletonImplementation from standard System.Generics.Defaults unit.

TSingletonImplementation is a base for simple classes that need a basic IInterface implementation, with reference counting disabled.

TSingletonImplementation is a thread-safe base class for Delphi classes that support interfaces. Unlike TInterfacedObject, TSingletonImplementation does not implement reference counting.

**C1:** Good answer, but something that wasn't available in the standard library in my version of Delphi at the time (<= 2007) : ) – onnodb Apr 22 '13 at 9:04

**A3:** `_AddRef`, `_Release` and `_QueryInterface` are, in fact, what you want to override. You should be very clear about what you're doing, however, as this can cause memory leaks or strange, hard-to-find bugs.

Don't descend from `TInterfacedObject`, instead descend from `TObject`, and implement your own versions of the first two of those methods that return 1.

**C1:** That's really fast... thanks a bunch! Do you think that the way I want to use interfaces makes sense? It strikes me as odd that the whole reference counting comes in at all, really --- why not just use them as a really nice way to decouple classes? – onnodb Apr 20 '09 at 17:53

**C2:** Reference counting is actually really slick. You don't need to free the object; Delphi will do it for you when the variable it's assigned to falls out of scope. – Tim Sullivan Apr 20 '09 at 17:59

**C3:** Yes, that's true, it is slick (though I haven't found a use for it yet). But it's also nice to be able to disable it, since it does make things inconsistent if mixed with 'traditional' object management :) – onnodb Apr 20 '09 at 18:08

**C4:** Returning -1 is just a convention, the returned value itself doesn't matter, as long as it is not 0 (which would lead to the destruction of the implementing object). – mghie Apr 20 '09 at 19:40

**C5:** @Mghie: Actually, since it's the `_Release` method itself that calls `Destroy` (on `TInterfacedObject`, that is), and not some external code, you don't even have to worry about returning 0. It's still better to return -1, though, to let end-users know that this is not a reference-counted interface, in case they care. – Mason Wheeler Apr 20 '09 at 19:58

**A4:** To disable reference counting, `AddRef` and `Release` should do nothing but return -1

```
function TMyInterfacedObject._AddRef: Integer;
begin
 Result := -1;
end;
```

```
function TMyInterfacedObject._Release: Integer;
begin
 Result := -1;
end;
```

There is quite a lot of utility in interfaces without reference counting. If you use reference counting, then you cannot mix object and interface references as bad things will happen. By disabling ref counts, you can happily mix interface and object references without worrying about your objects suddenly getting auto destroyed.

**C1:** One caveat with this approach: make absolutely sure that you have cleared all interface references to an object before the object is Free'd, otherwise you will get weird errors. – Alistair Ward Apr 22 '09 at 22:16

**A5:** Disabling reference counting for this kind of problem smells bad. A much nicer and architectural solution would be to use some kind of "singleton" pattern. The easiest way to implement this would look like:

interface

type

```
TDatabaseSettings = class(..., IMySettings)
```

```
end;
```

```
function DatabaseSettings: IMySettings;
```

implementation

```
var
```

```
 GDatabaseSettings: IMySettings;
```

```
function DatabaseSettings: IMySettings;
```

```
begin
```

```
 if GDatabaseSettings = nil then GDatabaseSettings := TDatabseSettings.Create;
```

```
 Result := GDatabaseSettings;
```

```
end;
```

```
O := TMyBusinessObject.Create;
O.Settings := DatabaseSettings;
O.Free;
```

By the way: when you use interfaces: always use interface variables! Do not mix both class en interface vars (use "var Settings: IMySettings" instead of "var Settings: TDatabaseSettings"). Otherwise reference counting will get in your way (auto destroy, invalid pointer operations, etc). In the above solution, GDatabaseSettings is also of type "IMySettings", so it gets a proper reference count, and will last till your program terminates.

**C1:** Yes, it does smell, and everyone here seems to agree on that. Which is too bad, since interfaces seem such a nice way to decouple objects (by only using them as a "contract"). Thanks for your input!  
– onnodb Apr 20 '09 at 18:30

**C2:** @onnodb: Interfaces are indeed a good help for properly decoupled design. Unless you need to have circular references the ref-counting isn't bad at all - you just need to be careful when mixing interfaces with references to the implementing objects. Don't do this, and you will be happy. Since classes can implement multiple interfaces there is generally no need to use the object references directly, just implement and use a more specialized secondary interface instead. – mghie Apr 20 '09 at 19:38

**C3:** Another tip: Don't use the technique in this answer, all the negative sides of singletons apply here as well - if you try to eliminate globals, don't go for such disguised globals instead. Having a interface reference in a place you control is just as good as above technique, with the added benefit that the implementing object will actually be destroyed once all references to it are reset, instead of it staying in memory until the app exits. That would be little better than a memory leak. – mghie Apr 20 '09 at 19:44

**C4:** @mghie: thanks for the great input! – onnodb Apr 20 '09 at 20:47

**A6:** Or just use the code below:

```
var
 I: IMyInterface;

begin
 I := ...;

 ...

 Do whatever you want in a scope;

 Initialize(I); // - this will clear the interface variable without calling the _release.
```

end.

811. <https://stackoverflow.com/questions/46226075/is-holding-static-reference-to-multiple-objects-in-abstract-class-ok/46226314#46226314>

**T:** Is holding static reference to multiple objects in abstract class OK?

**Q:** Is there anything significantly bad in terms of performance, memory consumption, design etc about below pattern ?

```
public abstract class A {
 public static final D d = new D();
 public static final C c = new C();
 and many more member of class B, C, and D; like hundreds
}
```

```
public class B extends A {
}
```

```
public class C extends B {
}
```

```
public class D extends C {
}
```

**C1:** I'd be most worried about the design. – Kayaman Sep 14 '17 at 18:33

**C2:** No, but there is probably a big design problem. I can't imagine a good reason to have hundreds of individual static final objects, especially if they're not inside some collection. – JB Nizet Sep 14 '17 at 18:34

**C3:** You probably want to use an interface if the whole purpose of the class is to hold static objects – smac89 Sep 14 '17 at 18:35

**C4:** What are you trying to accomplish? – Arkadiy Sep 14 '17 at 18:36

**C5:** Forgetting performance, it's a very dubious practice -- Your abstract class should not have such explicit awareness of its subtypes. – stephen.vakil Sep 14 '17 at 18:39

## 2 Answers

**A1:** Is there anything significantly bad in terms of performance, memory consumption, design etc about below pattern ?

performance - not really.

memory - no, if you (1) have predictable bound on how many internal objects will be created (and you are ok with memory they will occupy), (2) have a good idea of lifespan of these objects, (3) you are confident that your abstract class wont be leaked. Otherwise, the answer is maybe.

design - yes. What you are trying to do smells badly from design point of view. It is really hard to tell what you are actually trying to achieve, but the chance that you can design your architecture better is rather high.

**A2:** There is nothing wrong with it.

I would recommend using an interface though:

```
public interface A {
 D d = new D();
 C c = new C();
 and many more member of class B, C, and D; like hundreds
}
```

Because by default interface members which are fields are treated as public static final members, which is precisely what you were doing with the abstract class.

I only recommend this if the abstract class (as implied by your question) only holds those static fields. Otherwise, the way you currently have it is fine.

Edit: OP added question about design

In terms of design, it is a bad design because the abstract class is aware of its subtypes rather than simply relying on specifying its behaviour and leaving the rest to some other class which can aggregate both the parent and the children's behaviour to achieve some other result.

What I would do in this case is to make the child classes independent of each other, by having them only implement their behaviour which does not rely on A

So you will have a class:

```
public class B {
```

```
}
```

```
public class C {
```

```
}
```

```
public class D {
```

```
}
```

Now you create another class:

```
public class UseBCD {
```

```
 public static final B b;
```

```
 public static final C c;
```

```
 public static final D d;
```

```
 // define all the behaviour of class A, plus use the classes as you like
```

```
}
```

Now you have the dependency as unidirectional rather being tightly coupled.

If you find that you cannot have B, C, and D, separate, then it is most likely the case that you actually only need one class that does everything A, B, C, and D does.

**C1:** That's an anti-pattern. An interface is designed to be implemented. And that's not the case here. Just use a regular final class, with a private constructor. And use static imports if you want to use the constant without prefixing it with the class name. – JB Nizet Sep 14 '17 at 18:39

**C2:** To that point, if you're going to recommend something, explain the reasoning behind that recommendation. – Sotirios Delimanolis Sep 14 '17 at 18:41

**C3:** @JBNizet How is that not the case? Did you not see the other classes in the OP's question that extend the abstract class? How is using a final class going to help that? – smac89 Sep 14 '17 at 18:42

**C4:** The case refers to you using an interface with state, instead of behavior, which is an anti-pattern. – Sotirios Delimanolis Sep 14 '17 at 18:43

**C5:** @smac89 For a little more insight, this is called the constant interface – Vince Emigh Sep 14 '17 at 19:02

812. <https://stackoverflow.com/questions/45529749/cyclic-dependency-between-type-a-and-b/45530277#45530277>

**T:** Cyclic dependency between Type A and B

**Q:** I have two classes:

```
class A {
```

```
 final B b;
```

```
 A(final B b) {
```

```
 this.b = b;
```

```
}
```

```
 void doIt() {
```

```
 b.doSomething();
```

```
}
```

```
 void doSomething() {
```

```
// TODO Auto-generated method stub
}
}
```

and

```
class B {

 final A a;

 B(final A a) {
 this.a = a;
 }
```

```
 void doIt() {
 a.doSomething();
 }
```

```
 void doSomething() {
 // TODO Auto-generated method stub
 }
}
```

There is no way to instantiate any of them.

I could use a setter, e.g:

```
class B {

 A a;
```

```
B() {

}

void setA(final A a) {
 this.a = a;
}

void doIt() {
 a.doSomething();
}

void doSomething() {
 // TODO Auto-generated method stub
}
}
```

But here I need checking for a being null in doIt() and handling this case. This is not the end of the world, but maybe

there is a more clever way to do it?

Or maybe this is even an anti pattern in general and something is wrong with the architecture in the first place?

Root of the problem:

I have a database from which I load entities. I cache them once loaded and use this cache to establish bi-directional relationships between the types. This is necessary, since when I load multiple instances

of A, they should have (in this case) all the same instance of B. Therefore B needs to be instantiated before and re-used. But B has also a relationship to all these as, therefore the cyclic dependency.

So in more short, The cyclic dependencies are caused by bi-directional relationships in the database. I use to avoid them where possible but besides of the trouble described here, there is no 'real-world' problem with bi-di relationships, in fact it is a very natural thing.

So maybe the question should be How to properly map bi-di-relationships from a relational database into the oop world?

More concrete example:

To establish bi-di relationships, I load instances from a cache, so that I have the same instance when the entity ID is the same:

```
interface Cache<T>
```

```
interface CacheA extends Cache<A>
```

```
interface CacheB extends Cache
```

```
class CacheManager {
```

```
 final CacheA cacheA;
```

```
 final CacheB cacheB;
```

```
 CacheManager(final DatabaseAccess databaseAccess) {
```

```
 cacheA = new CacheA();
```

```
 cacheB = new CacheB();
```

```

cacheA.setEntityLoader(id -> new SimpleAttachedA(id, databaseAccess, cacheB));
cacheB.setEntityLoader(id -> new SimpleAttachedB(id, databaseAccess, cacheA));

}

}

```

Instances of A will access this cache if the relationship to B is accessed. The same the other way around.

I know that it would be best, if CacheA and CacheB would be the same object, since then I could just create the cache and pass it on to all instances of A and B.

CacheA and CacheB used to be the same, namely Cache. I chose to separate those, so I can use a generic class and remove a lot of duplicate code.

CacheManager cannot implement CacheA and CacheB, if they both extend the same generic interface Cache<T> but with different types of T.

Therefore CacheManager uses composition instead of inheritance. So I end up with two caches, which need to access each other to realize the bi-di relationship of A and B.

#### 4 Answers

**A1:** Cyclic dependencies are typically a sign of bad design. In some cases you cannot prevent cyclic dependencies, but you should always think about another solution. When you have cyclic dependencies, chances are that you will change one of the classes and have to change the other one as well. When your cycle contains more than two classes, this can be a lot of work. Also problems like the one you mentioned, "I need the other class to instantiate one of them", arise.

As your classes appear to be dummy classes, I cannot give a really good advise, but some general points nonetheless.

Classes should have high cohesion and low coupling. Meaning, classes should depend on another as less as possible (low coupling), while every class should do one functionality, and all of that functionality (high cohesion).

When you have two classes which depend on one another, this is typically a sign for low cohesion, as part of the functionality is in class A and another part in class B. In this case you should consider merging both classes in one class.

On the other hand when you try to find a class name for that merged class and come up with something like ThisAndThatDoer, you should split them in two classes ThisDoer and ThatDoer, as this is a sign for low cohesion. When you then have your original classes depending on one another again, you could maybe create a new class Executor which connects both classes. But this can quickly become a god class, which is also an anti-pattern. So you should be careful with this.

So all in all, I recommend thinking about your class design and finding a way to remove the dependency at least in one direction. I hope this helps with your problem.

**C1:** Thanks for the good answer, I edited the question. – kerner1000 Aug 6 '17 at 8:19

**A2:** This is indeed considered an anti-pattern and often, there is a better way to do it. If A needs B and B needs A this suggests that

functionality, which conceptually belongs together, is divided into two components (A and B). Because each component only implements part of the functionality, it needs the other to do what's missing. Solution: Identify the parts of A and B that belong together and move them to a new component C. Make what's left of A and B depend on C and remove the dependencies between A and B.

A contains two separate functionalities A1 and A2 that could be divided into two separate components. If A1 needs functionality provided by B and B needs functionality provided by A1, a circular dependency between A and B results. Solution: Split A into two separate components A1 and A2 and make A1 depend on B and make B depend on A2.

As mentioned earlier, there are cases where circular dependencies are alright and would result in a more obscure design if avoided. However, often this is not the case and you should try to restructure your functionalities to avoid circular dependencies.

If you provide more info on your specific case (i.e. what are A and B doing and what are the parts that depend on each other), more tips can be given.

**C1:** Thanks a lot for the answer, please see edited question for some more concrete explanation of the problem. – kerner1000 Aug 6 '17 at 8:21

**A3:** Or maybe this is even an anti pattern in general and something is wrong with the architecture in the first place?

1) A bidirectional coupling between two concrete classes should be avoided as much as possible if both classes don't need to have access all members of the other class.

Make it generally creates a coupling higher than needed.

2) A bidirectional coupling is not necessary a problem if it is required but a cyclic dependency in the construction of the objects is.

It is a bad smell as it is not solvable without breaking it.

Your solution with a setter is indeed a way to solve it.

If you want really to avoid it and keep the constructors way in both classes, you have some solutions if you change your design.

You could for example replace one of both parameter (A or B class) by a class that will contain all data to create the A or B instance.

Suppose you want to abstract the creation of B :

A

```
public A(ContextForB contextForB) {
 // init A data
 ...
 // create B from context and set the B dependency
 b = new B(contextForB, this);
}
```

B

```
public B(ContextForB contextForB, A a) {
 //.. create B from the context
 ...
 // set the A dependency
 this.a = a;
}
```

ContextForB can be anything.

ResultSet, Query, Iterator, Supplier etc...

You can so use them in these ways :

```
// instantiate both from A
A a = new A(new ContextForB(...));

// OR instantiate both from B
ContextForB contextForB = new ContextForB(...);
B b = new B(contextForB, new A(contextForB));
```

**C1:** Thanks for the excellent answer! I think I will just use a setter ;) Nevertheless, I edited the question to illustrate the problem more concretely, since A and B do not depend on each other actually, and they are not concrete types either. Maybe you could also comment on the more detailed description of the problem. – kerner1000 Aug 6 '17 at 9:34

**A4:** Create interface

```
public interface Doable {
 void doSomething();
}
```

Then use it in A and B:

```
class A implements Doable {
```

```
 final Doable b;
```

```
 A(final Doable b) {
```

```
 this.b = b;
```

```
}
```

```
 void doIt() {
```

```
 b.doSomething();
```

```
}
```

```
@Override
```

```
void doSomething0 {
```

```
 // TODO Auto-generated method stub
```

```
}
```

```
}
```

and

```
class B implements Doable {
```

```
 Doable a;
```

```
B(final Doable a) {
```

```
 this.a = a;
```

```
}
```

```

void doIt() {
 a.doSomething();
}

@Override
void doSomething() {
 // TODO Auto-generated method stub
}

}

```

Here you will avoid cyclic dependency.

**C1:** I still need in A and B an instance of Doable. The only difference here is that I could give A also an instance of A instead of B, since both implement the same interface. This was also only an example, for a more concrete explanation of the problem please see the edited question. – kerner1000 Aug 6 '17 at 8:28

**C2:** kerner1000, I think my answer is suitable to the edited question. You can create separate interfaces for A and B and then use them in each other. – Dmitry Gorkovets Aug 6 '17 at 8:32

**C3:** Sorry, but I think this does not work. Were does the instance of Doable come from? I cannot instantiate any implementing class of Doable. – kerner1000 Aug 6 '17 at 8:35

813. <https://stackoverflow.com/questions/51657920/emitting-events-to-a-distant-relative-of-a-component>

**T:** Emitting events to a distant relative of a component [duplicate]

**Q:** This question already has an answer here:

VueJs 2.0 emit event from grand child to his grand parent component 3 answers

Let's say I have the following component hierarchy:

App.vue

vue-router's router-view tag

Home.vue: the home page

PopularAudioList.vue

About.vue some static page

Player.vue: an always-on-top audio player that can be used throughout the site. Playback isn't interrupted when switching pages. It has visible play/stop/volume controls.

PopularAudioList.vue renders a list of audio files that users can choose from, and a play button for each item. Each play button emits a audio-file-chosen event with a URL parameter. I know how to make the component's parent, Home.vue, hook in to this event. But I'd like Player.vue to catch it, since that's the component that will be controlling audio playback.

What's the best way to propagate the event there? I could try to make Home.vue re-emit the event to App.vue, which would need to pass it to Player.vue. But that seems horribly inefficient, it smells like bad architecture, and vue-router might make this difficult.

Should I reorganize my architecture to create a more direct relation between PopularAudioList.vue and Player.vue to make this work? Are events even the right choice here?

**C1:** probably like this: inside player.vue, uses this.\$root.on('your-event', handler()), or use event bus – Sphinx Aug 2 at 16:11

**C2:** @thanksd, the approach this.\$root.\$emit and this.\$root.\$on should work also, but after google it, it seems much less developers mentioned this solution. are there any disadvantages? Caused by can't use it in the template by v-on? – Sphinx Aug 2 at 18:29

**C3:** @Sphinx There's nothing necessarily wrong with handling events through the root instance. It's effectively the same as using a bus (which is described in the post I linked). I think most people prefer to use bus instances because it's more explicitly clear that the function of the instance is for global event handling. In larger applications, you also might have multiple bus instances for different types of events. But yeah, like you mentioned, one of the downsides of using a bus or the root is that they don't use v-on, which makes it harder to see the flow of data in your app. – thanksd Aug 2 at 18:57

**C4:** Bingo. I think I'll either take the Vuex or this.\$root.\$emit approach then! – Pieter Aug 2 at 19:13

814. <https://stackoverflow.com/questions/41771642/is-procedural-code-ever-appropriate-for-rendering-a-ui-view/41772312#41772312>

**T:** Is procedural code ever appropriate for rendering a UI View? [closed]

**Q:** Background

At work, I ran into some code that used a series of procedural methods to build an HTML View. It felt really wrong to me, and while working on it, I managed to introduce unintended layout changes.

See the pseudo-code below for a more detailed explanation.

Questions

The project was an ASP.NET web application targeting the 4.0 framework. With all the tools available to an ASP.NET developer, is there any reason this pattern would be appropriate.

Ultimately, given no other time priorities, should this code be refactored ? It definitely smells of code fragility.

### Caveats

I'm not 100% sure if this is an appropriate question for SO. It falls in the somewhat subjective topic of programming patterns. As a subjective topic, there is the potential for the SO Answers to devolve into a discussion, which as we all know, is not the purpose of SO. I don't think this question qualifies as code-golf.

What I'm looking for is objective evidence that this particular pattern is either a bad idea for some reason such as it leads to unmaintainable code. Or evidence that this pattern is appropriate for certain situations, bonus points for citing a specific example.

Had I written this code, I would have probably used some sort of well-known templating engine. I'd handle the logic decisions (highlight rows for people who have birthdays) in non-view code. I suppose I'm a proponent of logic-less template engines.

I apologize for the long code, I tried to keep it terse without sacrificing context. Hopefully, this will be a fun question to answer for some battle-scarred SO veteran.

### The Code

#### About the pseudo-code

The code in this question does not represent any actual programming language. It is mostly based on JavaScript with HTML terms thrown in there. It should be easy enough to interpret without significant mental gymnastics.

page load event handler

```
protected void Page_Load(object sender, EventArgs e) {
```

```
 var data = DataLayer.getData();
```

```
var engine = new DataViewRenderEngine(data);

var divElement = engine.Render();

document.body.add(divElement);

}
```

Definition of DataViewRenderEngine

```
class DataViewRenderEngine {
```

```
 private _dataSource = null;
```

```
 public DataViewRenderEngine(dataSource) {
```

```
 this._dataSource = dataSource;
```

```
}
```

```
 public Element Render() {
```

```
 return RenderView(this._dataSource);
```

```
}
```

```
 private Element RenderView(data) {
```

```
 var containerDiv = RenderContainerDiv(data);
```

```
 var pageHeader = PenderPageHeader(data.Title);
```

```
 containerDiv.add(pageHeader)
```

```
 var personTable = renderPersonTable(data.PeopleArray)
```

```
 containerDiv.add(personTable);
```

```
 return containerDiv;

 }

private Element RenderContainerDiv() {
 return new Element({
 tag: 'div',
 class: 'container'
 });
}

private Element RenderPageHeader(title) {
 return new Element({
 tag: 'h1',
 innerHTML: title
 });
}

private Element RenderPersonTable(peopleArray) {
 var table = new Element('table');

 for(var person in peopleArray) {
 var row = RenderPersonTableRow(person);
 table.add(row);
 }
}
```

```

 return table;

 }

private Element RenderTableRow(person) {
 var row = new Element('tr');

 row.add(new Element({
 tag: 'td',
 innerHTML: person.firstName
 }));

 row.add(new Element({
 tag: 'td',
 innerHTML: person.lastName
 }));

 var today = Date.Today();
 if(person.birthday.Month == today.Month &&
 person.birthday.Day == today.Day) {
 row.BackgroundColor = 'green';
 }

 return row;
}

}

```

**C1:** I'm also not sure it belongs here. Maybe the Software Engineering site? I haven't read their policy on "best practices" questions in a while though. The refactoring / code fragility questions seem like they might be on topic there. But again, I haven't read their policies in a while. – Tophandour Jan 20 '17 at 20:19

**C2:** To whoever voted to close the question for being opinion-based: I tried to address that concern in the body of my question, so can you please comment as to why you think there is no objective answer to this question. Unless the vote was from @Tophandour , then thank you for the feedback. – Walter Stabosz Jan 20 '17 at 20:37

**C3:** the vote wasn't from me, but I imagine whoever it is might have similar thoughts. Personally I'm just not sure where this belongs and I'm deferring to someone who knows the other pages' policies better. – Tophandour Jan 20 '17 at 20:47

## 1 Answer

**A1:** Actually it seems like you think that object-oriented programming has no trace of the past: procedural programming is still there.

When you implement methods, their bodies are still procedural. That is, you're calling methods which used to be procedures and functions later fused into a single concept.

Later on, there're good and bad designs. If your coworker's code looks like your pseucode, then it seems that it smells.

A render engine shouldn't be tied to a particular view. Yours seem like a mix of a view, view template and view renderer. Thus, clearly breaks single responsibility principle as it does too many things.

Conclusion: it's just a bad design/architecture. That's all.

Now I'll answer your concrete questions:

The project was an ASP.NET web application targeting the 4.0 framework. With all the tools available to an ASP.NET developer, is there any reason this pattern would be appropriate.

In 2017, probably you shouldn't invest more effort on ASP.NET Web Forms. If they did this way, either adapt yourself to their bad design, or convince them to switch to ASP.NET MVC or even to abandon server-side view programming in favor of a full HTML5 web app on the client-side.

Ultimately, given no other time priorities, should this code be refactored ? It definitely smells of code fragility.

This question deserves the same answer as your first one.

815. <https://stackoverflow.com/questions/4835046/why-not-use-an-ioc-container-to-resolve-dependencies-for-entities-business-objec/4836790#4836790>

**T:** Why not use an IoC container to resolve dependencies for entities/business objects?

**Q:** I understand the concept behind DI, but I'm just learning what different IoC containers can do. It seems that most people advocate using IoC containers to wire up stateless services, but what about using them for stateful objects like entities?

Whether it's right or wrong, I normally stuff my entities with behavior, even if that behavior requires an outside class. Example:

```
public class Order : IOrder
{
 private string _ShipAddress;
 private IShipQuoter _ShipQuoter;

 public Order(IOrderData OrderData, IShipQuoter ShipQuoter)
 {
 // OrderData comes from a repository and has the data needed
 // to construct order
 _ShipAddress = OrderData.ShipAddress; // etc.
 _ShipQuoter = ShipQuoter;
 }

 private decimal GetShippingRate()
 {
 return _ShipQuoter.GetRate(this);
 }
}
```

}

}

As you can see, the dependencies are Constructor Injected. Now for a couple of questions.

Is it considered bad practice to have your entities depend on outside classes such as the ShipQuoter? Eliminating these dependencies seems to lead me towards an anemic domain, if I understand the definition correctly.

Is it bad practice to use an IoC container to resolve these dependencies and construct an entity when needed? Is it possible to do this?

Thanks for any insight.

**C1:** just do stuff that you need to because it makes your work easier, not because probably this is how you should do it – Omu Jan 29 '11 at 12:21

**C2:** As a self-taught programmer, I have gone that route, and it led to the software that is currently used by my company. A procedural/transaction script based software was what emerged, partly because it was easiest and partly because I didn't know any better. It is absolutely painful to maintain and expand, which is why I'm taking the time to re-write it and seeking advice from people who have already overcome these problems on how not to make the same mistakes. – Casey Wilkins Jan 29 '11 at 15:38

**C3:** related: [stackoverflow.com/questions/827670/](http://stackoverflow.com/questions/827670/)... – Ruben Bartelink Apr 25 '13 at 11:53

## 2 Answers

**A1:** The first question is the most difficult to answer. Is it bad practice to have Entities depend on outside classes? It's certainly not the most common thing to do.

If, for example, you inject a Repository into your Entities you effectively have an implementation of the Active Record pattern. Some people like this pattern for the convenience it provides, while others (like me) consider it a code smell or anti-pattern because it violates the Single Responsibility Principle (SRP).

You could argue that injecting other dependencies into Entities would pull you in the same direction (away from SRP). On the other hand you are certainly correct that if you don't do this, the pull is towards an Anemic Domain Model.

I struggled with all of this for a long time until I came across Greg Young's (abandoned) paper on DDDD where he explains why the stereotypical n-tier/n-layer architecture will always be CRUDy (and thus rather anemic).

Moving our focus to modeling Domain objects as Commands and Events instead of Nouns seems to enable us to build a proper object-oriented domain model.

The second question is easier to answer. You can always use an Abstract Factory to create instances at run-time. With Castle Windsor you can even use the Typed Factory Facility, relieving you of the burden of implementing the factories manually.

**C1:** Thanks Mark. I've seen the Typed Factory and read your other posts on the Abstract Factory method, but I have never seen any examples of them being used to resolve entities. Is this because most people design their entities without any dependencies except a repository? Am I getting into trouble down the road if I make rigorous use of something like Typed Factory to resolve my entities that have outside dependencies? – Casey Wilkins Jan 29 '11 at 15:48

**C2:** The thing I was trying to say is that if your Entities contains other collaborators that may access other Entities, etc. you may run into all sorts of maintenance issues - not to mention the SRP violations and the N+1 issues. That's why Evans recommends treating each Entity as an Aggregate Root. – Mark Seemann Jan 29 '11 at 18:34

**C3:** In my example ShipQuoter pulls shipping rates for an order from a webservice (e.g. UPS). Would you make this a Service that accepts IOrder, or would you make it part of the domain object like Order.GetRates? – Casey Wilkins Jan 29 '11 at 21:45

**C4:** I would spend a lot of time figuring out how I could avoid a synchronous pull in the first place. You more you pull data in synchronous, blocking fashion, the more brittle your design becomes. That's why CQRS is such an attractive alternative. – Mark Seemann Jan 30 '11 at 9:35

**C5:** Your link to Greg's paper is dead. But it's still available here. And it appears like this is a newer version. – BornToCode Jun 14 '16 at 12:55

**A2:** I know this is an old post but wanted to add. The domain entity should not persist itself even if you pass in an abstracted repository in ctor. The reason I am suggestion this is not merely that it violates SRP, it also contrary to DDD's aggregation. Let me explain, DDD is suited for complex apps with inherently deep graphs, therefore, we use aggregate or composite roots to persist changes to the underlying "children", so when we inject persistence into the individual children we violate the relationship children have to the composite or aggregate root that should be "in charge" of the life cycle or aggregation. Of course the composite root or aggregate does not persist its own graph either. Another is with injecting dependencies of DDD objects is that an injected domain object effectively has no state until some other event takes place to hydrate its state. Any consumer of the code will be forced to init or setup the domain object first before they can invoke business behavior which violates encapsulation.

816. <https://stackoverflow.com/questions/20401150/how-to-setup-my-environment-so-my-continuous-integration-applied-web-cfg-trans>

**T:** How to setup my environment so my continuous integration applied web.config transformations and does not overwrite the original web.config file?

**Q:** Currently I have in my project my local computer, in which I develop the system and a Dev server, in which the continuous integration is meant to happen. My dev server also has a visual studio in which I would like to be able to open my solution sometimes, so, to be able to do so, I have a folder to which I download my source code and open the solution from it. My IIS also points to this folder.

This brings me to a problem: when the continuous integration runs, I need it to run the webconfig transformation. If I do so and overwrite my versioned web.config, GIT will point it out as a changed file.

I think I am doing something wrong with my architecture here. Something smells bad. What am I doing wrong? What are the best practices to set my environment to be able to

Have continuous integration

Use web.config transformations

Be able to open the source code in visual studio on my dev machine

?

Thanks!

817. <https://stackoverflow.com/questions/48425977/c-sharp-how-to-disable-all-events-on-wpf-form/48449698#48449698>

**T:** C# - How to disable all events on WPF form

**Q:** I have a lot of ToggleSwitch and Combobox controls in my application, I am setting them up on application startup, which fires all the events associated with those controls.

These events are supposed to fire only when the user interacts with the controls and not when the value is changed programmatically.

Is there a way to disable all the events and reactivate them afterwards?

I didn't find any efficient solution on other posts or on the Internet.

**C1:** I'm not aware any way to do this. but the need to do this might point to a bad architecture. – Alex Jan 24 at 15:26

**C2:** you can add a flag and rise it after you finish programmatically push. in the event Handler you do if(flag){}else{} – Sarel Foyerlicht Jan 24 at 15:26

**C3:** What if you just declare a boolean set to false, that you will switch to true at the end of the startUp. You can check in your custome event the value, if it's false they just return – Daniele Sartori Jan 24 at 15:27

**C4:** Already thought about this solution but it means a lot of conditions. If i have 100 events it makes 100 test. I was looking for something less messy. – Dairon Jan 24 at 15:33

**C5:** Well... 100 hundred events IS messy... ;-) As Alex said, this is a clue pointing to bad design – Bruno Jan 24 at 15:42

**C6:** What do you mean setting them up? Do you not use XAML and not care at all about events? – XAMIMAX Jan 24 at 16:00

**C7:** I wouldn't consider 100 checks (especially such trivial ones) "messy". Apart from that, do these events being raised have any real impact on your application, or are you just trying to optimize your code upfront? If it is an issue, I don't think raising these events is the problem, but rather what your handlers do, so perhaps a good place to start would be to defer subscription to these event (by, for example, creating a subscription queue, which would realize them once the application is "set up"). – Grx70 Jan 24 at 17:41

**C8:** To keep long story short - there is no way to disable event raising in .NET, let alone to narrow it only to WPF related ones. – Grx70 Jan 24 at 17:46

**C9:** @ALex and Bruno you said it might be a bad design issue. I have on my UI 10 checkbox and 10 combobox how do you catch user interaction if not with events ? – Dairon Jan 25 at 8:35

**C10:** @Grx70 They have an impact because everytime a combobox item is changed or a checkbox is checked it has to communicate with a serial device. So at application startup when i get all the parameter of the serial device to set up my ComboBoxes and everything, it is triggering all the events related to these controls and sending unnecessary data to the serial device. Which makes the process of reading my serial device parameters slower. – Dairon Jan 25 at 8:42

## 2 Answers

**A1:** Disabling all events isn't possible because there are many event handlers in the framework that you have no direct control over. The fact you want to do this at all suggests that your design is flawed.

You can detect the difference between user interaction and programmatic change with a bit of plumbing and the diligence to use it everywhere that it matters. Suppose you have a ComboBox, and

you want to detect when the user triggers SelectionChanged. This can be done with a flag, set only when you make programmatic changes. i.e.

```
private bool blockHandlers;
```

```
// Wrapped in a method for convenience.
```

```
public void SetSelectedIndex(int index)
```

```
{
```

```
 blockHandlers = true;
```

```
 comboBox.SelectedIndex = index;
```

```
 blockHandlers = false;
```

```
}
```

```
private void ComboBox_SelectionChanged(object sender, SelectionChangedEventArgs e)
```

```
{
```

```
 if (blockHandlers) return;
```

```
// Your event handling code...
```

```
}
```

Using this technique requires that you always either use SetSelectedIndex or set/reset blockHandlers around programmatic changes to ensure event handler(s) observe it and do nothing.

**C1:** I will look for other ways to do it and if none of them satisfying for my purpose I think i will just go with that. – Dairon Jan 25 at 8:45

**C2:** Somewhat offtopic remark: The general consensus between me and coworkers is to name such a bool switch by its effect (blockEvents) rather than the description of why it needs to be switched (isSelfUpdating), because there may be several reasons to flick the switch. – Flater Jan 25 at 11:04

**C3:** @Flater That's useful, thanks. – Koby Duck Jan 25 at 18:23

**A2:** As some have said, this smells of bad architecture and that you would even want to do this in the first place, but there is a way you can "block" events using an if statement and a simple boolean.

First, you'll want to declare a field in your class.

```
private bool _blockHandlers;
```

Once you've done that, you just set the bool to true where you want to start blocking handler, probably in your class constructor if its straight away. As I don't know the name of your class I won't go there.

But lets say you have an event handler

```
private void SomeHandler
```

```
{
```

```
 if (blockHandlers)
```

```
 {
```

```
 return;
```

```
}
```

```
// It's not blocked, lets continue...
```

```
}
```

This way, you can temporarily block handlers or permanently block them, with this method you just simple check if they're blocked, if not you can continue with your handler.

**C1:** upvote for the ability to only temporary disable them. – Josh Hallow Jan 25 at 18:38

**C2:** Aside from mentioning that it's a code smell, how is this any different from my answer? – Koby Duck Jan 25 at 18:55

**C3:** @JoshHallow Yes I don't see how this is different from KobyDuck's solution. And as you are mentioning a possible bad architecture and would you populate combo boxes and checkboxes on launch ? Without raising the events. – Dairon Jan 26 at 7:55

818. <https://stackoverflow.com/questions/14371700/di-service-with-no-dependent-services>  
**T:** DI Service with No Dependent Services

**Q:** I have been working with Ninject to implement an application using dependency injection. I feel like I have a pretty thorough understanding of the concepts and have really liked the loosely coupled and testable architecture that the application has achieved using DI. I am struggling with one specific type of service, however, and am looking for insight into whether I am doing something wrong or if others have ran across the same thing.

Basically, I end up with some services/classes (a pretty small number) that have no other services depending on them. Because of this, the class never gets instantiated even though it is required to since it performs a useful role in the application. As an example, say I have an IMonkeyRepository service and an IMonkeyPopulator service. Assume the IMonkeyPopulator service really has no public API, and its sole responsibility (following the Single Responsibility Principle) is to discover monkeys on the network and populate the IMonkeyRepository with them. This service depends on the IMonkeyRepository and perhaps some other service(s) to handle its interaction with the network (configuration data for ports and addresses, for example). However, the IMonkeyPopulator has no public API, its just an empty interface.

Is this a bad design or some sort of code smell that I'm missing? I could obviously move this functionality into the repository itself but that seems like a violation of SRP to me (the repository has useful access functions, etc., and could actually be populated by multiple services). Some approaches that I've considered or tried but am not happy with are:

Make the service have a single public method, such as Start, that must be called for it to begin work. This has the drawback of needing to determine a somewhat arbitrary spot in the system to make this call.

Bind the service to a constant that I instantiate when the Ninject kernel is created. This requires that I understand that no one is dependent on this service so it must be handled specially, which seems wrong.

Add some members to the service and make a GUI somewhere in my application that reads these values (such as status of the service, etc.). Obviously, having to add a GUI to my application that is only there for this reason is quite silly (although at times useful for debugging, etc.).

Any thoughts or guidance?

## 2 Answers

**A1:** You say that the IMonkeyPopulator depends on the IMonkeyRepository, but it seems like that should be the other way around? It sounds like your IMonkeyRepository depends on, and consequently may need to be injected with, an IMonkeyPopulator. If you also inject some other service fine, but internally, the IMonkeyRepository could tell the IMonkeyPopulator to "start" so that there's actually something in the repository? I might be misunderstanding the problem though... maybe I shouldn't be monkeying around so much :/

**C1:** Interesting, but I think this approach would violate the Single Responsibility Principle. Say I have multiple populators, I would have to inject all of them into the repository (and start them all). Now the repository class would have to change both anytime a new populator arises and also when the way access to the items in the repository needs changed. Multiple reasons to change a class indicates an

SRP violation. That being said, I think this approach could be as good as anything I've thought of. – StellarEleven Jan 18 '13 at 0:22

**C2:** In that case, I'd inject an object like an IMonkeyPopulatorAggregate and call its populate() method from within the repository. If I needed to add more populators, the repository code wouldn't change at all. Having said that, in my experience, planning for every possible contingency rather than the specific problem at hand (and maybe the scenario you mentioned IS your specific problem--I don't know) is like looking for the bottom of the rabbit hole. And lastly, once you do truly understand a specific rule/principle/pattern/philosophy/flavor-of-the-month, reserve the right to violate it. – Quanta Jan 19 '13 at 3:31

**A2:** Your IMonkeyPopulator is therefore some kind of ActiveObject which listens on a tcp connection in the background and writes that data into the repository. I would say from an application perspective that active object has to be started and stopped because you don't want to start the tcp connection in the constructor. So you can use the OnActivation and OnDeactivation methods on the binding to start and stop the service like so:

```
This.Bind<IPopulatorService>().To<>().OnActivation((c, i) => i.Start()).OnDeactivation((c, i) => i.Stop())
```

But still someone in your application has to fetch/get the IPopulatorService in order to get it instantiated in your application. I usually use the bootstrapper pattern here  
<http://www.appcelerate.com/bootstrapper.html> in order to achieve this.

**C1:** Why would you say that I would not want to start a TCP connection in the constructor? – StellarEleven Jan 18 '13 at 0:23

**C2:** I practice TDD a lot and it makes it easier if your objects are easy to construct and non active during creation – Daniel Marbach Jan 18 '13 at 6:30

819. <https://stackoverflow.com/questions/10101443/how-can-i-avoid-downcasting-when-passing-information-through-a-queue>

**T:** How can I avoid downcasting when passing information through a queue?

**Q:** I'm writing a tool which enables a user to interact with a bit of hardware by changing settings and then streaming information.

To do this I have a couple of threads running: EquipmentInterface and DataProcessor which are connected by a Queue.

The EquipmentInterface thread has methods to alter settings on the equipment (Rotate and Refocus for example) and the resulting information (CurrentAngle and CurrentFocalDistance) is added to the

Queue. Once the settings are correct there are methods to StartStreaming and StopStreaming and once streaming starts, data from the equipment is packetised and added onto the queue.

All of the information placed on the queue derives from a single BaseMessage class which includes an indication of the message type. I then have derived message types for angles, focal distances, beginning and ending streaming and of course, the data itself.

The DataProcessor listens to the other end of the Queue and depending on the current angle / focal distance, processes the subsequent data.

Now, the thing is, I have a function in the data processor which uses a switch statement to type-check the messages coming in. Those messages are then down-casted to the appropriate type and passed to an appropriate handler. In reality, there's more than just a DataProcessor listening to a single queue, but in fact multiple listeners on multiple queues (some store to disk, some display information on a gui). Every time I add some information I have to create a new BaseMessage derived class, add a new type to that base class and then update the switch statements in each of the consumers to cope with the new message.

Something about this architecture feels wrong to me and I've been reading a lot about down-casting recently. From what I've seen, the general consensus seems to be that what I'm doing is a bad code smell. I've seen a suggestion which use Boost, but they don't look any cleaner than the switch statement to me (maybe I'm missing something?).

So my question is: Should I be trying to avoid the switch-statement / downcasting solution and if so, how?

My implementation is in C++/CLI so either .net or C++ solutions are what I'm after.

Edit - Based on the comments from iammilind and stfaanv, is this the sort of thing you're suggesting:

```
class QueuedItem
{
public:
 QueuedItem() { }

 virtual ~QueuedItem() { }
```

```
};
```

```
class Angle : public QueuedItem
```

```
{
```

```
public:
```

```
 Angle() {}
```

```
 virtual ~Angle() {}
```

```
};
```

```
class FocalLength : public QueuedItem
```

```
{
```

```
public:
```

```
 FocalLength() {}
```

```
 virtual ~FocalLength() {}
```

```
private:
```

```
};
```

```
class EquipmentHandler
```

```
{
```

```
protected:
```

```
 virtual void ProcessAngle(Angle* angle) {};
```

```
 virtual void ProcessFocalLength(FocalLength* focalLength) {};
```

```
public:
```

```
 void ProcessMessages(QueuedItem* item)
```

```
{
 Angle* pAngle = dynamic_cast<Angle*>(item);
 if(pAngle != NULL)
 {
 ProcessAngle(pAngle);
 }

 FocalLength* pFocalLength = dynamic_cast<FocalLength*>(item);
 if(pFocalLength != NULL)
 {
 ProcessFocalLength(pFocalLength);
 }

}
};
```

```
class MyDataProcessor : public EquipmentHandler
{
protected:
 virtual void ProcessAngle(Angle* angle) override { printf("Processing Angle"); }
 virtual void ProcessFocalLength(FocalLength* focalLength) override { printf("Processing
FocalLength"); };
};
```

```
int _tmain(int argc, _TCHAR* argv[])
{

 // Equipment interface thread...
 FocalLength* f = new FocalLength();
```

```

QueuedItem* item = f; // This gets stuck onto the queue

// ...DataProcessor thread (after dequeuing)

QueuedItem* dequeuedItem = item;

// Example of a DataProcessor implementation.

// In reality, this would

MyDataProcessor dataProc;

dataProc.ProcessMessages(dequeuedItem);

return 0;

}

```

...and can it be simplified? The ProcessMessages feels a bit clunky but that's the only way I could see to do it without a switch statement and some sort of enumerated message type identifier in the base class.

**C1:** It seems like You are in desperate need of Dynamic Polymorphism and Dynamic dispatch. – Alok Save Apr 11 '12 at 7:12

**C2:** Why don't you declare a virtual function in a base class and implement in all its children. – iammilind Apr 11 '12 at 7:13

**C3:** @iammilind: That would certainly save re-implementing the switch statement multiple times but doesn't get rid of it completely. Is that the most efficient way to determine which handler to call? – Jon Cage Apr 11 '12 at 7:24

**C4:** @Als: Can you elaborate? – Jon Cage Apr 11 '12 at 7:32

What @iammilind, said & yes that is the way to do it. – Alok Save Apr 11 '12 at 7:32

**C5:** @Als: I just found something called the visitor pattern. Is this what you're talking about: stackoverflow.com/questions/3254788/... ...or is that over-complicating things? – Jon Cage Apr 11 '12 at 7:37

**C6:** @JonCage: it does get rid of the switch and downcasting completely, all that the queue-reader has to do is call the virtual function. So the only thing to do is define a class per message with the function that accesses the destination object. With std::bind and std::function, you can even avoid making a class per message, because the data of the message class are mostly function parameters anyway. – stefaanv Apr 11 '12 at 7:43

**C7:** @JonCage: visitor is over complicating things because you just need to dispatch. With visitors, you introduce dependencies and must overload the visit function for each message. – stefaanv Apr 11 '12 at 7:46

**C8:** You don't need to overload the visit function in every visitor if you use a base class for your visitor which implements all visiting methods as noops. See my answer. – fjardon Apr 11 '12 at 9:25

**C9:** @stefaanv: I've added an example of what I think you're talking about. The only way I can see you can get rid of the switch statement is by multiple attempts to identify the handler to call is with repeated dynamic cast attempts. I've not benchmarked this, but it feels like it would be slow given a high message throughput? – Jon Cage Apr 11 '12 at 21:19

**C10:** I added a sample code to show how to implement the visitor. Please remark that with this scheme when you create a new equipment handler inheriting from EquipmentVisitor you only need to implement the method handling the message you're interested in. The other messages will pass through the EquipmentVisitor base class virtual methods which are no ops. – fjardon Apr 12 '12 at 8:00

### 3 Answers

**A1:** You could try a visitor design pattern: [http://en.wikipedia.org/wiki/Visitor\\_pattern](http://en.wikipedia.org/wiki/Visitor_pattern)

Each DataProcessor would inherit from a BaseVisitor class, which defines virtual method for handling each type of Message. Basically these methods are just noop.

When you define a new message type you add a new virtual method with a noop implementation for this message type in the BaseVisitor. Then if a child DataProcessor class wants to process this message type you override the virtual method in this DataProcessor only. All other DataProcessor remain untouched.

```
#include <iostream>
```

```
class FocalLength;
```

```
class Angle;
```

```
class EquipmentVisitor;
```

```
class QueuedItem
```

```
{
```

```
public:
```

```
QueuedItem() { }

virtual ~QueuedItem() { }

virtual void AcceptVisitor(EquipmentVisitor& visitor) = 0;

};

class EquipmentVisitor

{

public:

 virtual ~EquipmentVisitor() {}

 virtual void Visit(FocalLength& item) {}

 virtual void Visit(Angle& item) {}

void ProcessMessages(QueuedItem* item)

{

 item->AcceptVisitor(*this);

}

};

class Angle : public QueuedItem

{

public:

 Angle() {}

 virtual ~Angle() { }

 void AcceptVisitor(EquipmentVisitor& visitor) { visitor.Visit(*this); }

};
```

```

class FocalLength : public QueuedItem
{
public:
 FocalLength() {}

 virtual ~FocalLength() {}

 void AcceptVisitor(EquipmentVisitor& visitor) { visitor.Visit(*this); }

private:
};

class MyDataProcessor : public EquipmentVisitor
{
public:
 virtual ~MyDataProcessor() {}

 void Visit(Angle& angle) { std::cout << "Processing Angle" << std::endl; }

 void Visit(FocalLength& focalLength) { std::cout << "Processing FocalLength" << std::endl; }

};

int main(int argc, char const* argv[])
{
 // Equipment interface thread...
 FocalLength* f = new FocalLength();

 QueuedItem* item = f; // This gets stuck onto the queue
}

```

```

// ...DataProcessor thread (after dequeuing)

QueuedItem* dequeuedItem = item;

// Example of a DataProcessor implementation.

// In reality, this would

MyDataProcessor dataProc;

dataProc.ProcessMessages(dequeuedItem);

return 0;
}

```

**C1:** Something like the example I added to the question? – Jon Cage Apr 11 '12 at 21:51

**C2:** Fantastic! This is a really neat solution now that I've actually got my head around how it works :‐) – Jon Cage Apr 12 '12 at 15:03

**A2:** Simplest message handling according to me for sending 4 messages to 2 handlers:

```

#include <iostream>

#include <queue>

#include <memory>

class HandlerA

{

public:

void doA1() { std::cout << "A1\n"; }

void doA2(const std::string& s) { std::cout << "A2: " << s << "\n"; }

};


```

class HandlerB

```

{

public:
```

```
void doB1() { std::cout << "B1\n"; }

void doB2(const std::string& s) { std::cout << "B2: " << s << "\n"; }

};
```

```
class BaseMsg

{

public:

 virtual ~BaseMsg() {}

 void send();

 virtual void handle() { execute(); }

 virtual void execute() = 0;

};
```

```
typedef std::shared_ptr<BaseMsg> Msg;
```

```
class Medium

{

public:

 void send(Msg msg) { queue.push(msg); }

 void process()

 {

 while (!queue.empty())

 {

 std::cout << "Processing\n";

 queue.front()->handle();

 queue.pop();

 }

 }

};
```

```
 }

};

class BaseMsgHndlrA : public BaseMsg

{

protected:

 HandlerA& ha;

public:

 BaseMsgHndlrA(HandlerA& ha_) : ha(ha_) { }

};
```

```
class BaseMsgHndlrB : public BaseMsg

{

protected:

 HandlerB& hb;

public:

 BaseMsgHndlrB(HandlerB& hb_) : hb(hb_) { }

};
```

```
class MsgA1 : public BaseMsgHndlrA

{

public:

 MsgA1(HandlerA& ha_) : BaseMsgHndlrA(ha_) { }

 virtual void execute() { ha.doA1(); }

};
```

```
class MsgA2 : public BaseMsgHndlrA

{
```

```
public:
 MsgA2(HandlerA& ha_) : BaseMsgHndlrA(ha_) { }
 virtual void execute() { ha.doA2("Msg A2"); }
};

class MsgB1 : public BaseMsgHndlrB
{
public:
 MsgB1(HandlerB& hb_) : BaseMsgHndlrB(hb_) { }
 virtual void execute() { hb.doB1(); }
};

class MsgB2 : public BaseMsgHndlrB
{
 std::string s;
public:
 MsgB2(HandlerB& hb_, const std::string s_) : BaseMsgHndlrB(hb_), s(s_) { }
 virtual void execute() { hb.doB2(s); }
};

int main()
{
 Medium medium;
 HandlerA handlerA;
 HandlerB handlerB;

 medium.send(Msg(new MsgA1(handlerA)));
 medium.send(Msg(new MsgA2(handlerA)));
```

```

medium.send(Msg(new MsgB1(handlerB)));
medium.send(Msg(new MsgB2(handlerB, "From main")));
}

medium.process();
}

```

This only uses virtual functions to dispatch to the right handler with some parameters.

The handle() function is not strictly needed, but helpful when defining hierarchy of messages.

A generic message could hold an std::function that can be filled in with bind, so actual functions with parameters can be sent instead of making a message class per queued action.

To hide the actual sending, the handlers can do the sending themselves, so they can be accessed immediately from the sending thread.

If however several messages need to be sent to more handlers, double dispatch (visitor) can be used.

**C1:** As I said in the question, the full application involves multiple messages (all derived from a single common base) being sent to a variety of handlers. – Jon Cage Apr 12 '12 at 15:38

**C2:** And this answers your question (I showed two handlers accessed by the messages). However, as I already commented, you have the choice between this single dispatch solution and fjardon's double dispatch solution and even a casting solution, so it's your call and apparently double dispatch it is. – stefaany Apr 13 '12 at 6:35

**A3:** You could do any of the following:

Delegate the handling code (as in each case in your switch statement) to Handler objects -- either a hierarchy of HandlerBase objects, or completely unrelated types.

You then have your messages keep a reference to the Handler object (if it's a hierarchy, you can do it at BaseMessage level, if unrelated objects, then as part of the individual specialised message types), to which you can then pass them when you're handling them, through a BaseMessage::Handle() method. Edit: This method is NOT virtual.

Of course, if you go down the path of HandlerBase hierarchy, you'll still need to static\_cast the messages back to whatever type they are, but that should be fine: they should only be created with their own Handler (that's supposed to know their types) anyway.

Example:

```
// BaseMessage.hpp

#include <iostream>

class BaseMessage
{
public:
 BaseMessage(HandlerBase* pHandler);
 : m_pHandler(pHandler)
 {}

 virtual ~BaseMessage()
 {}

 void SetHandler(HandlerBase* pHandler)
 {
 m_pHandler = pHandler;
 }

 void Handle()
 {
 assert(m_pHandler != 0);
 m_pHandler->Handle(this);
 }
};

protected:
 HandlerBase* m_pHandler; // does not own it - can be shared between messages
```

```
};
```

```
// HandlerBase.hpp
```

```
class HandlerBase
```

```
{
```

```
public:
```

```
 HandlerBase()
```

```
{}
```

```
 virtual ~HandlerBase()
```

```
{}
```

```
 virtual void Handler(BaseMessage* pMessage) =0;
```

```
}
```

```
// message and handler implementations
```

```
class AMessage: public BaseMessage
```

```
{
```

```
public:
```

```
 AMessage(BaseHandler* pHandler)
```

```
 : BaseMessage(pHandler)
```

```
{}
```

```
 ~AMessage() {}
```

```
 void DoSomeAness()
```

```
{
```

```
 std::cout << "Being an A..." << std::endl;
```

```
 }

};

class AHandler

{

public:

 AHandler()

 {}

 virtual ~AHandler()

 {}

 virtual void Handle(BaseMessage* pMessage)

 {

 AMessge *pMsgA(static_cast<AMessge*>(pMessage));

 pMsgA->DoSomeAness();

 }

};

class BMessage: public BaseMessage

{

public:

 BMessage(BaseHandler* pHandler)

 : BaseMessage(pHandler)

 {}

 ~BMessage() {}

}
```

```
void DoSomeBness()

{

 std::cout << "Being a B..." << std::endl;

}

};

class BHandler

{

public:

 BHandler()

 {

 virtual ~BHandler()

 {

 virtual void Handle(BaseMessage* pMessage)

 {

 BMessage *pMsgB(static_cast<BMessage*>(pMessage));

 pMsgB->DoSomeBness();

 }

 };

 // the thread

 static std::list<BaseMessage*> msgQueue;

 int HandlerThread(void *pData)

 {
```

```
while(true) // find some more sophisticated way to break
{
 while(!msgQueue.empty())
 {
 msgQueue.front()->Handle();
 msgQueue.pop_front();
 }
 // delay and stuff
}
return 0;
}
```

```
int main(int argc, char** argv)
{
 start_thread(HandlerThread, 0); // your favorite API here

 AHandler aHandler;
 BHandler bHandler;

 msqQueue.push_back(new AMessage(&aHandler));
 msqQueue.push_back(new BMessage(&bHandler));
 msqQueue.push_back(new BMessage(&bHandler));
 msqQueue.push_back(new AMessage(&aHandler));
 msqQueue.push_back(new AMessage(&aHandler));
 msqQueue.push_back(new BMessage(&bHandler));
 msqQueue.push_back(new AMessage(&aHandler));
 msqQueue.push_back(new BMessage(&bHandler));
```

```
 return 0;
```

```
}
```

Edit: yes, in essence, this is the visitor pattern.

**C1:** Does that mean that each object needs to know (when it's created) what's going to handle it?  
Could you provide a concrete example? – Jon Cage Apr 11 '12 at 7:28

**C2:** added some example code. the objects don't absolutely have to know about their handlers, but it will be a pain to SetHandler()s after they're created and added to the queue, mostly because of how queues work and because they just appear to be BaseMessage\*s. You can add some other facility that knows about your message types, mapped to whatever information, and can set their handlers respectively. – zyndor Apr 11 '12 at 9:21

**C3:** @iCE-9: your solution seems to be halfway between message dispatching and double dispatch, both of which are more elegant and avoid the casting. If your messages are specific to a handler, just use the specific handler in the message and do the right call to the handler via a virtual handle() function. If the message is potentially for any handler, but with different result, do double dispatch by a virtual handle() (or accept) function in the message and an overloaded (per message) act() (or visit) function in the handler called by the msg::handle() function. – stefaanv Apr 11 '12 at 9:26

**C4:** @stefaanv: it being a replacement of a switch statement is anything but dynamic: one message ('case:') can be handled by exactly one handler (the body of the 'case:') - but multiple cases / message types can be routed to the same handler. The handler does not have to call member functions of the messages, it just goes to express that the stuff that's happening is specific to the type of the message. – zyndor Apr 11 '12 at 9:42

**C5:** @iCE-9: I'm sorry, but I don't understand your last comment. However, as I see it, the OP can decide to use 1. direct dispatching (n msgs per handler), 2. dispatching per handler with casting (n msgs to m handlers), 3. double dispatch (n msgs to m handlers, see fjardon's answer). – stefaanv Apr 11 '12 at 10:03

**C6:** @stefaanv: sorry, didn't have a chance to reply properly. I meant that the code that Jon is trying to replace isn't 'dynamic', and the mapping between message types and handlers is many-to-one, which is why I didn't worry about Double/Dynamic dispatch. Btw, what do you mean by "If your messages are specific to a handler, just use the specific handler in the message and do the right call"? (A/BMessage's derivatives might also use their respective handlers, this is what I meant by the last sentence.) – zyndor Apr 11 '12 at 18:18

**C7:** Maybe I didn't make the problem clear, but it's many to many as I stated in the question "In reality, there's more than just a DataProcessor listening to a single queue, but in fact multiple listeners on multiple queues (some store to disk, some display information on a gui)."....so there's no way to pass in the handler in advance. Having to pass in handlers from the other end of the queue seems like a messy way to do things still... – Jon Cage Apr 11 '12 at 21:03

**C8:** see my answer for dispatching handler specific messages without casting or switch case. Passing handler in advance is not that messy. – stefaanv Apr 12 '12 at 7:10

820. <https://stackoverflow.com/questions/41767567/is-it-a-good-practice-to-reference-servlet-as-osgi-component/41769710#41769710>

**T:** Is it a good practice to reference servlet as OSGI component?

**Q:** In my project we have few servlets that are osgi components and have properties tied to them. Like

```
@Component(label = "Default Address Servlet", immediate = true)
@Service(value = Servlet.class)
@Properties(
 @Property(name = "sling.servlet.resourceTypes", value = { "sling/servlet/default" }),
 @Property(name = "sling.servlet.selectors", value = { "defaultaddress" }),
 @Property(name = "sling.servlet.extensions", value = { "json" }),
 @Property(name = "sling.servlet.methods", value = { "POST" }),
 @Property(name = "prop1", value = { "value1" }) })

public class SetDefaultAddressServlet extends SlingAllMethodsServlet {
```

Now I have a requirement to use this prop1 inside a sling model class during a load of a component. While technically servlets are osgi components, it is ok to reference this servlet as osgi component? Like

```
@Model(adaptables = SlingHttpServletRequest.class)
public class Address {

 @Inject
 @Reference
 private SetDefaultAddressServlet service;
```

Though this technically works right, is it a good approach? Or alternate, I need to create separate OSGi service with the respective property and reference it. What is the advisable approach?

## 2 Answers

**A1:** It's a philosophical question, rather than technical because nobody can give you 100% correct answer, but I will put my opinion there.

I prefer applying Hexagonal Architecture to my code (original post on this pattern or another great one) which brings to your application high maintainability.

One of its main ideas is that dependencies should point inwards - so external world depends on your servlet, servlet depends on your business layer.

Servlet can be treated here as an adapter between external world and your business logic. Sling Model is just the same - it is sitting between your html page and service.

And according to this design pattern, it's a bad idea to reference one adapter from another.

Also, there is a light code smell: what do these classes need this property for? Should the code, which needs the same property be placed in 2 different places, rather than in one small Util class or Service?

Again, it's just my opinion.

**C1:** Thanks. Liked the hexagonal architecture explanation. Modified my code to decouple the dependency – Saravana Prakash Jan 24 '17 at 18:30

**A2:** Just to add on the previous answer from another user and given that it's not a solid code architecture approach, in the AEM context, this is also not a good approach.

Your model (Address) is dependent on a service implementation. A servlet has a lot of information in it related to the HTTP request and normally this model does not need access to all the heavy information in the HTTP servlets.

You probably want to access some limited set of properties in the HTTP request and transform them into a POJO model and these properties can be a part of request information. In such cases you are better off making an adaptable from HttpServletRequest or some more value centric object which can be extracted from your request.

Also, think of code-smells as pointed by other users. What's stopping the Address object from calling Servlet methods on the referenced class and modifying the state of the request (like accessing the session etc.)

Again, it works but it's not the best way given that there are better ways just by limiting it to AEM best practices. I would recommend that you read the following article:

<https://sling.apache.org/documentation/bundles/models.html>

Hope this helps

821. <https://stackoverflow.com/questions/31083051/using-angular-service-inside-each-other/31083496#31083496>

**T:** Using angular service inside each other [duplicate]

**Q:** This question already has an answer here:

Problems with circular dependency and OOP in AngularJS 3 answers

Do you know if it's possible to use angular services inside each other? I tried it but getting error "Circular dependency found". For example I have two services A and B. Can I use service A inside service B and service B inside service A ?

## 1 Answer

**A1:** No , you cant do it with basic angularjs dependency injector, but you can retrieve any service with \$injector

[https://docs.angularjs.org/api/auto/service/\\$injector](https://docs.angularjs.org/api/auto/service/$injector)

so can "lazy" load it to any var, and access it in other service.... but you should post some code.

Also it is smell like you are anti patterning something , or you have bad architecture when you have circular dependencies. Its like on the road :

Assume you have 2 Services

Foo Depends on Bar

Bar depends on Foo

Angular will go as this

Foo -> Depends on bar so load Bar -> Instantiate Bar but its depends on Foo so instantiate Foo -> Instantiate Foo but it depends on Bar but wait! Bar is still not instantiated because it waiting for Foo , so its cyclic.

You should have service

Foo with no dependency

Bar with no dependency

and Third factory

FooBar which will handle functions which needs the circular dependency.

**C1:** Thanks, will try to refactor my client side :) – user2031218 Jun 26 '15 at 23:29

822. <https://stackoverflow.com/questions/51661895/angular-6-post-request-return-correct-object-but-from-service-to-component-it-g>

**T:** angular 6 post request return correct object, but from service to component it gets undefined

**Q:** I'm new in Angular, its architecture and typescript. I'm Struggling to achieve this simple thing and i didn't find any tutorial which i could follow. So i will really appreciate a little help with this.

I have a project or web app where I'm practicing a simple login process. In this case login component has a method to login where the app takes as arguments user and password from textfields and call a user service method which is in charge of doing a post request to a REST service. I've verified that Rest server send as body the answer I expect (in this case, the complete user in case of right user and password values). Login component subscribes to this call and I want it passing the value obtained as User in a property. BUT even when I get a JSON object as response, when service pass the value to login component it becomes undefined.

I know it seems simple but I think I'm misunderstanding the architecture of angular itself or maybe the observables... I don't know, I will appreciate any kind of advice in this.

Let me present you the code:

User class:

```
export class Usuario {
 // atributos

 nombreDeUsuario: string;

 email: string;

 password: string;

 fechaNacimiento: Date;

 karma: number; /*puntuación del usuario en la comunidad*/

 isAdmin: boolean; /*flag que establece si es administrador o no*/

 amigos: Usuario[]; /* lista de amigos del usuario */

 bloqueados: Usuario[]; /* lista de usuarios bloqueados */
```

```
 public constructor() {}
```

```
 public static conversor(convertible: any): Usuario {

 const usuario: Usuario = new Usuario();

 usuario.nombreDeUsuario = convertible.nombreDeUsuario;

 usuario.email = convertible.email;

 usuario.password = convertible.password;

 usuario.fechaNacimiento = convertible.password;

 usuario.karma = convertible.karma;

 usuario.amigos = convertible.amigos;

 usuario.bloqueados = convertible.bloqueados;

 console.log('convertido ' + usuario.toString());

 return usuario;
 }
```

```
 public toString(): String {

 return 'Usuario{' +
```

```

'nombreDeUsuario=' + this.nombreDeUsuario + '"' +
', email=' + this.email + '"' +
', password=' + this.password + '"' +
', fechaNacimiento=' + this.fechaNacimiento +
', karma=' + this.karma +
', isAdmin=' + this.isAdmin +
', amigos=' + this.amigos +
', bloqueados=' + this.bloqueados +
'}';
}

}

login component:

```

```

import { Component, OnInit } from '@angular/core';
import { UsuariosService } from '../../servicios/usuarios.service';
import { FormsModule } from '@angular/forms';
import { Usuario } from '../../modelo/usuario';

@Component({
 selector: 'app-login',
 templateUrl: './login.component.html',
 styleUrls: ['./login.component.css']
})
export class LoginComponent implements OnInit {

 servicioUsuarios: UsuariosService;
 nombreDeUsuario: string;
 password: string;
}

```

```

usuario: Usuario;

constructor(servicioUsuarios: UsuariosService) {
 this.servicioUsuarios = servicioUsuarios;
}

ngOnInit() {

}

iniciarSesion() {
 console.log('se ejecuta');
 console.log(this.nombreDeUsuario);
 console.log(this.password);
 this.servicioUsuarios.inicioDeSesion(this.nombreDeUsuario, this.password)
 .subscribe((usuario) => { this.usuario = <Usuario>usuario; console.error(this.usuario); },
 (error) => { console.log(error); });
}

}

and finally user service:
```

```

import { Injectable } from '@angular/core';
import { Http } from '@angular/http';
import { catchError, map } from 'rxjs/operators';
import { Usuario } from '../modelo/usuario';

@Injectable()

```

```
export class UsuariosService {

 constructor(public http: Http) { }

 getUsuario(nombreDeUsuario: String) {
 let path: String = 'http://localhost:8080/usuarios/';
 path = path.concat(nombreDeUsuario.valueOf());
 return this.http.get(path.valueOf()).pipe(map(resultado => resultado.json() as Usuario));
 }

 inicioDeSesion(nombreDeUsuario: string, password: string) {
 const peticion: Login = {
 nombreDeUsuario: nombreDeUsuario,
 password: password
 };
 console.log(peticion);
 return this.http.post('http://localhost:8080/login', peticion)
 .pipe(map(resultado => {
 if (resultado == null) {
 throw new Error();
 } else {
 Usuario.conversor(resultado.json() as Usuario);
 }
 }),
 error => console.log('Error capturado'),
 catchError(err => err));
 }
}
```

```
}
```

```
}
```

```
interface Login {
```

```
 nombreDeUsuario: string;
```

```
 password: string;
```

```
}
```

I've tried:

Passing to login component directly response.json();

Using a static method in User class to make a conversion of any to a User object.

passing response without .json() directly and passing to the property the values directly from the response (but i got many error messages).

I know this code probably smells of bad design so I would appreciate any advice.

**C1:** Please, post a console.log() of the resultado you receive making this call: return  
this.http.post('http://localhost:8080/login', peticion) .pipe(map(resultado => {.... – Lynx Aug 2 at  
21:09

**C2:** sure: \_body:

```
"{\"nombreDeUsuario\":\"paco\",\"email\":\"paco@paco.es\",\"password\":\"passwordpaco\",\"fechaNacimiento\":\"2018-07-19T21:01:03.000+0000\",\"karma\":2.5,\"amigos\":[],\"bloqueados\":[],\"admin\":false}"
headers:
Object { _headers: Map(1), _normalizedNames: Map(1) }
ok: true status: 200 statusText: "OK"
type: 2 – Shiba Togami Aug 2 at 21:46
```

**C3:** What happens if you change this line of code Usuario.conversor(resultado.json() as Usuario); to  
this Usuario.conversor(resultado.json());? – Lynx Aug 2 at 21:49

It's pretty much the same, i only use "as" in an intend to force the type but without results – Shiba  
Togami Aug 2 at 21:53

**C4:** btw i forgot to add that in the console.error(this.usuario); line of login.component i get undefined  
– Shiba Togami Aug 2 at 21:54

**C5:** Sorry, I have no further idea. – Lynx Aug 3 at 4:10

**C6:** @Lynx no problem, ty for your time. – Shiba Togami Aug 3 at 12:55

### [server-side-validations](#)

**T:** Staying RESTful while performing AJAX server-side validations?

**Q:** My Rails application has a number of forms. When Joe uses my app, I want each form to provide him with immediate visual feedback as to the validity of his input for each field. One field checks the format of his email address - pretty simple. But another allows him to associate the current resource with a number of other resources, and complex business rules apply. If the form is incomplete or invalid, I want to prevent Joe from moving forward by, for example, disabling the 'submit' button.

I could duplicate the validations that appear in my Rails code by writing JavaScript that does the validation in the browser as well. But this smells bad - any time business rules change, I'll need to update them in two places with two different languages and two sets of tests.

Or I could add a single method to the controller for the resource called 'validate'. It would accept form data in an AJAX request, and return a response that could then be used inside Joe's form to provide real-time validation feedback. Unlike the 'create' action, the 'validate' action would not change the state of the server. The only purpose of 'validate' would be to provide a validation response.

The dilemma is that I don't like adding actions to RESTful controllers in Rails. But I like even less the idea of duplicating validation code in two different contexts.

I noticed this SO question, which touches on this subject. But I'm not interested in a plugin or piece of technology. Nor do I consider this question necessarily Rails-specific. I'm more interested in how best to handle this kind of problem in general in a Web application.

I also notice this SO question, which doesn't include the constraint of maintaining a RESTful architecture.

Given the need to dynamically validate form data with complex business rules in a Web application, and the desirability of maintaining a REST-like server architecture, what is the cleanest, most maintainable way to accomplish both at the same time?

**C1:** There are some things that just don't make sense in an orthodox REST architecture. Darrel's answer is pretty good, though. – gmoore Sep 14 '10 at 17:29

**C2:** Both vise's and Darrel's solutions would work. Vise's solution assumes you already have a custom validation function in the model that handles the complex biz logic, which is not a bad assumption. Darrel's solution is more flexible, but will have higher maintenance. – Srdjan Pejic Sep 14 '10 at 19:19

### 3 Answers

**A1:** I see no problem in creating a validator "processing resource" that can accept an entity and ensure that it passes all validation rules.

You could do this either with a global validator

POST /validator

where the validator will have to identify the passed representation and perform the appropriate rules, or you could create subresources,

POST/foo/validator

As long as these urls are discovered via hypermedia and the complete representation to validate is passed as a body of the request, I see no REST constraints being violated.

**C1:** I considered this idea briefly. How would you mitigate excessive conditional logic to test for resource type in the create action of the controller (let's say 12 resources used this validator resource)? Maybe a hashtable that maps resource type to a method? – Rich Apodaca Sep 17 '10 at 3:55

**C2:** @Rich Personally, I would go the subresource route to avoid the problem. – Darrel Miller Sep 17 '10 at 5:36

**A2:** I hope I understood correctly, but you could send the javascript requests to the same create action. For example:

```
def create
```

```
 @data = DataObject.new(params[:data])
```

```
 if request.xhr?
```

```
 response = @data.valid? ? { :success => true } : { :errors => @data.errors }
```

```
 render :json => response
```

```
 return
```

```
end
```

```
@data.save etc..
```

```
end
```

I'm actually using something like this in a multistep wizard (one page form, with hidden css sections)

**C1:** interesting idea. Wouldn't this prevent a JSON-based web API from working in the future? Also, wouldn't this sort of break other RESTful conventions for the meaning of a POST request - that is, to create a resource on the server? – Rich Apodaca Sep 17 '10 at 3:51

**C2:** You can always extend the `to_json` method if you wish. I'm also pretty sure you would use `post` if you would have a `validate` method as well. The fact is that the `validate` method resembles `create` a lot. Just bare in mind that this approach doesn't include any edit action, nor does it work too well if you have multiple controllers with the same requirement. So, I think it works well if your requirements are simple and you want to avoid overengineering without venturing too far from the rest principles. – vise Sep 20 '10 at 20:40

**A3:** You are right not to duplicate validation logic on client (javascript) and server side). But adding validation resources also adds maintenance effort and costs server network calls. I like to do basic validation on client side (better user experience) and for data consistency on server side also.

Why don't you attach your model with validation metadata and then the forms + javascript for validation gets generated. On the final submit you also do a final validation on server side based on the model.

I am sure some generic validation logic is possible with Ruby. I guess also some existing validation frameworks could be reused.

824. <https://stackoverflow.com/questions/974863/overuse-of-polymorphism-in-mvc-pattern>

**T:** Overuse of polymorphism in MVC pattern?

**Q:** I am surely missing something huge, I've seen this problem several times so I would like to know your opinion on resolving these code-smells.

Background is a windows forms app organized using the MVC architecture pattern.

Data is organized in a hierarchical way (tree model), with different types of nodes representing different types of data.

Data view is a composite view, containing various views which can be added or modified according to customers request. Each data node can be represented using several views (table, chart, custom stuff), and each view knows how to display one or more different data node types.

Before displaying, some views also require that the data is processed in some way. Multiple views can use the same processed data, but not all views use the same data, so this processing is not related to the only one view or one node type.

So the thing that bothers me is that, in current implementation, nodes' interface is becoming overloaded with many properties like "Node.CanProvideThisData" or "Node.CanProvideSomeOtherData", which each derived node is required to implement. This shows that a node's interface knows too much about everything, right?

Who should, in your opinion, decide where and when will this processing happen, so that each view gets the desired processed data, and that no processing is duplicated?

Did you have similar problems before? Or do you think that there is something wrong with the implementation (or my understanding of implementation) of MVC? Or is this something that could be fixed with some refactoring?

Edit: One more thing that should be considered, of course, is handling later modifications. This interface, as bad as it may be, does force the programmer to implement each part of the contract, so any new node implementations should work instantly.

## 1 Answer

**A1:** Without a deeper understanding of your architecture, I can't be sure that my suggestion is a good one, but one possibility might be the use of Custom Attributes to declaratively state what data each node type can expose. Note that I'm assuming your "Can provide this data" methods are all very dumb and basically return a constant value for a particular type.

Your question states that your software uses polymorphism extensively and that you want to avoid having to re-implement multiple "can provide this sort of data" functions for each new type. In this case, consider adding a custom attribute ("AvailableDataAttribute") that explicitly states, "This type supports these sorts of data." The SortsOfData would probably be a flags enum, or something similar. You could then add AvailableDataAttribute to all the appropriate nodes. Next, you could remove implementations of your "can provide data X, can provide data Y" methods and replace them with a single method on the base class that accepts an instance of SortsOfData and evaluates whether its dynamic type claims to support that data in its attribute. It would just grab that type's SortsOfData value and check it for the desired value.

This has the big advantage of removing dynamic determination of static metadata about your node types (assuming that it is static metadata), and so your design is reflected more clearly in your types.

Of course, none of this holds if a particular node can support data at one point in time, then a few seconds later might not.

**C1:** Thanks! At present, a node either supports the data or it doesn't, but I guess I can easily make that "single base method" virtual if I need to add more logic to it later. – Groo Jun 10 '09 at 12:18

825. <https://stackoverflow.com/questions/29288639/how-to-use-alloy-to-find-faults-in-software-architecture>

**T:** How to use Alloy to find faults in software architecture

**Q:** I'm having lots of fun learning Alloy, and am excited to apply it to some software projects I am working on.

In the past, I've used lightweight formal methods informally, if it were, to write in first order logic some of the invariants that I expect the system to have. I've never used this to find defects, only to focus my design and testing on the properties that are critical.

I'd like to go beyond that now, and actually use Alloy to find faults in the architecture. How can I do this? The approach I've been taking is:

Strip the architecture down to some kernel (eg remove use sets instead of more complicated data structures, use sig instead of more detailed enumerations)

Codify an invariant as an assert

check and run

However, while learning a lot about Alloy, this hasn't helped me improve my architecture. In the process of simplifying my model, it seems the invariants I encode are simplified accordingly, and naturally hold.

For example, there was a bug in the architecture which we encountered only through prototyping and testing. The bug had to do with assuming if we have  $n$  items in a sequence, we can break them up into groups of  $m$  and process each  $m$ -group sequentially. ( $n$  happens to be much larger than  $m$ .) The problem is of course that  $m$  doesn't necessarily divide  $n$ , and thus the last group may be too small. This is a design level defect completely expressible in logic, precisely the type of defect Alloy is designed for. Yet, my Alloy model didn't find it. It simply abstracted away the integer size (see advice given in Why does Alloy tell me that  $3 \geq 10$ ? to avoid using numbers), partitioned  $n$  into disjoint groups, and ran beautifully.

In other words, it almost seems that to make sure your model includes enough detail to capture the defect, you almost need to know about the defect in advance.

How do you then use Alloy for reviewing software architectures?

PS I understand that there are many cases where you don't have this problem. For instance, when reviewing a spec for a distributed system, and wanting to show invariants. My challenge here is applying Alloy to help with implementation, not to review a protocol or spec or state machine or other logical construct.

**C1:** could you show your alloy model that did not detect the bug? I'm curious as to how come it didn't find (how you modeled it). I guess looking at it may shed some insight on how to advice you –  
Bernardo Ferreira Bastos Braga Mar 27 '15 at 0:04

## 1 Answer

**A1:** Alloy is not best suited to reason about numbers, or strings. So , your model will often fail to detect faults related to the format of a given string or the value of a given integer fields.

Now, what Alloy is great for, is to reason about relations, and constraints over those relations. Checking assertion is one way of assuring yourself that a given property holds, so you are right, using solely this technique, you might have the feeling that you need to know about the defect in advance.

826. <https://stackoverflow.com/questions/30647948/overwrite-one-column-in-select-statement-with-a-fixed-value-without-listing-all/30648054#30648054>

**T:** Overwrite ONE column in select statement with a fixed value without listing all columns

**Q:** I have a number of tables with a large number of columns (> 100) in a SQL Server database. In some cases when selecting (using views) I need to replace exactly ONE of the columns with a fixed result value instead of the data from the row(s). Is there a way to use something like

select table.\* , 'value' as Column1 from table

if Column1 is a column name within the table?

Of course I can list all the columns which are expected as result in the select Statement, replacing the one with a value. However, this is very inconvinient and having 3 or 4 those views I have to maintain them all if columns are added or removed from the table.

**C1:** did u try using update present table? instead of replacing – Deepak Kumar Jun 4 '15 at 15:28

**C2:** No, this is not possible. You need to list all of the columns explicitly to do that, – Siyual Jun 4 '15 at 15:28

**C3:** Unless you have a very good reason for doing otherwise, you should always explicitly state all columns. Using SELECT \* ... can have various unintended consequences. – DavidG Jun 4 '15 at 15:34

## 1 Answer

**A1:** Nope, you have to specify columns in this case.

And you have much more serious problems if tables are being changed often. This may be a signal of large architectural defects.

Anyway, listing all columns instead of \* is a good practice, because if columns number will change, it may cause cascade errors.

**C1:** that's what I expected :-( I will Keep the question open for some more time, maybe there are some recommendations. And I can tell you, there ARE good reasons to NOT list all columns... – Herbert Jun 4 '15 at 16:00

**C2:** @Herbert so maybe you will share them with the community here? – miracle\_the\_V Jun 5 '15 at 7:42

**C3:** The application at hand implements the delivery of XML Messages following the "ONIX for books" Standard. It is a way for Publishers, wholesalers and bookshops to exchanged bibliographic and Status Information about books. The entire Standard consists of about 500-600 data elements, implemented in 12 or more tables. The Standard is expanded and upgraded continuously according to market Needs, so is the implementation with respect to the German market where I am working in. I have to add data elements (=columns) to the tables as Need arises. ... to be continued – Herbert Jun 10 '15 at 11:26

**C4:** To complicate it more, different expressions Need different sets of columns or slightly different values in the same column. Therefore, using "select \*" instead of repeating lists of 150 and more columns in 5 or more different places is just an economical way of implementation. The application itself is driven by a data dictionary which selects the needed columns for each specific Output ... – Herbert Jun 10 '15 at 11:28

827. <https://stackoverflow.com/questions/536944/maintaining-conceptual-integrity-of-the-system-during-maintenance>

**T:** Maintaining conceptual integrity of the system during Maintenance

**Q:** While starting a new project, we kick start it based on what is "latest" and what is "known".

This includes selection of programming languages, frameworks in those languages etc. Quite a lot of time is spent on architectural design and detailed level design in terms of using specific frameworks and design patterns etc.

Things go on fine till we complete the development and push things to production.

Then comes maintenance (Defect fixes and Enhancements). People change, architects and designers moved out.

New set of folks who may not have any historical details of project are maintaining it now. They start comprising things on architecture, design principles etc. to provide quick fixes and adding enhancements.

This trend I'm seeing in many projects I've worked.

How to maintain the "conceptual integrity" of the system while doing maintenance?

## 2 Answers

**A1:** Maintaining conceptual integrity is difficult. It's an issue that needs to be addressed constantly during architecture, design, and construction, and it only gets worse when a project changes hands.

One thing that can help is for people from the original development team to be involved in the maintenance. Someone who already has an idea of the project's conceptual framework will be better able to keep to that framework than someone who is learning it from scratch.

Other than that, though, this comes down to the gigantic topic of best practices. Almost all "good" programming practices are aimed at ease of maintenance. Good design and construction practices lead to projects that are more easily grasped by later developers. Steve McConnell talks about managing complexity as the central imperative of software work. If the complexity is managed well up front, it will be easier for those who come later to keep the conceptual integrity of the project intact.

At the other end, good maintenance practices involve working against entropy. Keep the system under test. Don't decrease cohesion or increase coupling for the sake of a quick fix or a new feature. In fact, aim to make the project more coherent with each change that is made.

If the system was designed with extensibility in mind, then it shouldn't be difficult for maintenance programmers to keep conceptual integrity intact while doing their jobs. And even if it wasn't, it should still be possible for them to improve the project during maintenance rather than bring it down further.

If maintenance developers simply hack things together and do things the "easy" way, it will always degrade the conceptual integrity and increase the complexity of a project. Developers have to be aware of that, and they have to consciously choose the practices that will best allow them to avoid it.

The main idea is that maintenance should be a process of constantly improving a project, not constantly degrading it. An excellent book that deals with this topic is Michael Feathers' Working Effectively with Legacy Code. You might want to check it out.

C1: What I said, only better. +1 – David Schmitt Feb 11 '09 at 14:48

## A2:

1. Start with minimal changes.
2. Get into the style of the project.
3. Create islands of sanity.
4. Each commit has to improve the state of the code.

See [this excellent screencast](#) for an example of what can be done on legacy code without too much disruption.

Of course this requires management's commitment to a code-quality-first strategy to be able to make those fixes "right".

C1: No downvote - however from my experience, this is very difficult to achieve. The maintenance (or sustenance) teams have aggressive targets/schedules - as a result their primary motive is to get as many defects fixed as possible. Also they are usually not the most proficient developers AFAI have seen. – Gishu Jul 23 '10 at 3:33

C2: Yes, if the maintenance team's primary goal (set by management) is not to improve the situation, no amount of good will or strategy helps. See [thedailywtf.com](#) – David Schmitt Jul 26 '10 at 10:44

828. <https://stackoverflow.com/questions/13784078/twitter-api-getting-follower-ids-for-huge-number-without-getting-error>

T: Twitter API getting follower ids for huge number, without getting error

Q: [I am using Python, and ruby gem twurl to request with OAuth.]

I am trying to get follower ids from Twitter, for @BarackObama, who has 24,265,751 followers currently. Mathematically,  $24,265,751 / 5000 / 350$  gives 13.8 hrs to collect, and that is about 14-15 hrs if we give it with an hour margin.

Everytime I try to collect it with my code, it gives error on some point while pagination. When I get back on collecting after I get error, it looks at different page so that it collects more than I was expected to have.

I want to know if I am working wrong, or my code architecture has defects. Here are my functions to use;

```
def request_followers(namevar, name, candidate_id, id_str):
 next_cursor = -1
 cmd = 'twurl "/1/followers/ids.json?cursor=-1&screen_name=' + namevar + "'"
 data = fol_req(cmd)

 /*code to add data into database as soon as it gets the data.*/

try:
 if (data.get('ids')):
 while (len(data.get('ids')) == 5000):
 next_cursor = data['next_cursor']
 followers_request = 'twurl "/1/followers/ids.json?cursor=' + str(next_cursor) + '&screen_name=' + namevar + "'"
 try:
 data = fol_req(followers_request)
 /*code to add data into database as soon as it gets the data.*/
 except:
 time.sleep(5)
 continue # if error, retry after 5 sec.
 except:
 print "error on", followers_request
 check_list.append(followers_request)
```

This is to have pagination, and

```

def fol_req(followers_request):
 request_limit = remainingHits()
 attempt = 0
 data = {}

 while (attempt < request_limit-1) and not(data.get('ids')):
 try:
 attempt += 1
 (status, output) = commands.getstatusoutput(followers_request)
 if status:
 sys.stderr.write(output)
 sys.exit(1)
 data = json.loads(output)
 except:
 continue
 break
 else:
 request_limit = remainingHits()
 time.sleep(1200)
 data = fol_req(followers_request)

 return data

```

This is to request using twurl and python sys.

Is my architecture wrong some point?

**C1:** I would be surprised if the service allows you to freely fetch that amount of data. Do they legally allow that ? – mmgp Dec 9 '12 at 2:50

**C2:** You're probably hitting the limits of Twitter api. It shouldn't let you do more than 150 calls. – Diego Basch Dec 11 '12 at 21:06

829. <https://stackoverflow.com/questions/22516450/use-a-particular-ca-for-a-ssl-connection/23180787#23180787>

T: Use a particular CA for a SSL connection

Q: I'm reading through [Support Certificates In Your Applications With The .NET Framework 2.0](#) trying to determine how to set a CA for a SSL connection.

Around half-way down the article under [Validating Certificates](#), MSDN presents some code:

```
static void ValidateCert(X509Certificate2 cert)

{

 X509Chain chain = new X509Chain();

 // check entire chain for revocation
 chain.ChainPolicy.RevocationFlag = X509RevocationFlag.EntireChain;

 // check online and offline revocation lists
 chain.ChainPolicy.RevocationMode = X509RevocationMode.Online |
 X509RevocationMode.Offline;

 // timeout for online revocation list
 chain.ChainPolicy.UrlRetrievalTimeout = new TimeSpan(0, 0, 30);

 // no exceptions, check all properties
 chain.ChainPolicy.VerificationFlags = X509VerificationFlags.NoFlag;

 // modify time of verification
 chain.ChainPolicy.VerificationTime = new DateTime(1999, 1, 1);

 chain.Build(cert);

 if (chain.ChainStatus.Length != 0)
 Console.WriteLine(chain.ChainStatus[0].Status);
}
```

Then later:

```
// override default certificate policy
ServicePointManager.ServerCertificateValidationCallback =
 new RemoteCertificateValidationCallback(VerifyServerCertificate);
```

I feel like I'm missing something really obvious. For example, I don't want a callback - I just want to say, "establish a SSL connection, and here's the one CA to trust". But I don't see that in the code above.

[X509Chain](#) does not appear to have an add method to add a CA or root of trust. Shouldn't the CA be set before the callback? But I don't see that in the code above.

In Java, it would be done with a TrustManager (or TrustManagerFactory) after loading the particular CA you want to use (for an example, see [Use PEM Encoded CA Cert on filesystem directly for HTTPS request?](#)).

**Question:** How does one set a CA to use for an SSL connection in .Net or C#?

## 1 Answer

**A1:** The following code will avoid the Windows certificate stores and validate the chain with a CA on the filesystem.

The name of the function does not matter. Below, VerifyServerCertificate is the same callback as RemoteCertificateValidationCallback in SslStream class. It can also be used for the ServerCertificateValidationCallback in ServicePointManager.

```
static bool VerifyServerCertificate(object sender, X509Certificate certificate,
 X509Chain chain, SslPolicyErrors sslPolicyErrors)
{
 try
 {
 String CA_FILE = "ca-cert.der";
 X509Certificate2 ca = new X509Certificate2(CA_FILE);

 X509Chain chain2 = new X509Chain();
 chain2.ChainPolicy.ExtraStore.Add(ca);
```

```

// Check all properties

chain2.ChainPolicy.VerificationFlags = X509VerificationFlags.NoFlag;

// This setup does not have revocation information

chain2.ChainPolicy.RevocationMode = X509RevocationMode.NoCheck;

// Build the chain

chain2.Build(new X509Certificate2(certificate));

// Are there any failures from building the chain?

if (chain2.ChainStatus.Length == 0)

 return false;

// If there is a status, verify the status is NoError

bool result = chain2.ChainStatus[0].Status == X509ChainStatusFlags.NoError;

Debug.Assert(result == true);

return result;

}

catch (Exception ex)

{

 Console.WriteLine(ex);

}

return false;
}

```

I have not figured out how to use this chain (chain2 below) by default such that there's no need for the callback. That is, install it on the ssl socket and the connection will "just work". And I have not

figured out how install it such that its passed into the callback. That is, I have to build the chain for each invocation of the callback. I think these are architectural defects in .Net, but I might be missing something obvious.

**C1:** A local CA certificate is one that can't be validated or revoked. Only recently, the Heartbleed exploit exposed the certificates on numerous sites, causing massive revocations - and many sites are still unsafe. Your solution would be valid if you loaded the certificate from its URL source instead of the local drive, ensuring it is valid. To avoid the performance penalty you can cache the certificate but then - that's what Windows Certificate store already does for you. – Panagiotis Kanavos Apr 23 '14 at 7:01

**C2:** @Panagiotis - "A local CA certificate is one that can't be validated or revoked" - not true. You really need to educate yourself in PKI and security diversification techniques. Peter Guttmann's Engineering Security would probably be very helpful to you. – jww Apr 23 '14 at 7:12

**C3:** @Panagiotis - "Heartbleed exploit exposed the certificates on numerous sites, causing massive revocations" - that affected end entity certificates (e.g., server or client), and not CA certificates. If Heartbleed affected your CA operations, then your operations were flawed. – jww Apr 23 '14 at 7:22

**C4:** @Panagiotis - "if you loaded the certificate from its URL source instead of the local drive" - you probably don't realize what's wrong with this suggestion. Guttmann's book explains why its not ideal, and offers other methods to improve upon it. Its all part of a security diversification strategy. – jww Apr 23 '14 at 7:27

**C5:** if (chain2.ChainStatus.Length == 0) should return False, not true – John Oct 16 '17 at 13:05

830. <https://stackoverflow.com/questions/12653911/how-to-use-certificate-callback-in-sslstream-authenticateasclient-method/22702002#22702002>

**T:** How to use certificate callback in SslStream.AuthenticateAsClient method?

**Q:** My C#.NET SSL connect works when I import the certificate manually in IE (Tools/Internet Options/Content/Certificates), but how can I load the certificate by code? Here is my code:

```
TcpClient client = new TcpClient(ConfigManager.SSLSwitchIP,
Convert.ToInt32(ConfigManager.SSLSwitchPort));
```

```
SslStream sslStream = new SslStream(

 client.GetStream(),

 false,

 new RemoteCertificateValidationCallback(ValidateServerCertificate),

 null
);
```

```
sslStream.AuthenticateAsClient("Test");
```

The above code works fine if i import my certificate file manually in Internet Explorer. But if i remove my certificate from IE and use the following code instead, i get Authentication exception:

```
sslStream.AuthenticateAsClient("Test", GetX509CertificateCollection(), SslProtocols.Default, false);
```

and here is the 'GetX509CertificateCollection' method :

```
public static X509CertificateCollection GetX509CertificateCollection()
```

```
{
```

```
 X509Certificate2 certificate1 = new X509Certificate2("c:\\ssl.txt");
```

```
 X509CertificateCollection collection1 = new X509CertificateCollection();
```

```
 collection1.Add(certificate1);
```

```
 return collection1;
```

```
}
```

What should I do to load my certificate dynamically?

### 3 Answers

**A1:** To build upon owlstead's answer, here's how I use a single CA certificate and a custom chain in the verification callback to avoid Microsoft's store.

I have not figured out how to use this chain (chain2 below) by default such that there's no need for the callback. That is, install it on the ssl socket and the connection will "just work". And I have not figured out how install it such that its passed into the callback. That is, I have to build the chain for each invocation of the callback. I think these are architectural defects in .Net, but I might be missing something obvious.

The name of the function does not matter. Below, VerifyServerCertificate is the same callback as RemoteCertificateValidationCallback. You can also use it for the ServerCertificateValidationCallback in ServicePointManager.

```
static bool VerifyServerCertificate(object sender, X509Certificate certificate,
```

```
 X509Chain chain, SslPolicyErrors sslPolicyErrors)
```

```
{
```

```
try
{
 String CA_FILE = "ca-cert.der";
 X509Certificate2 ca = new X509Certificate2(CA_FILE);

 X509Chain chain2 = new X509Chain();
 chain2.ChainPolicy.ExtraStore.Add(ca);

 // Check all properties
 chain2.ChainPolicy.VerificationFlags = X509VerificationFlags.NoFlag;

 // This setup does not have revocation information
 chain2.ChainPolicy.RevocationMode = X509RevocationMode.NoCheck;

 // Build the chain
 chain2.Build(new X509Certificate2(certificate));

 // Are there any failures from building the chain?
 if (chain2.ChainStatus.Length == 0)
 return true;

 // If there is a status, verify the status is NoError
 bool result = chain2.ChainStatus[0].Status == X509ChainStatusFlags.NoError;
 Debug.Assert(result == true);

 return result;
}

catch (Exception ex)
```

```

{
 Console.WriteLine(ex);

}

return false;
}

```

**A2:** A quick Google pointed me to a piece of text from the Microsoft SslStream class.

The authentication is handled by the Security Support Provider (SSPI) channel provider. The client is given an opportunity to control validation of the server's certificate by specifying a RemoteCertificateValidationCallback delegate when creating an SslStream. The server can also control validation by supplying a RemoteCertificateValidationCallback delegate. The method referenced by the delegate includes the remote party's certificate and any errors SSPI encountered while validating the certificate. Note that if the server specifies a delegate, the delegate's method is invoked regardless of whether the server requested client authentication. If the server did not request client authentication, the server's delegate method receives a null certificate and an empty array of certificate errors.

So simply implement the delegate and do the verification yourself.

**C1:** thank you. I've done that before, but it has errors if i haven't added the certificate to root store. by the way, how can i verify remote certificate? what's the manual check instructions and rules? – losingsleep Oct 14 '12 at 11:27

**C2:** You have implemented the callback function and when it returned true it still did not work?  
Really? – Maarten Bodewes Oct 14 '12 at 16:09

**C3:** Yes. As I understood , when i call "AuthenticateAsClient" method , .NET does SSL handshake using keys in "Trusted Root Certification Authorities" (Internet Explorer/Tools/Internet Options/Content/Certificates) that is called ROOT when we wanna add it by code. And if the needed public key doesn't exist there, .NET's program control goes into the "RemoteCertificateValidationCallback" callback method with some errors, and if i check remote certificate manually and return "true" in that method, no problem like "AuthenticationException" will occur. So what's the rules of verification? – losingsleep Oct 15 '12 at 12:20

**C4:** Well, that's up to you. You should at least verify a chain to a trusted certificate (but that chain may be one cert long). Then it would be wise to check that the current date is within the validity period. Then there are key usages and other extended elements. In that regard it is a solution, but not an easy solution. – Maarten Bodewes Oct 15 '12 at 12:36

**A3:** I wrote another method to add my certificate to **Trusted Root Certification Authorities** (root) before attempting to authenticate as client via SSLStream object:

```
public static void InstallCertificate()
{
 X509Store store = new X509Store(StoreName.Root, StoreLocation.LocalMachine);
 store.Open(OpenFlags.ReadWrite);
 string fileName = "sslcert.pem";
 X509Certificate2 certificate1;
 try
 {
 certificate1 = new X509Certificate2(fileName);
 }
 catch (Exception ex)
 {
 throw new Exception("Error loading SSL certificate file." + Environment.NewLine +
fileName);
 }

 store.Add(certificate1);
 store.Close();
}
```

And then:

```
InstallCertificate();
sslStream.AuthenticateAsClient("Test");
```

It works fine without any warnings or errors. But base question still remains unsolved:

### **How can I use a certificate to authenticate as client without installing it in Windows?**

**C1:** "How can I use a certificate to authenticate as client without installing it in Windows?" - see the answer below. It builds upon owlstead's answer. – jww Mar 28 '14 at 1:15

831. <https://stackoverflow.com/questions/1056206/reducing-defect-injection-rates-in-large-software-development-projects/1056271#1056271>

**T:** Reducing defect injection rates in large software development projects

**Q:** In most software projects, defects originate from requirements, design, coding and defect corrections. From my experience the majority of defects originate from the coding phase.

I am interested in finding out what practical approaches software developers use to reduce defect injection rates.

I have seen the following approaches used with varying levels of success and associated cost

- code inspections
- unit tests
- static code analysis tools
- use of programming style
- peer programming

[unit-testing](#)

**C1:** TDD is helpful as well. – John Saunders Jun 29 '09 at 1:21

## 6 Answers

**A1:** In my experience it has been the fault of the process, not developers, that permit defects. See They Write the Right Stuff on how the process affects bugs.

### Competitive Testing

Software developers should aspire to prevent testers from finding issues with the software they have written. Testers should be rewarded (does not have to be financial) for finding issues with software.

### Sign Off

Put a person in charge of the software who has a vested interest in making sure the software is devoid of issues. The software is not shipped until that person is satisfied.

### Requirements

Avoid changing requirements. Get time estimates from developers for how long it will take to implement the requirements. If the time does not match the required delivery schedule, do not hire more developers. Instead, eliminate some features.

## Task Switching

Allow developers to complete the task they are working on before assigning them to another. After coming back to a new task, much time is spent getting familiar with where the task was abandoned and what remaining items are required to complete the it. Along the way, certain technical details can be missed.

## Metrics

Gather as many possible metrics you can. Lines of code per method, per class, dependency relationships, and others.

## Standards

Ensure everyone is adhering to corporate standards, including:

Source code formatting. This can be automated, and is not a discussion.

Naming conventions (variables, database entities, URLs, and such). Use tools when possible, and weekly code reviews to enforce.

Code must compile without warnings. Note and review all exceptions.

Consistent (re)use of APIs, both internally and externally developed.

## Independent Review

Hire a third-party to perform code reviews.

## Competent Programmers

Hire the best programmers you can afford. Let go of the programmers who shirk corporate standards.

## Disseminate Information

Hold review sessions where developers can share (with the entire team) their latest changes to the framework(s). Allow them freedom to deprecate old portions of the code in favour of superior methods.

## Task Tracking

Have developers log how long (within brackets of 15 minutes) each task has taken them. This is not to be used to measure performance, and must be stressed that it has no relation to review or salary. It is simply a measure of how long it takes certain technical tasks to be implemented. From there you can see, generally, how much time is being spent on different aspects of the system. This will allow you to change focus, if necessary.

## Evaluate the Process

If many issues are still finding their way into the software, consider reevaluating the process with which the software is being developed. Metrics will help pinpoint the areas that need to be addressed.

**A2:** First, bugs injected at requirements time are far, far more costly than coding bugs. A zero-value requirement, correctly implemented is a piece of zero-value, unused (or unusable) functionality.

## Two things reduce the incidence of bugs

Agility. You are less likely to inject bugs at every step (requirements, design, etc.) if you aren't doing as much in each step. If you try to write all the requirements, you will make terrible mistakes. If you try to write requirements for the next sprint, odds are better that you will get those few requirements correct.

TDD. You are less likely to struggle with bad requirements or bad design if you have to write a test first. If you can't figure out what you're testing, you have a requirements bug. Stop coding. Step away from the keyboard.

If you can't figure out how to test it, you have a design bug. Again, stop coding. Fix the design so it's testable. Then move forward.

**A3:** The majority of defects may occur during coding, but the impact of coding defects is generally much lower than the impact of errors made during the process of understanding requirements and while developing a resilient architecture. Thus the use of short executable-producing iterations focused on

- identifying and correcting ambiguous, imprecise, or just plain incorrect requirements
- exposing a suboptimal and/or brittle architecture

can save enormous amounts of time and collective stomach lining in a project of significant scope.

Unit testing, scenario testing, and static analysis tools can detect defects after they are created, but to reduce the number of defects created in the first place, reduce the number of interruptions that developers must endure:

- reduce, eliminate, and/or consolidate meetings
- provide an interrupt-free working environment
- allow developers to correct their defects when they find them (while the responsible code is still fresh in their mind) rather than defer them to a later time when context must be re-established

**A4:** I think the main problem of injection rates can come from a lot of sources, and it vary from environment to environment.

You can use a lot of best practices like TDD, DDD, pair programming, continuous integration, etc. But you will never be free from bugs, because what creates bugs are human people, and not exactly the processes.

But IMO, using a bug tracker tool could bring you hints of which problem is more recurrent. From there, you can start attacking your main problem.

**A5:** In addition:

- **Project knowledge base.** It says how we do activity X (like 'form validation') in this project. This allows unification and re-use of tested solution, preventing bugs injected when re-inventing-the-wheel.
- **Production bug monitoring.** When a production bug occurs it is investigated. Why this bug was not caught? How we can ensure that this won't happen again? Then we change the process accordingly.

**A6: Step 1 - Understand where your defects are being injected.**

Use a technique such as [Orthogonal Defect Classification \(ODC\)](#) to measure when in the software lifecycle defects are injected and when they are detected. Once you know when the defects are injected and have identified when they were discovered you can start to understand the gaps in your process with respect to defect injection and removal.

## Step 2 - Develop defect "filters" and adapt your process

Once you know when defects are being injected you can devise strategies to prevent them from entering the system. Different strategies are effective at different points in the software lifecycle. For example, static analysis tools don't help with defects that originated in the requirements, instead you should be looking into some kind of peer review or inspection, maybe even changing the way requirements are specified so you use automated analysis or achieve a more meaningful sign-off, etc.

Generally I use a combination of inspection, static analysis, and testing (many different kinds) to filter as many bugs as I can, as soon after they are injected as I am able.

832. <https://stackoverflow.com/questions/45876228/loadrunner-replay-http-response-returns-different-return-uri-than-when-performed/45911391#45911391>

**T:** Loadrunner replay http response returns different return\_uri than when performed manually from the browser

**Q:** I have started using HP Loadrunner as part of a performance testing project. We are trying to hit an initial URL which redirects to an identity server and then redirects to the web portal login screen. For now I am trying in parallel to see the message exchange in both loadrunner log and browser log (just to compare the two request response messages). For some reason even though the initial HTTP GET message seems to be the same as the browser one the response coming back from the web portal is not the same. So at the location property when i get the redirection url the path is missing the port number at the redirect\_uri point (...../url:portnumber2/.....). that creates an issue with the second redirection as instead of getting me to the proper redirection url it takes me to the error page redirection.

so the message exchange in browser looks like below:

Request URL:https://urladdress:portnumber1/

Request Method:GET

Status Code:302

Remote Address:10.33.5.83:4020

Referrer Policy:no-referrer-when-downgrade

Response Headers

content-length:0

date:Fri, 25 Aug 2017 06:50:47 GMT

location:/connect/authorize?client\_id=...&redirect\_uri=https%3A%2F%2Furladdress%3Aportnumber%2F....sign.....

server:.....

set-cookie:.AspNetCore.OpenIdConnect.....

set-cookie:.AspNetCore.....

status:302

x-powered-by:ASP.NET

x-ua-compatible:IE=Edge,chrome=1

Request Headers

:authority:urladdress:portnumber1

:method:GET

:path:/

:scheme:https

accept:text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,\*/\*;q=0.8

accept-encoding:gzip, deflate, br

accept-language:en-US,en;q=0.8

upgrade-insecure-requests:1

user-agent:.....

second redirection

Request URL:https://urladdress:portnumber2/connect/authorize?.....

Request Method:GET

Status Code:302

Remote Address:ipaddress:portnumber2

Referrer Policy:no-referrer-when-downgrade

Response Headers

content-length:0

date:Fri, 25 Aug 2017 06:50:47 GMT

location:https://urladdress:portnumber2/account/login?.....

server:.....

status:302

x-powered-by:ASP.NET

#### Request Headers

:authority:urladdress:portnumber2

:method:GET

:path:/connect/authorize?.....

:scheme:https

accept:text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,\*/\*;q=0.8

accept-encoding:gzip, deflate, br

accept-language:en-US,en;q=0.8

cookie:.AspNetCore.....

upgrade-insecure-requests:1

user-agent:.....

and the message exchange in loadrunner looks the same with the only difference of not including the portnumber2 after the end of the return\_uri property. That results in being redirected to an error page instead of the second redirection. The script we are using is shown below:

```
web_set_sockets_option("SSL_VERSION", "TLS1.2");
web_cleanup_cookies();
web_cache_cleanup();
web_add_auto_header("Accept-Encoding","gzip, deflate, br");
web_add_auto_header("Accept-Language","en-US,en;q=0.8");
web_add_auto_header("Accept","text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8");
web_add_auto_header("Upgrade-Insecure-Requests","1");
web_add_auto_header("User-Agent","Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/60.0.3112.101 Safari/537.36");

web_set_option("MaxRedirectionDepth","0",LAST);
web_set_max_html_param_len("10000000");
```

```
web_reg_save_param_ex("ParamName=url1",
 "LB=Location: ",
 "RB=\r\n",
 LAST);
```

```
web_url("urladdress:portnumber1",
 "URL=https://urladdress:portnumber1",
 "Resource=0",
 "RecContentType=text/html",
 "Referer=",
 "Mode=HTTP",
 LAST);
```

```
lr_message("redirected address 1 = %s ",lr_eval_string("{url1}"));
```

```
web_reg_save_param_ex("ParamName=url2",
 "LB=Location: ",
 "RB=\r\n",
 LAST);
```

```
web_url("connect",
 "URL={url1}",
 "Resource=0",
 "RecContentType=text/html",
 "Referer=https://urladdress:portnumber1",
 "Mode=HTTP",
 LAST);
```

```
return 0;
```

I need to know why the port number on a url is not fetched by the http response message( perhaps there is a configuration I need to create). Any other comments that might help would be much appreciated.

**C1:** What is the error response? – James Pulley Aug 26 '17 at 16:59

**C2:** There is no error just that the http process redirects me to the error page. Since the url is not good. – user2719567 Aug 31 '17 at 7:35

**C3:** Managed to pass the error posted here but now I am getting another LR error -  
26499:InternalError - Invalid \_pt0wningTask/\_ptTaskItem(000000/000000) for mnSocketFD-1596inOnSslFirstSendStart – user2719567 Aug 31 '17 at 14:03

**C4:** No need its ok found the issue and resolved it I created a new solution and forgot to enter the proper SSL/TLS version. The issue was resolved and the solution was to change the web server not to require different sockets than the default ones. So for HTTP we had 4020 port when its 80 the default and for SSL we had 4030 when its 443. By just bringing everything back to default it worked like a charm. – user2719567 Aug 31 '17 at

## 1 Answer

**A1:** Have you considered that having a double redirection, particularly ones which are temporary, are going to extract a large performance hit. You have two double handshakes in a row. This is bad magic, independent of the testing tool being used. It is poor architecture on the part of your designers/developers. Cite the defect - Go for a max redirect level of one.

**C1:** Yes that is correct. The double handshaking is not the best architecture but this is how the system is so there is not much there. The problem as I posted is not the redirection as such but rather the Location: url that is returned back in the response message as the browser and loadrunner differs ( browser also includes port number where the loadrunner doesn't). – user2719567 Aug 29 '17 at 6:20

833. <https://stackoverflow.com/questions/48805296/aws-multiple-lambda-in-same-project>

**T:** AWS multiple Lambda in same project

**Q:** My team is in the process of creating a project which follows the serverless architecture, we are using AWS Lambda, NodeJS and Serverless framework. The application will be a set of services each one will be handled as a separate function.

I found examples combining multiple functions under the same project then using cloud formation to deploy all at once, but with some defects we don't want, like having resources of different modules deployed for each lambda function, which will cause some redundancy and if we want to change one file it will not be reflected in all lambda functions as it's local to the hosting lambda function

<https://github.com/serverless/examples/tree/master/aws-node-rest-api-with-dynamodb>

My question: do you know the best way to organize a project containing multiple functions, each one has its separate .yaml and configurations with the ability to deploy all of them when needed or specify selective updated functions to be deployed?

**C1:** Can you elaborate a little on why using one yaml file containing several functions doesn't suite you? This will centralize your deployment and really make your life easier. What defects did you encounter? – Gal Bashan Feb 15 at 10:58

**C2:** @GalBashan thanks for your comment , I updated the post with my concern also we need to have it following the microservices way by isolating each service alone and don't have coupling between them – emad omara Feb 15 at 11:18

**C3:** Looking at the issues you described, there are solutions while still using serverless and 1 yaml file: 1. You can set a resource to a specific function, not the entire project 2. You can deploy a single function using sls deploy function, so a change in one file won't cause a deployment to all Is that helpful or am I missing something? – Gal Bashan Feb 15 at 11:23

## 1 Answer

**A1:** I think I found a good way to do this in a way like the one mentioned here :  
<https://serverless.readme.io/docs/project-structure>

I created a service containing some Lambda functions , each one is contained within a separate folder , also I had a lib folder on the root level containing all the common modules that can be used in my Lambda functions .

So my Structure looks like :

Root --- functions---- function1 function2 libs--- tests-- resources serverless.yml (root level)

and in my yml file I'm pointing to Lambdas with relative paths like :

```
functions: hello1: handler: functions/function1/hello1.hello
```

Now I can deploy all functions with one Serverless command , or selectively deploy the changes function specificity

and the deployed Lamda will only contain the required code

834. <https://stackoverflow.com/questions/22593948/websocket-authentication-security/22594987#22594987>

**T:** WebSocket authentication security

**Q:** I'm trying to authenticate a client to my secure WebSocket server (wss) for registered member area.

Once a member is connected to the web server, I record, in a database, a unique token (associated to the member) that I displayed in a hidden field on the page initiating the connection to the Web Socket server.

Then the token is sent to the WebSocket server that authenticates the account using the token.

I'm really not a security expert, and I wanted your opinion as to the security of my authentication.

Are there any risks (except cookie hijacking)? Are there any better way to proceed considering that WebSocket doesn't prescribe any particular way that servers can authenticate clients during the WebSocket handshake.

I use Ratchet WebSocket.

**C1:** Also see Websocket authentication. I don't believe its a duplicate since its asking about a HTTP login within a WebSocket. – jww Mar 23 '14 at 19:07

**C2:** What is in the token? Most session/authentication tokens have some kind of time limiting mechanism (to mitigate the impact of leaks) and maybe a mechanism whereby the user can invalidate old tokens (for example on changing password). Does your token include signed expiry times, or act as a key to server-side state storage with similar properties? – bobince Jun 12 '14 at 21:36

**C3:** SocketCluster was using cookies originally for storing JWT tokens but it has moved away from this. You can read why here: [github.com/SocketCluster/socketcluster-client/issues/9](https://github.com/SocketCluster/socketcluster-client/issues/9) – Jon Feb 4 '16 at 3:41

## 2 Answers

**A1:** Yes, one option is to use cookies (and TLS to avoid cookie hijacking):

Have the cookie set after "plain old HTML form based" login, transmit the cookie to WebSocket server, and use the cookie to authenticate the WebSocket.

Here is a complete example of doing Mozilla Persona based authentication with WebSocket.

You asked about Ratchet. This example is not Ratchet, but it might give you some clues - which is why I think it's ok to point to.

**A2:** Are there any risks ...

Yes, lots. PKI/PKIX and SSL/TLS has a number of architectural defects. For the full treatment, see Peter Gutmann's Engineering Security.

Also, WebSockets does not allow you to query attributes of the underlying connection. So, as far as I know, you can't even tell if you are actually using SSL/TLS. The only thing you will know is you requested it.

Are there any better way to proceed considering that WebSocket

The last time I checked, WebSockets is pretty lame. All you get to do is open, read and write. They are intended to be easy to use, but lack anything useful related to security.

For completeness, the last time I checked was March 2013 while performing a security evaluation on app that used them. Things may have changed by now.

I also tried engaging the WebSockets RFC authors, and the RFC editor about some of the issues from a security point of view. All of the emails went unanswered.

UPDATE (2015): It gets even better... Browsers and other user agents have Host Public Key Pinning now.

But if you look at the details, it should be called "Host Public Key Pinning with Overrides". The built-in overrides allow an attacker to break a good pinset. Worse, the browser is complicit in the cover-up because it MUST suppress the failed pin report.

You can read more complaints about it (and the rebuttal) at [Comments on draft-ietf-websec-key-pinning](#).

Its a junk standard that never should have been standardized. Its more insecure browser junk.

**C1:** One needs to differentiate between the WebSocket protocol (RFC6455) and the W3C WebSocket API in browsers. JavaScript running in browsers is not able to retrieve e.g. the certificate on a secure connection - and that is independent of using WebSocket, AJAX or whatever. This is by design. A rogue JS running on an Intranet might otherwise "probe around" on the network. – oberstet Mar 24 '14 at 11:38

**C2:** oberstet - thanks, +1. Do you realize that position actually means you cannot use the socket? In data security, we [are supposed to] never apply our secret to an non-validated "thing" (for lack of a better term). For public key encryption, that means we validate the public key. For a secure channel, that means we verify SSL/TLS and certain attributes in the certificate chain. – jww Mar 24 '14 at 18:43

**C3:** No, it does not mean that. The certificate is verified by the browser (verify in this case means: check if the cert is valid wrt to the trust chain built into browsers). If running outside a browser, a WebSocket client can and should verify the server certificate itself of course. – oberstet Mar 24 '14 at 18:52

**C4:** "The certificate is verified by the browser" - bad idea. The browser (i.e., the platform) cannot know things like what CA is supposed to issue the end entity cert or what the server's expected public key is. The issuing authority or server's public key are things an app would know and could verify (if WebSocket made the information available). Little details like this are why web application are relegated to low value data. If the data is high value, a web app cannot be used. (At least in the risk departments I have worked). – jww Mar 24 '14 at 19:07

**C5:** The browser does know which CAs are acceptable for the server cert to be valid: the CA cert in the trust store. For IE/Chrome on Windows e.g. there is a OS wide trust store used. An the user/admin of the PC can modify the trust store. So you can remove all but one CA cert, and the browser will only connect to a server via TLS if the server cert was issued by that CA. – oberstet Mar 24 '14 at 19:14

**C6:** The problem is plural - "CAs". There's one valid issuing CA (sans countersigning or cross certification using a PKI bridge). There's no need to trust the CA zoo (or DNS for that matter). That's gotten us into trouble in the past. Its why Comodo hacker was successful in his attack with the compromised Diginotar root. And its why Trustwave was successful in their MitM attacks. – jww Mar 24 '14 at 19:19

**C7:** Yes. I agree on that one. It's a problem that a server certificate is not "pinned" to a specific issueing CA. There are fixes for that ongoing: [security.stackexchange.com/questions/29988/...](http://security.stackexchange.com/questions/29988/) – oberstet Mar 24 '14 at 19:32

**C8:** There is also a "more radical" approach than pinning: convergence.io – oberstet Mar 24 '14 at 20:29

**C9:** Being able to access the CA in the browser WebSocket API would be pretty useless. If we assume a compromised CA attack then the attacker would be eminently capable of sabotaging the JS that did that check, at the point it was served to the client. The commercial X.509 PKI has its problems for sure, but it's not reasonable to blame WebSocket for that. – bobince Jun 12 '14 at 21:29

**C10:** @bobince - "Being able to access the CA in the browser WebSocket API would be pretty useless." - I disagree. What use case are you thinking of? I'm thinking of a side loaded app in a trusted distribution channel, like loaded from a organization's app server. In this case, the bad guy does not get access to the Javascript in motion because its already present on the device. I believe it should apply to SysApps, WebApps, Packaged Apps, Installable Apps, etc (but not bookmarked apps). It all depends on the distribution channel. – jww Jun 12 '14 at 21:41

**C11:** I'm thinking of a normal web application, which appears to be the OP's use case. Custom client software can have its own CA trust store: this is the right level to handle trust, pre-connection-opening. For a custom app implemented in-browser, it would not be practical to do a post-opening check on every connection (image/script/stylesheets resource fetches, XMLHttpRequest and WebSocket) even if there were a way to do that... with script/style inclusion your JS origin is compromised immediately anyway. Plus a connection's TLS properties are not static as they can be renegotiated. – bobince Jun 12 '14 at 23:58

**C12:** @bobince - "... a connection's TLS properties are not static as they can be renegotiated" - if the certificate or public key changes, then you probably have bigger problems. Triple Handshake Attack FTW! The TLS WG is working on that as we speak. – jww Jun 13 '14 at 1:04

**C13:** @bobince - "Custom client software can have its own CA trust store..." - Forgive my ignorance.... do you have a reference? I don't believe the web security model has provisions for custom stores. I know WebCrypto does not. I think about the best we have is IndexedDB or WebStorage, and I've never seen anyone wire it up. They don't even have protected storage. – jww Jun 13 '14 at 1:07

835. <https://stackoverflow.com/questions/48699765/ui-with-microservices/48704042#48704042>

**T:** UI with microservices

**Q:** I have front end Web application written in JSF with Richfaces. Its a kind of dashboard application. We are trying to move this in Angular 2 with Spring Boot rest api. I want to write microservices where each functionality would be independent. There are total 10 functionality so i will write 10 different rest services and each one would have its own build process. But i am confused with front end part. Should i create separate artifacts or separate build for each UI as well ? Or should i bundle in each respective rest api? how should i take care of front end part in microservices?

## 2 Answers

**A1:** The UI shouldn't be bundled with the REST services in a true Microservices based architecture. Because if the UI is bundled with APIs, for every defect fix in the UI, all the APIs need to be rebuilt and deployed. The UI needs to be hosted separately. If the team feels comfortable with Spring Boot, the Angular UI can be bundled in a separate Spring Boot application that doesn't have any API.

Update on 21-Mar-2018 I understand that bundling the Angular GUI with Angular Universal in a pm2 server is a better approach.

C1: Agreed.. Thanks – Dead Programmer Feb 9 at 10:45

**A2:** The decision depends on organizational aspects (See another answer about the essence of microservices). So you have to ask: Will you need multiple separate teams for the frontend parts? Will they be separate from the backend service development teams? In some organizations the service development teams would also provide front end components and then a separate dedicated UI-team would use these components and glue them together to create the seamless user experience. In other organizations it makes more sense to have separate teams for backend and anything UI related. So there could be a UI team for each UI component and then one for the integration/final UI. In general the larger the project size the more component-ization you will need to do to keep the teams a 2-pizza-size. And be ready to split teams/components as needed when your project grows.

**C1:** Thanks for quick reply. In my case we dont make frequent changes in UI side but at the same time we build new functionality within each 3 months. – Dead Programmer Feb 9 at 7:10

**C2:** 3 months is still a relatively fast release cycle compared to many larger monolith developments. With smaller teams you can achieve even faster releases if that is desirable in your domain. – Oswin Noetzelmann Feb 9 at 7:41

**C3:** Good luck with your project, btw. – Oswin Noetzelmann Feb 9 at 7:59

So should i maintain different build for UI nd Service and should i bundle together? – Dead Programmer Feb 9 at 8:00

**C4:** Different build / deployment for sure, but you may still want it to be the same team, if team size is small. You probably want to automate build/test with CICD anyway. – Oswin Noetzelmann Feb 9 at 8:02

**C5:** Sure...CI CD is future plan..Thanks ☺ – Dead Programmer Feb 9 at 8:09

**C6:** Ok. Now i have created plan to develop microservices with service and UI all together different. The problem is how feasible it would be to create multiple war files like i have 10 functionality so there would be 20 war files with one for ui and one for service respectively. What about deployment? Should i deploy all in single server or use multiple servers. – Dead Programmer Feb 14 at 8:54

**C7:** Have you looked into containerized deployments yet? For example with kubernetes. In conjunction with a CICD server you can automate deployments, upgrades, etc. with zero downtime. And the split into different services allows you to build/test/deploy each independently. And when you have Angular 2 UI you should be able to just serve static files for the UI. – Oswin Noetzelmann Feb 14 at 9:14

**C8:** We are planning to deploy in WebLogic server not sure how to do with container – Dead Programmer Feb 14 at 10:35

**C9:** Check this out blogs.oracle.com/weblogicserver/… – Oswin Noetzelmann Feb 14 at 10:43

836. <https://stackoverflow.com/questions/34976481/how-to-load-chunk-files-made-by-webpack-during-runtime>

**T:** How to load chunk files made by Webpack during runtime?

**Q:** How to load chunk files which were generated by webpack 1.12.9?

Does the webpack bootstrap script automatically load chunk files during runtime?

Or.... do I have to manually import those chunk file in web page by script tag?

The situation is that I have a cordova web app which is modularized by amd (asynchronous module definition).

Since there are some defects of design in its architecture, we have to load javascript separately in our web page. We want to load frameworks and framework initialization code inside head tag, and rest of all stuff in the end of body tag. The structure of my page is demonstrated below.

```
<html>
 <head>
 <!--ignored-->
 <script src="lib/requirejs/require.js"></script>
 <script src="js/common.js"></script><!-- frameworks e.g. jquery-->
 <script src="js/boot.js"></script><!-- framework initialization -->
 </head>
 <body>
 <!-- Several pages in this SPA -->
 <script src="js/main.js"></script><!-- main entry point -->
 <script src="js/delivery.js"></script><!-- other modules -->
 </body>
</html>
```

But if I build my web page by webpack settings below, then my browser will try to load jquery from the root path of my site during runtime.

For example, requirejs attempts to load jquery from <http://localhost:8000/browser/www/jquery> instead of getting it from chunk files which has included frameworks built up this SPA.

This problem crashes my app.

```
{
 entry: {
 boot: "./src/js/boot.js",
 main: "./src/js/main.js",
 delivery: "./src/js/module/dev/delivery.js"
 },
 output: {
 path: path.join(__dirname, "www/js"),
 filename: "[name].js",
 chunkFilename: '[name].js'
 //,libraryTarget:"amd"
 },
 resolve: {
 root: [
 path.resolve('./src/js')
],
 alias: {
 "jquery":path.join(__dirname, jquerySrcPath),
 "jquery.mobile":path.join(__dirname, jqmSrcPath),
 "jqm-and-i18next-config":path.join(__dirname, "src/js/jqm-and- i18next-config.js"),
 "jquery.i18next":path.join(__dirname, "src/lib/jquery-i18next-plugin-for-synnex/i18next.amd.withJQuery-1.8.0.js"),
 "underscore":path.join(__dirname, "src/lib/underscore/underscore.js"),
 "backbone":path.join(__dirname, "src/lib/backbone/backbone.js")
 }
 }
}
```

```

 },
 },
 plugins: [
 new webpack.optimize.CommonsChunkPlugin("common.js")
]
}

```

I wonder what might be the root cause of this problem? And .... if requirejs attempt to load jquery from an incorrect place is because that my web page did not load chunk files during runtime, then how to do it in the webpack suggested way?

Any suggestion is appreciated, thank you!

837. <https://stackoverflow.com/questions/24229926/ksectrustresultrecoverabletrustfailure-when-connecting-to-https-with-self-signed/24234862#24234862>

**T:** kSecTrustResultRecoverableTrustFailure when connecting to https with self-signed certificate using NSURLConnection

**Q:** I've seen here a few questions but none of them helped me. People resolve issues mostly regenerating server certificates: [What is the reason of kSecTrustResultRecoverableTrustFailure?](#)

Suppose I need to make a https connection to server with self-signed certificate. I don't have **any internal data from the server** such as its private keys. For example the server is <https://www.pcwebshop.co.uk/>

As far as I understand I can bundle a client certificate into app and use it for verification. Am I right I can obtain a valid client certificate without having any internal data from the server?

I've googled a tutorial here <http://www.indelible.org/ink/trusted-ssl-certificates>

Here's how I'm obtaining a client certificate

```
openssl s_client \
```

```
-showcerts -connect "${HOST}:443" </dev/null 2>/dev/null | \
```

```
openssl x509 -outform DER >"./resources/${HOST}.der"
```

Here's the code (almost unchanged):

```
- (BOOL)connection:(NSURLConnection *)connection
canAuthenticateAgainstProtectionSpace:(NSURLProtectionSpace *)protectionSpace
```

```
{
```

```

 return [protectionSpace.authenticationMethod
isEqualToString:NSUTFURLConnectionAuthenticationMethodServerTrust];
 }

- (void)connection:(NSURLConnection *)connection
didReceiveAuthenticationChallenge:(NSURLAuthenticationChallenge *)challenge
{
 if ([self shouldTrustProtectionSpace:challenge.protectionSpace]) {
 [challenge.sender useCredential:[NSURLCredential
credentialForTrust:challenge.protectionSpace.serverTrust]
forAuthenticationChallenge:challenge];
 } else {
 [challenge.sender performDefaultHandlingForAuthenticationChallenge:challenge];
 }
}

- (BOOL)shouldTrustProtectionSpace:(NSURLProtectionSpace *)protectionSpace
{
 // load up the bundled certificate
 NSString *certPath = [[NSBundle mainBundle] pathForResource:protectionSpace.host
ofType:@"der"];

 if (certPath == nil)
 return NO;

 OSStatus status;
 NSData *certData = [[NSData alloc] initWithContentsOfFile:certPath];
 CFDataRef certDataRef = (__bridge retained CFDataRef)certData;
 SecCertificateRef cert = SecCertificateCreateWithData(NULL, certDataRef);
}

```

```

// establish a chain of trust anchored on our bundled certificate

CFArrayRef certArrayRef = CFArrayCreate(NULL, (void *)&cert, 1, NULL);

SecTrustRef serverTrust = protectionSpace.serverTrust;

status = SecTrustSetAnchorCertificates(serverTrust, certArrayRef);

// status == 0

// verify that trust

SecTrustResultType trustResult;

status = SecTrustEvaluate(serverTrust, &trustResult);

// status == 0

CFRelease(certArrayRef);

CFRelease(cert);

CFRelease(certDataRef);

return trustResult == kSecTrustResultUnspecified;
}

```

trustResult is always kSecTrustResultRecoverableTrustFailure.

What am I doing wrong? Thank you.

**UPDATE:** Ok, I found out that the reason is "Server's certificate does not match the URL".

Is it possible to fix the issue from the client side by ignoring the URL (hostname) of the server's certificate?

## 1 Answer

**A1:** Suppose I need to make a https connection to server with self-signed certificate. I don't have any internal data from the server such as its private keys.

In this case, you need a security diversification strategy. Gutmann covers it in great detail in his book [Engineering Security](#).

The short of it: validate the certificate sensibly the first time you encounter it. You can still use most of the traditional PKI/PKIX tests. Once the certificate passes all tests (other than the "trusted root path"), you then call it "Trusted". This strategy is called Trust On First Use or TOFU.

In subsequent connections, you don't need TOFU again because you already encountered the certificate or public key. In the subsequent connections, you ensure the certificate or public key is continuous (i.e., does not change), the IP is from the same area as previously encountered, etc. If the certificate changes, then be sure its because the self signed is expiring. Be wary of unexpected changes.

---

Here's the code (almost unchanged):

...

```
trustResult == trustResult == kSecTrustResultUnspecified
```

For kSecTrustResultUnspecified, see [Technical Q&A QA1360](#). Essentially, its a recoverable error. The Q&A says to prompt the user. Gutmann (and I) say to use a security diversification strategy as described above.

You need to take the user out of the loop because they will always make a decision that gets them past the Message Boxes as quickly as possibly. It dies not matter if they answer right or wrong - they want to see the dancing bunnies.

Also, the security diversification strategy even applies to kSecTrustResultProceed. Consider: Both [Diginotar](#) and [Trustwave](#) broke PKI{X}, and Cocoa/CocoaTouch was more than happy to return kSecTrustResultProceed. Its not really Cocoa/CocoaTouch's fault - there are architectural defects incumbent to PKI{X}.

---

Is it possible to fix the issue from the client side by ignoring the URL (hostname) of the server's certificate?

That kind of defeats the purpose of PKI{X}. If you will accept any host, any public key or any signature, why even bother with PKI{X} in the first place? The whole point of X509 in PKI{X} is to bind a entity or host to a public key using a trusted third party signature (or self signed, in this case).

If you don't care about the binding, just use Anonymous Diffie-Hellman and put an end to the security theater.

**C1:** OK, now I decided just to compare the server certificate with my local copy and check if IP address of the hostname matches with my local copy. Wish I could find the working example of how to retrieve the server certificate and IP address =/ – alopatindev Jun 16 '14 at 20:08

**C2:** That's good strategy. Its called Certificate Pinning. IP blocks works well to. You don't want to see a US or UK IP address one day, and then a Russian IP the next. Something fishy is probably going on.... – jww Jun 16 '14 at 20:17

838. <https://stackoverflow.com/questions/12536199/is-it-enough-to-launch-sonar-only-once-a-day-or-week/12536407#12536407>

T: Is it enough to launch Sonar only once a day or week?

**Q:** I have been digging quite a bit on Sonar best practices. The consensus seems to be that Sonar would be launched only once a day or week, e.g. during the night. However, what if one uses a CI server such as Jenkins? Jenkins builds on every SVN commit, runs unit tests, deploys to staging environment, runs Selenium tests, etc. The way I understand it, all this additional information is lost if Sonar is launched only once a day/week. Most likely all the team's code problems and failing tests have been resolved on in the afternoon or end of the week. Sonar runs probably on Sunday night or every night. The application is pre-built and tested, and then Sonar analysis is executed based on that information. Most likely all tests pass, no major code problems are left in the repository, and the QA team incorrectly believes that there are no problems since all Sonar reports display green. However, during the day/week it is possible that the project has been a total mess with broken builds etc., but is never displayed in Sonar reports :)

Am I missing something here, or should Sonar actually be executed upon every commit, or at least once an hour?

### 3 Answers

**A1:** It all depends on your need and your team velocity to develop new code, test and integrate new functionalities into the project.

If you have a sprint with a time box of a web, probably that on the weekend, the version that started on monday is stable, and therefore bug free, or only a few bugs. If your sprint time box is a week, i would higly recommend at least once a day, so you can get defects running unit tests and so on, giving a good reality on your project quality.

I would recommend these practices:

1. Using code coverage like Cobertura, running unit tests at least once a day;
2. Using code analysis like PMD, checkstyle and so on. If possible, create your own rules that applies to your architecture, generating more value for your project in terms of quality.
3. Considering your time box for a Sprint, choose a frequency for your builds in sonar and schedule a cron job that runs it only when you really need it(since its time consuming).

These are practices I use in my projects, but you have to look closely to your needs, since the tool (Sonar) is to help you with information about the quality of your project, and therefore, your architecture, your team and your engineering practices.

**C1:** Good points, thanks. My other comment above partly targets your answer too, in terms that one would/should really have only one repository for quality reports. The Jenkins cobertura reports may indicate of huge quality problems, but are never displayed in Sonar. I wonder, one could of course execute Sonar with unit test reports but without code analysis on every commit, and execute both test reports and code analysis reports once a day or even week. One would have to maintain separate Sonar executing configs, but that may be ok... – user1340582 Sep 21 '12 at 18:59

**C2:** Sonar lacks of quality to show information about tests and quality of your code. In fact, Sonar is only a tools that tries to gather informations using third party tools, like Cobertura, PMD, Checkstyle and so on in a web interface. It could get much better than it is. – gdfbarbosa Sep 21 '12 at 19:18

**A2:** Most of the data that Sonar collects is static analysis info (complexity, code style violations and so on) that wouldn't change much from build to build unless the code is refactored, so it should be enough to run it once a day. Consider also that Sonar analysis will add to your build execution time - at my work it can add 2 or 3 minutes to a build that only takes that long to compile and test in the first place.

If you want to collect code coverage and test results for every CI build, you can do that in Jenkins and use Jenkins as an early warning system for build health, leaving Sonar for more long term analysis of overall code quality and maintainability.

You can still trend code coverage and test results in Sonar as you mentioned in your question, you just won't have it for every CI build

**C1:** One could execute unit tests with cobertura at every commit and run the Sonar analysis once every night. However, I think that defeats the whole point of using Sonar as your centralized quality repository. If cobertura is executed without Sonar, then you will start having quality metrics in two places: Jenkins and Sonar. Someone from QA will look at your Sonar metrics and say "this is great, but how are you really doing?" Then you have to start digging your other test reports that are not part of sonar, and you discover that you are not doing so well in the project after all in quality... – user1340582 Sep 21 '12 at 18:54

**C2:** That's true, it depends on your definition of quality - in my experience it's very hard to have a single place that you can go to get an overview of all the factors that contribute to your product's quality. So I use my CI system to alert me of immediate quality "breakages" (failing compilation, test failures, code coverage dropping below a threshold, etc.) and keep Sonar for more long term trending. You can still trend code coverage and test results in Sonar as you mentioned in your question, you just won't have it for every CI build. – gareth\_bowles Sep 21 '12 at 19:05

**A3:** Running Sonar once a day/week should not be considered 'best practice'. It might be the best currently possible, considering available hardware and quality of quality measurements, but as you say, in a CI environment you need feedback every commit (and actually should have it inside the commit too, like you can have with Smalltalk & MOOSE on every method save). Code complexity and test coverage change of the parts I'm currently working on are some of the visualizations/measurements I like having at a much smaller granularity than once a day.

That Sonar adds a lot of time to your build is an implementation problem, not a fundamental, and can be tackled in a number of different ways: caching information, splitting between slow and fast measurements, splitting in modules, running asynchronously, etc.

**T:** Understanding REST: Verbs, error codes, and authentication

**Q:** I am looking for a way to wrap APIs around default functions in my PHP-based web applications, databases and CMSs.

I have looked around and found several "skeleton" frameworks. In addition to the answers in my question, there is [Tonic](#), a REST framework I like because it is very lightweight.

I like REST the best for its simplicity, and would like to create an API architecture based on it. I'm trying to get my head around the basic principles and have not fully understood it yet. Therefore, a number of questions.

### **1. Am I understanding it right?**

Say I have a resource "users". I could set up a number of URIs like so:

/api/users    when called with GET, lists users  
/api/users    when called with POST, creates user record  
/api/users/1    when called with GET, shows user record  
                  when called with PUT, updates user record  
                  when called with DELETE, deletes user record

is this a correct representation of a RESTful architecture so far?

### **2. I need more verbs**

Create, Update and Delete may be enough in theory, but in practice I will have the need for a lot more verbs. I realize these are things that *could* be embedded in an update request, but they are specific actions that can have specific return codes and I wouldn't want to throw them all into one action.

Some that come to mind in the user example are:

activate\_login  
deactivate\_login  
change\_password  
add\_credit

how would I express actions such as those in a RESTful URL architecture?

My instinct would be to do a GET call to a URL like

/api/users/1/activate\_login

and expect a status code back.

That deviates from the idea of using HTTP verbs, though. What do you think?

### **3. How to return error messages and codes**

A great part of REST's beauty stems from its use of standard HTTP methods. On an error, I emit a header with a 3xx,4xx or 5xx error status code. For a detailed error description, I can use the body (right?). So far so good. But what would be the way to transmit a **proprietary error code** that is more detailed in describing what went wrong (e.g. "failed to connect to database", or "database login wrong")? If I put it into the body along with the message, I have to parse it out afterwards. Is there a standard header for this kind of thing?

#### 4. How to do authentication

- What would a API key based authentication following REST principles look like?
- Are there strong points against using sessions when authenticating a REST client, other than that it's a blatant violation of the REST principle? :) (only half kidding here, session based authentication would play well with my existing infrastructure.)

C1: @Daniel, thanks for the edit. "I more verbs" was an intentional pun, but I'm leaving it as is, it's easier to read now. :) – Pekka ☰ Jan 12 '10 at 15:42

C2: BTW, about error description. I ended up with putting error description to response's header. Just add header named 'Error Description'. – Andrii Muzychuk Mar 10 '15 at 11:09

C3: This looks more like application security questions. Application security is not what REST is about. – Nazar Merza Aug 26 '16 at 15:23

C4: @NazarMerza how are 1., 2. and 3. application security questions? – Pekka ☰ Aug 27 '16 at 7:54

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## 10 Answers

A1: I noticed this question a couple of days late, but I feel that I can add some insight. I hope this can be helpful towards your RESTful venture.

---

### Point 1: Am I understanding it right?

You understood right. That is a correct representation of a RESTful architecture. You may find the following matrix from [Wikipedia](#) very helpful in defining your nouns and verbs:

---

When dealing with a **Collection** URI like: <http://example.com/resources>

- **GET**: List the members of the collection, complete with their member URIs for further navigation. For example, list all the cars for sale.
- **PUT**: Meaning defined as "replace the entire collection with another collection".
- **POST**: Create a new entry in the collection where the ID is assigned automatically by the collection. The ID created is usually included as part of the data returned by this operation.
- **DELETE**: Meaning defined as "delete the entire collection".

---

When dealing with a **Member** URI like: <http://example.com/resources/7HOU57Y>

- **GET**: Retrieve a representation of the addressed member of the collection expressed in an

appropriate MIME type.

- **PUT:** Update the addressed member of the collection or create it with the specified ID.
  - **POST:** Treats the addressed member as a collection in its own right and creates a new subordinate of it.
  - **DELETE:** Delete the addressed member of the collection.
- 

## Point 2: I need more verbs

In general, when you think you need more verbs, it may actually mean that your resources need to be re-identified. Remember that in REST you are always acting on a resource, or on a collection of resources. What you choose as the resource is quite important for your API definition.

**Activate/Deactivate Login:** If you are creating a new session, then you may want to consider "the session" as the resource. To create a new session, use POST to <http://example.com/sessions> with the credentials in the body. To expire it use PUT or a DELETE (maybe depending on whether you intend to keep a session history) to [http://example.com/sessions/SESSION\\_ID](http://example.com/sessions/SESSION_ID).

**Change Password:** This time the resource is "the user". You would need a PUT to [http://example.com/users/USER\\_ID](http://example.com/users/USER_ID) with the old and new passwords in the body. You are acting on "the user" resource, and a change password is simply an update request. It's quite similar to the UPDATE statement in a relational database.

My instinct would be to do a GET call to a URL like /api/users/1/activate\_login

This goes against a very core REST principle: The correct usage of HTTP verbs. Any GET request should never leave any side effect.

For example, a GET request should never create a session on the database, return a cookie with a new Session ID, or leave any residue on the server. The GET verb is like the SELECT statement in a database engine. Remember that the response to any request with the GET verb should be cacheable when requested with the same parameters, just like when you request a static web page.

---

## Point 3: How to return error messages and codes

Consider the 4xx or 5xx HTTP status codes as error categories. You can elaborate the error in the body.

**Failed to Connect to Database: / Incorrect Database Login:** In general you should use a 500 error for these types of errors. This is a server-side error. The client did nothing wrong. 500 errors are normally considered "retryable". i.e. the client can retry the same exact request, and expect it to succeed once the server's troubles are resolved. Specify the details in the body, so that the client will be able to provide some context to us humans.

The other category of errors would be the 4xx family, which in general indicate that the client did something wrong. In particular, this category of errors normally indicate to the client that there is no need to retry the request as it is, because it will continue to fail permanently. i.e. the client needs to change something before retrying this request. For example, "Resource not found" (HTTP 404) or "Malformed Request" (HTTP 400) errors would fall in this category.

---

#### **Point 4: How to do authentication**

As pointed out in point 1, instead of authenticating a user, you may want to think about creating a session. You will be returned a new "Session ID", along with the appropriate HTTP status code (200: Access Granted or 403: Access Denied).

You will then be asking your RESTful server: "Can you GET me the resource for this Session ID?".

There is no authenticated mode - REST is stateless: You create a session, you ask the server to give you resources using this Session ID as a parameter, and on logout you drop or expire the session.

**C1:** re: HTTP Status Codes. Regard this (non-trivial) flow chart for choosing which HTTP status to be returned by REST service: [aisee.com/graph\\_of\\_the\\_month/http.png](http://aisee.com/graph_of_the_month/http.png) – David J. Liszewski Nov 17 '11 at 17:31

**C2:** Explanation of POST is wrong; formally, what a POST does depends on the document that you send. The only real requirement is that it is not required to be idempotent, which in turn means that it can do non-repeatable actions like issuing new IDs. (Create maps to POST, but that's just a subset of what POST can do.) Similarly, PUT may create resources with user-specified IDs; this is how WebDAV works... – Donal Fellows Jan 15 '14 at 15:12

**C3:** Very good, however your use of PUT to change a password is probably incorrect; PUT requires the entire resource, so you'd have to send all user attributes in order to comply with HTTP (and therefore with HATEOAS REST). Rather, to simply change the password one should use PATCH or POST. – Lawrence Dol Mar 18 '14 at 1:41

**C4:** I think this post would be perfect if you expanded more on what "POST: Treats the addressed member as a collection in its own right and creates a new subordinate of it." means. - I found what it means by Googling - it's an exception to your otherwise great answer. – Martin Konecny Jul 27 '14 at 0:04

**C5:** I don't agree with the very last sentence. You are explaining how REST is stateless. Logging in to create a session, then logging out to end the session after doing some work is the best example of a stateful API. – Brandon Jul 29 '14 at 0:27

**C6:** How about @Brandon 's comment (2014-07-29 0:27)? The idea of a session implies some sort of state. How can that be seen in the light of REST? – bvgheluwe Apr 28 '15 at 8:00

**C7:** "This goes against a very core REST principle: The correct usage of HTTP verbs. Any GET request should never leave any side effect." - What if you want to maintain a hit count for the resource? – bobbyalex May 5 '15 at 3:22

**C8:** This article should answer your questions. [saipraveenblog.wordpress.com/2014/09/29/rest-api-best-practices/](http://saipraveenblog.wordpress.com/2014/09/29/rest-api-best-practices/) – java\_geek May 6 '15 at 7:15

**C9:** There should be no need for server side sessions. – Stefan Sep 9 '16 at 11:43

**C10:** I started looking for a definition, because the OpenAPIv2 spec example (pet shop) actually uses GET requests for login/logout and that seems wrong to me. This post leaves me thinking I'm right, but I keep wondering why, the spec that seems to become the industry's standard, would implement it that

way in their example that's supposed to teach others... See petstore.swagger.io and the /user/login part.  
– NKCSS Apr 25 '17 at 10:17

**C11:** Please can someone explain how a POST on a /resources/id will work ie the second eg Members - resources/7HOU57Y will creates a new subordinate of it ? is it the right/best design practices. – imvp Dec 27 '17 at 6:01

**A2:** Simply put, you are doing this completely backward.

You should not be approaching this from what URLs you should be using. The URLs will effectively come "for free" once you've decided upon what resources are necessary for your system AND how you will represent those resources, and the interactions between the resources and application state.

To quote [Roy Fielding](#)

A REST API should spend almost all of its descriptive effort in defining the media type(s) used for representing resources and driving application state, or in defining extended relation names and/or hypertext-enabled mark-up for existing standard media types. Any effort spent describing what methods to use on what URIs of interest should be entirely defined within the scope of the processing rules for a media type (and, in most cases, already defined by existing media types). [Failure here implies that out-of-band information is driving interaction instead of hypertext.]

Folks always start with the URIs and think this is the solution, and then they tend to miss a key concept in REST architecture, notably, as quoted above, "Failure here implies that out-of-band information is driving interaction instead of hypertext."

To be honest, many see a bunch of URIs and some GETs and PUTs and POSTs and think REST is easy. REST is not easy. RPC over HTTP is easy, moving blobs of data back and forth proxied through HTTP payloads is easy. REST, however, goes beyond that. REST is protocol agnostic. HTTP is just very popular and apt for REST systems.

REST lives in the media types, their definitions, and how the application drives the actions available to those resources via hypertext (links, effectively).

There are different view about media types in REST systems. Some favor application specific payloads, while others like uplifting existing media types in to roles that are appropriate for the application. For example, on the one hand you have specific XML schemas designed suited to your application versus using something like XHTML as your representation, perhaps through microformats and other mechanisms.

Both approaches have their place, I think, the XHTML working very well in scenarios that overlap both the human driven and machine driven web, whereas the former, more specific data types I feel better facilitate machine to machine interactions. I find the uplifting of commodity formats can make content negotiation potentially difficult. "application/xml+yourresource" is much more specific as a media type than "application/xhtml+xml", as the latter can apply to many payloads which may or may not be something a machine client is actually interested in, nor can it determine without introspection.

However, XHTML works very well (obviously) in the human web where web browsers and rendering is very important.

Your application will guide you in those kinds of decisions.

Part of the process of designing a REST system is discovering the first class resources in your system, along with the derivative, support resources necessary to support the operations on the primary resources. Once the resources are discovered, then the representation of those resources, as well as the state diagrams showing resource flow via hypertext within the representations because the next challenge.

Recall that each representation of a resource, in a hypertext system, combines both the actual resource representation along with the state transitions available to the resource. Consider each resource a node in a graph, with the links being the lines leaving that node to other states. These links inform clients not only what can be done, but what is required for them to be done (as a good link combines the URI and the media type required).

For example, you may have:

```
<link href="http://example.com/users" rel="users" type="application/xml+usercollection"/>
<link href="http://example.com/users?search" rel="search"
type="application/xml+usersearchcriteria"/>
```

Your documentation will talk about the rel field named "users", and the media type of "application/xml+youruser".

These links may seem redundant, they're all talking to the same URI, pretty much. But they're not.

This is because for the "users" relation, that link is talking about the collection of users, and you can use the uniform interface to work with the collection (GET to retrieve all of them, DELETE to delete all of them, etc.)

If you POST to this URL, you will need to pass a "application/xml+usercollection" document, which will probably only contain a single user instance within the document so you can add the user, or not, perhaps, to add several at once. Perhaps your documentation will suggest that you can simply pass a single user type, instead of the collection.

You can see what the application requires in order to perform a search, as defined by the "search" link and its mediatype. The documentation for the search media type will tell you how this behaves, and what to expect as results.

The takeaway here, though, is the URIs themselves are basically unimportant. The application is in control of the URIs, not the clients. Beyond a few 'entry points', your clients should rely on the URIs provided by the application for its work.

The client needs to know how to manipulate and interpret the media types, but doesn't much need to care where it goes.

These two links are semantically identical in a clients eyes:

```
<link href="http://example.com/users?search" rel="search"
type="application/xml+usersearchcriteria"/>
```

```
<link href="http://example.com/AW163FH87SGV" rel="search"
type="application/xml+usersearchcriteria"/>
```

So, focus on your resources. Focus on their state transitions in the application and how that's best achieved.

**C1:** Thanks Will for this very deep answer. Several points taken. I realize that planning from "what the URL looks like" is doing it the other way round, and I am planning from the resource side as well. Having URLs to play with just makes it more easy for me to understand the concept. It could be that my requirements can be met with a system that does not 100% follow REST principles as you define it here. I will draw out a full list of requirements for each resource type, I guess I will be able to decide then. Cheers. – Pekka ☺ Jan 12 '10 at 15:47

**A3: re 1:** This looks fine so far. Remember to return the URI of the newly created user in a "Location:" header as part of the response to POST, along with a "201 Created" status code.

**re 2:** Activation via GET is a bad idea, and including the verb in the URI is a design smell. You might want to consider returning a form on a GET. In a Web app, this would be an HTML form with a submit button; in the API use case, you might want to return a representation that contains a URI to PUT to to activate the account. Of course you can include this URI in the response on POST to /users, too. Using PUT will ensure your request is idempotent, i.e. it can safely be sent again if the client isn't sure about success. In general, think about what resources you can turn your verbs into (sort of "nounification of verbs"). Ask yourself what method your specific action is most closely aligned with. E.g. change\_password -> PUT; deactivate -> probably DELETE; add\_credit -> possibly POST or PUT. Point the client to the appropriate URIs by including them in your representations.

**re 3.** Don't invent new status codes, unless you believe they're so generic they merit being standardized globally. Try hard to use the most appropriate status code available (read about all of them in RFC 2616). Include additional information in the response body. If you really, really are sure you want to invent a new status code, think again; if you still believe so, make sure to at least pick the right category (1xx -> OK, 2xx -> informational, 3xx -> redirection; 4xx-> client error, 5xx -> server error). Did I mention that inventing new status codes is a bad idea?

**re 4.** If in any way possible, use the authentication framework built into HTTP. Check out the way Google does authentication in GData. In general, don't put API keys in your URIs. Try to avoid sessions to enhance scalability and support caching - if the response to a request differs because of something that has happened before, you've usually tied yourself to a specific server process instance. It's much better to turn session state into either client state (e.g. make it part of subsequent requests) or make it explicit by turning it into (server) resource state, i.e. give it its own URI.

**C1:** Can you discuss why not to put API keys in URLs? Is it because they are visible in proxy logs? What if the keys are transient, time-based? What if HTTPS is used? – MikeSchinkel Aug 15 '10 at 17:41

**C2:** Apart from violating the spirit (URIs should identify things), the main consequence is that it ruins caching. – Stefan Tilkov Aug 20 '10 at 9:42

**A4: 1.** You've got the right idea about how to design your resources, IMHO. I wouldn't change a thing.

4. Rather than trying to extend HTTP with more verbs, consider what your proposed verbs can be reduced to in terms of the basic HTTP methods and resources. For example, instead of an activate\_login verb, you could set up resources like: /api/users/1/login/active which is a simple boolean. To activate a login, just PUT a document there that says 'true' or 1 or whatever. To deactivate, PUT a document there that is empty or says 0 or false.

Similarly, to change or set passwords, just do PUTs to /api/users/1/password.

Whenever you need to add something (like a credit) think in terms of POSTs. For example, you could do a POST to a resource like /api/users/1/credits with a body containing the number of credits to add. A PUT on the same resource could be used to overwrite the value rather than add. A POST with a negative number in the body would subtract, and so on.

5. I'd strongly advise against extending the basic HTTP status codes. If you can't find one that matches your situation exactly, pick the closest one and put the error details in the response body. Also, remember that HTTP headers are extensible; your application can define all the custom headers that you like. One application that I worked on, for example, could return a 404 Not Found under multiple circumstances. Rather than making the client parse the response body for the reason, we just added a new header, X-Status-Extended, which contained our proprietary status code extensions. So you might see a response like:

HTTP/1.1 404 Not Found

X-Status-Extended: 404.3 More Specific Error Here

That way a HTTP client like a web browser will still know what to do with the regular 404 code, and a more sophisticated HTTP client can choose to look at the X-Status-Extended header for more specific information.

6. For authentication, I recommend using HTTP authentication if you can. But IMHO there's nothing wrong with using cookie-based authentication if that's easier for you.

**C1:** Neat idea of using "extended" resources to do things to smaller portions of a larger resource. – womble Jun 28 '11 at 1:43

**C2:** Cookies are valid in HTTP/REST, but the server should not store the cookie as state (so not as a session). The cookie can store a value like an HMAC, however, which can be disassembled without looking up the state elsewhere. – Bruce Alderson Nov 10 '11 at 20:11

## A5: REST Basics

REST have an uniform interface constraint, which states that the REST client must rely on standards instead of application specific details of the actual REST service, so the REST client won't break by minor changes, and it will probably be reusable.

So there is a contract between the REST client and the REST service. If you use HTTP as the underlying protocol, then the following standards are part of the contract:

- [HTTP 1.1](#)
  - method definitions
  - status code definitions
  - cache control headers
  - accept and content-type headers

- auth headers
- [IRI \(utf8 URI\)](#)
- body (pick one)
  - registered application specific MIME type, e.g. [maze+xml](#)
  - vendor specific MIME type, e.g. [vnd.github+json](#)
  - generic MIME type with
    - application specific RDF vocab, e.g. [ld+json](#) & [hydra, schema.org](#)
    - application specific profile, e.g. [hal+json](#) & profile link param (I guess)
- hyperlinks
  - what should contain them (pick one)
    - sending in [link headers](#)
    - sending in a hypermedia response, e.g. html, atom+xml, hal+json, ld+json&hydra, etc...
  - semantics
    - use IANA link relations and probably custom link relations
    - use an application specific RDF vocab

REST has a stateless constraint, which declares that the communication between the REST service and client must be stateless. This means that the REST service cannot maintain the client states, so you cannot have a server side session storage. You have to authenticate every single request. So for example HTTP basic auth (part of the HTTP standard) is okay, because it sends the username and password with every request.

## To answer your questions

1. Yes, it can be.

Just to mention, the clients do not care about the IRI structure, they care about the semantics, because they follow links having link relations or linked data (RDF) attributes.

The only thing important about the IRIs, that a single IRI must identify only a single resource. It is allowed to a single resource, like an user, to have many different IRIs.

It is pretty simple why we use nice IRIs like /users/123/password; it is much easier to write the routing logic on the server when you understand the IRI simply by reading it.

2. You have more verbs, like PUT, PATCH, OPTIONS, and even more, but you don't need more of them... Instead of adding new verbs you have to learn how to add new resources.

activate\_login -> PUT /login/active true deactivate\_login -> PUT /login/active false change\_password -> PUT /user/xy/password "newpass" add\_credit -> POST /credit/raise {details: {}}

(The login does not make sense from REST perspective, because of the stateless constraint.)

3. Your users do not care about why the problem exist. They want to know only if there is success or error, and probably an error message which they can understand, for example: "Sorry, but we weren't able to save your post.", etc...

The HTTP status headers are your standard headers. Everything else should be in the body I think. A single header is not enough to describe for example detailed multilingual error messages.

4. The stateless constraint (along with the cache and layered system constraints) ensures that the service scales well. You surely don't want to maintain millions of sessions on the server, when you can do the same on the clients...

The 3rd party client gets an access token if the user grants access to it using the main client. After that the 3rd party client sends the access token with every request. There are more complicated solutions, for example you can sign every single request, etc. For further details check the OAuth manual.

## Related literature

- [Architectural Styles and the Design of Network-based Software Architectures](#)  
Dissertation of Roy Thomas Fielding (author of REST)  
2000, University of California, Irvine
- [Third Generation Web APIs - Bridging the Gap between REST and Linked Data](#)  
Dissertation of Markus Lanthaler (co-author of JSON-LD and author of Hydra)  
2014, Graz University of Technology, Austria

**A6:** For the examples you stated I'd use the following:

activate\_login

POST /users/1/activation

deactivate\_login

DELETE /users/1/activation

change\_password

PUT /passwords (this assumes the user is authenticated)

add\_credit

POST /credits (this assumes the user is authenticated)

For errors you'd return the error in the body in the format that you got the request in, so if you receive:

DELETE /users/1.xml

You'd send the response back in XML, the same would be true for JSON etc...

For authentication you should use http authentication.

**C1:** I wouldn't use create as part of the URI (remember that URIs should be nouns, and HTTP methods should be verbs that operate on those nouns.) Instead, I would have a resource like /users/1/active which can be a simple boolean, and it can be set by PUTting a 1 or 0 to that resource. – friedo Jan 4 '10 at 21:12

**C2:** You're right, I took out the /create. It should just be a post to the singleton resource. – jonnii Jan 4 '10 at 21:36

**C3:** I wouldn't use activation on the URI either, unless you will explicitly manipulate and manage a resource by the name of /users/1/activation. What does a GET on that do? What does a PUT do? It sure feels to me that you are verbifying the URI. Also, as for content-type negotiation, that is also often best left out of the URI and inserted into headers, like Accept. – Cheeso Apr 22 '10 at 3:34

**A7:**

1. Use post when you don't know how the new resource URI would look like (you create new user, application would assign the new user its id), PUT for updating or creating resources

- that you know how they are going to be represented (example: PUT /myfiles/thisismynewfile.txt)
2. return the error description in message body
  3. You can use HTTP authentication (if it's enough) Web services should be stateless

**A8:** I would suggest (as a first pass) that PUT should only be used for updating existing entities. POST should be used for creating new ones. i.e.

/api/users when called with PUT, creates user record

doesn't feel right to me. The rest of your first section (re. verb usage) looks logical, however.

**C1:** Duly noted and updated, cheers. – Pekka ☺ Jan 4 '10 at 20:03

**C2:** Downvoted why? – Brian Agnew Jan 4 '10 at 21:10

**C3:** probably someone thought this wasn't really an answer to his question – lubos hasko Jan 8 '10 at 1:47

**C4:** My take on PUT versus POST for creating new entities is to use PUT when the caller controls the resource name, so you can PUT to the exact resource and POST when the callee controls the new resource name (such as in the example here). – SteveD Jan 10 '10 at 11:55

**A9:** Verbose, but copied from the HTTP 1.1 method specification at  
<http://www.w3.org/Protocols/rfc2616/rfc2616-sec9.html>

### 9.3 GET

The GET method means retrieve whatever information (in the form of an entity) is identified by the Request-URI. If the Request-URI refers to a data-producing process, it is the produced data which shall be returned as the entity in the response and not the source text of the process, unless that text happens to be the output of the process.

The semantics of the GET method change to a "conditional GET" if the request message includes an If-Modified-Since, If-Unmodified-Since, If-Match, If-None-Match, or If-Range header field. A conditional GET method requests that the entity be transferred only under the circumstances described by the conditional header field(s). The conditional GET method is intended to reduce unnecessary network usage by allowing cached entities to be refreshed without requiring multiple requests or transferring data already held by the client.

The semantics of the GET method change to a "partial GET" if the request message includes a Range header field. A partial GET requests that only part of the entity be transferred, as described in section 14.35. The partial GET method is intended to reduce unnecessary network usage by allowing partially-retrieved entities to be completed without transferring data already held by the client.

The response to a GET request is cacheable if and only if it meets the requirements for HTTP caching described in section 13.

See section 15.1.3 for security considerations when used for forms.

## 9.5 POST

The POST method is used to request that the origin server accept the entity enclosed in the request as a new subordinate of the resource identified by the Request-URI in the Request-Line. POST is designed to allow a uniform method to cover the following functions:

- Annotation of existing resources;
- Posting a message to a bulletin board, newsgroup, mailing list, or similar group of articles;
- Providing a block of data, such as the result of submitting a form, to a data-handling process;
- Extending a database through an append operation.

The actual function performed by the POST method is determined by the server and is usually dependent on the Request-URI. The posted entity is subordinate to that URI in the same way that a file is subordinate to a directory containing it, a news article is subordinate to a newsgroup to which it is posted, or a record is subordinate to a database.

The action performed by the POST method might not result in a resource that can be identified by a URI. In this case, either 200 (OK) or 204 (No Content) is the appropriate response status, depending on whether or not the response includes an entity that describes the result.

If a resource has been created on the origin server, the response SHOULD be 201 (Created) and contain an entity which describes the status of the request and refers to the new resource, and a Location header (see section 14.30).

Responses to this method are not cacheable, unless the response includes appropriate Cache-Control or Expires header fields. However, the 303 (See Other) response can be used to direct the user agent to retrieve a cacheable resource.

POST requests MUST obey the message transmission requirements set out in section 8.2.

See section 15.1.3 for security considerations.

## 9.6 PUT

The PUT method requests that the enclosed entity be stored under the supplied Request-URI. If the Request-URI refers to an already existing resource, the enclosed entity SHOULD be considered as a modified version of the one residing on the origin server. If the Request-URI does not point to an existing resource, and that URI is capable of being defined as a new resource by the requesting user agent, the origin server can create the resource with that URI. If a new resource is created, the origin server MUST inform the user agent via the 201 (Created) response. If an existing resource is modified, either the 200 (OK) or 204 (No Content) response codes SHOULD be sent to indicate successful completion of the request. If the resource could not be created or modified with the Request-URI, an appropriate error response SHOULD be given that reflects the nature of the problem. The recipient of the entity MUST NOT ignore any Content-\* (e.g. Content-Range) headers that it does not understand or implement and MUST return a 501 (Not Implemented) response in such cases.

If the request passes through a cache and the Request-URI identifies one or more currently cached entities, those entries SHOULD be treated as stale. Responses to this method are not cacheable.

The fundamental difference between the POST and PUT requests is reflected in the different meaning of the Request-URI. The URI in a POST request identifies the resource that will handle the enclosed entity. That resource might be a data-accepting process, a gateway to some other protocol, or a separate entity that accepts annotations. In contrast, the URI in a PUT request identifies the entity enclosed with the request -- the user agent knows what URI is intended and the server MUST NOT attempt to apply the request to some other resource. If the server desires that the request be applied to a different URI,

it MUST send a 301 (Moved Permanently) response; the user agent MAY then make its own decision regarding whether or not to redirect the request.

A single resource MAY be identified by many different URIs. For example, an article might have a URI for identifying "the current version" which is separate from the URI identifying each particular version. In this case, a PUT request on a general URI might result in several other URIs being defined by the origin server.

HTTP/1.1 does not define how a PUT method affects the state of an origin server.

PUT requests MUST obey the message transmission requirements set out in section 8.2.

Unless otherwise specified for a particular entity-header, the entity-headers in the PUT request SHOULD be applied to the resource created or modified by the PUT.

## 9.7 DELETE

The DELETE method requests that the origin server delete the resource identified by the Request-URI. This method MAY be overridden by human intervention (or other means) on the origin server. The client cannot be guaranteed that the operation has been carried out, even if the status code returned from the origin server indicates that the action has been completed successfully. However, the server SHOULD NOT indicate success unless, at the time the response is given, it intends to delete the resource or move it to an inaccessible location.

A successful response SHOULD be 200 (OK) if the response includes an entity describing the status, 202 (Accepted) if the action has not yet been enacted, or 204 (No Content) if the action has been enacted but the response does not include an entity.

If the request passes through a cache and the Request-URI identifies one or more currently cached entities, those entries SHOULD be treated as stale. Responses to this method are not cacheable.

**A10:** About REST return codes: it is **wrong** to mix HTTP protocol codes and REST results.

However, I saw many implementations mixing them, and many developers may not agree with me.

HTTP return codes are related to the HTTP Request itself. A REST call is done using a Hypertext Transfer Protocol request and it works at a lower level than invoked REST method itself. REST is a concept/approach, and its output is a *business/logical* result, while HTTP result code is a *transportone*.

For example, returning "404 Not found" when you call /users/ is confuse, because it may mean:

- URI is wrong (HTTP)
- No users are found (REST)

"403 Forbidden/Access Denied" may mean:

- Special permission needed. Browsers can handle it by asking the user/password. (HTTP)
- Wrong access permissions configured on the server. (HTTP)
- You need to be authenticated (REST)

And the list may continue with '500 Server error" (an Apache/Nginx HTTP thrown error or a business constraint error in REST) or other HTTP errors etc...

From the code, it's hard to understand what was the failure reason, a HTTP (transport) failure or a REST (logical) failure.

If the HTTP request physically was performed successfully it should *always* return 200 code, regardless is the record(s) found or not. Because URI resource is *found* and was handled by the http server. Yes, it may return an empty set. Is it possible to receive an empty web-page with 200 as http result, right?

Instead of this you may return 200 HTTP code and simply a JSON with an empty array/object, or to use a bool result/success flag to inform about the performed operation status.

Also, some internet providers may intercept your requests and return you a 404 http code. This does not means that your data are not found, but it's something wrong at transport level.

From [Wiki](#):

In July 2004, the UK telecom provider BT Group deployed the Cleanfeed content blocking system, which returns a 404 error to any request for content identified as potentially illegal by the Internet Watch Foundation. Other ISPs return a HTTP 403 "forbidden" error in the same circumstances. The practice of employing fake 404 errors as a means to conceal censorship has also been reported in Thailand and Tunisia. In Tunisia, where censorship was severe before the 2011 revolution, people became aware of the nature of the fake 404 errors and created an imaginary character named "Ammar 404" who represents "the invisible censor".

839. <https://stackoverflow.com/questions/2718864/restrict-violation-of-architecture-asp-net-mvp>

**T:** Restrict violation of architecture - asp.net MVP

**Q:** If we had a defined hierarchy in an application. For ex a 3 - tier architecture, how do we restrict subsequent developers from violating the norms?

For ex, in case of MVP (not asp.net MVC) architecture, the presenter should always bind the model and view. This helps in writing proper unit test programs. However, we had instances where people directly imported the model in view and called the functions violating the norms and hence the test cases couldn't be written properly.

Is there a way we can restrict which classes are allowed to inherit from a set of classes? I am looking at various possibilities, including adopting a different design pattern, however a new approach should be worth the code change involved.

## 4 Answers

**A1: I'm afraid this is not possible.** We tried to achieve this with the help of attributes and we didn't succeed. You may want to refer to my [past post on SO](#).

The best you can do is keep checking your assemblies with [NDepend](#). NDepend shows you dependency diagram of assemblies in your project and you can immediately track the violations and take actions reactively.

[alt text http://www.ndepend.com/Res/NDependBig17.png](#)

**C1:** @this.\_curious\_geek: thanks for pointing me to NDepend. I shall check it out. Cool nick btw.. – Srikanth Venugopalan Apr 27 '10 at 8:40

**C2:** Could you please answer stackoverflow.com/questions/8851933/... ? – Lijo Jan 16 '12 at 6:11

**A2:** It's been almost 3 years since I posted this question. I must say that I have tried exploring this despite the brilliant answers here. Some of the lessons I've learnt so far -

1. More code smell come out by looking at the consumers (Unit tests are best place to look, if you have them).
  - Number of parameters in a constructor are a direct indication of number of dependencies. Too many dependencies => Class is doing too much.
  - Number of (public) methods in a class
  - Setup of unit tests will almost always give this away
2. Code deteriorates over time, unless there is a focused effort to clear technical debt, and refactoring. This is true irrespective of the language.
3. Tools can help only to an extent. But a combination of tools and tests often give enough hints on various smells. It takes a bit of experience to catch them in a timely fashion, particularly to understand each smell's significance and impact.

**A3:** You are wanting to solve a people problem with software? Prepare for a world of pain!

The way to solve the problem is to make sure that you have ways of working with people that you don't end up with those kinds of problems.... Pair Programming / Review. Induction of people when they first come onto the project, etc.

Having said that, you can write tools that analyse the software and look for common problems. But people are pretty creative and can find all sorts of bizarre ways of doing things.

**A4:** You are wanting to solve a people problem with software? Prepare for a world of pain!

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Having said that, you can write tools that analyse the software and look for common problems. But people are pretty creative and can find all sorts of bizarre ways of doing things.

**C1:** Ohh I am feeling the pain alright!!! I was hoping against hope if there were some sort of framework/tool that could analyze/validate some architectural rules I guess there is no shortcut to reviews eh? – Srikanth Venugopalan Apr 27 '10 at 5:19

**C2:** well, by separating out the assemblies and making the View entirely independent of the model, so the Presenter provides all the objects the view deals with you could verify that the View doesn't use the Model. But that's more pain than its worth. Mostly. – Keith Nicholas Apr 27 '10 at 5:23

**C3:** but that would likely just move your problem somewhere else.... introduce more training on how to work within the architectural style you have – Keith Nicholas Apr 27 '10 at 5:24

840. <https://stackoverflow.com/questions/42522059/custom-http-header-does-it-violate-the-restful-architecture>

**T:** Custom HTTP Header, does it violate the RESTful Architecture

**Q:** I'm currently working on designing a RESTful API, my question is, does it violate the RESTful Architecture if adding custom HTTP Header as part of the requirements?

X-API-Token: MyToken

Appreciate the help, thank you!

Erson

## 1 Answer

**A1:** As long as you do not store client context as part your custom header, you're good to go.

**C1:** Thanks Jerven, appreciated. This solve my problem. – Erson Puyos Mar 1 '17 at 3:12

841. <https://stackoverflow.com/questions/42908705/is-jsf-service-returning-error-messages-a-violation-of-mvc-architecture>

**T:** Is JSF Service returning error messages a violation of MVC architecture?

**Q:** I am not sure whether I am violating MVC architecture by having my Service return an array of error Strings. The errors are in fact warnings that result from parsing of an excel file that the user has uploaded. There might be multiple of those warnings, and none of them should stop the parsing process. So I believe I cannot possibly use Exceptions. But is there a better way to inform the user about the problems in his/her Excel file than returning an array of error Strings?

The controller:

```
private void handleUpload() {
 ArrayList<String> errors = myService.parseExcel(file);

 for (String error : errors) {
 FacesContext.getCurrentInstance().addMessage(null,
 new FacesMessage(FacesMessage.SEVERITY_WARN, "Error: ", error));
 }
}
```

The service:

```
public ArrayList<String> parseExcel(UploadedFile file) {
 ArrayList<String> errors = new ArrayList<String>();

 // while document not finished, do parsing...
 // if a specific cell incorrect value
 errors.add("Cell at row x, column y has incorrect value");

 return errors;
}
```

**C1:** I cant see how you are violating the MVC architecture here (can you even do that to a JSF app?)  
– Ouerghi Yassine Mar 21 '17 at 0:44

**C2:** yes, I would like to know that as well (: – april Mar 21 '17 at 13:38

842. <https://stackoverflow.com/questions/30367431/does-writing-code-in-viewDidLoad-violates-mvc-architecture>

T: Does writing code in viewDidLoad Violates MVC architecture?

Q: I was working in a client project. I have written lot many view customisation code inside ViewDidLoad. I have models for data store and access. The project was working fine. They hired a new iOS developer he said the code is not compliant with MVC architecture. The asked the reason why? He said the views are created inside viewDidLoad which is a controller of the Class hence it is not acceptable code. What should we do when its really dynamic views and can not be created using storyboard.

C1: Did you ask his opinion? – Azat May 21 '15 at 7:39

C2: You can create classes for each view, which you are creating dynamically. then you easily import them into your controller. – Vijay Masiwal May 21 '15 at 7:43

C3: He works remotely . But the sole reason of denying that the code is not in MVC is that I created some views inside view DidLoad. Only question that stroke in my mind is" In iOS application development If I write view creation code inside ViewDidLoad does it violate MVC architecture?" – Dipesh Pokhrel May 21 '15 at 7:44

C4: Yes. As per the MVC model, each class in your project is either a Controller, a Model or a View; don't combine the functionality of two roles in one class. – Vijay Masiwal May 21 '15 at 7:50

### 3 Answers

A1: My answer is No

From apple doc

Controller Objects

A controller object acts as an intermediary between one or more of an application's view objects and one or more of its model objects. Controller objects are thus a conduit through which view objects learn about changes in model objects and vice versa. Controller objects can also perform setup and coordinating tasks for an application and manage the life cycles of other objects.

I think that the controller has the responsibility to manage what the view look like.

In viewDidLoad,it is good to write **one-time** view customisation code here.

But if you write a lot configuration code to a view. I think it is better to use a subclass of UIView. This makes your code clear and easy to debug and maintain.

C1: This is what exactly I thought . Sorry due to low reputation could not up vote. – Dipesh Pokhrel May 21 '15 at 11:39

**C2:** @DipeshPokhrel but you can accept that answer if it is correct for you. WenchenHuang what is the question for your bold NO answer? OP's question asks "What should we do?" – Azat May 21 '15 at 21:00

**C3:** His question is "Does writing code in viewDidLoad Violates MVC architecture?" – Leo May 21 '15 at 23:10

**C4:** The explanation that has been provided is very satisfactory for me. It seems I am violating the MVC pattern but in case the very less customisation of views inside viewDidLoad could be acceptable. – Dipesh Pokhrel May 22 '15 at 5:59

Hope this can be help you.

**A3:** You would ideally have a dedicated class for your main view (the one that's accessed by self.view inside viewController) - derived from UIView.

Inside this view class (say Myview.m) - you will create its subviews inside various view methods - such as init (for instantiation of subviews), layoutSubviews (for frame setting of subviews) and drawrect (any graphics drawing etc.) If the view has NIB, some processing will go inside awakeFromNib too.

843. <https://stackoverflow.com/questions/10928056/do-aop-violate-layered-architecture-for-enterprise-apps>

**T:** Do AOP violate layered architecture for enterprise apps?

**Q:** The question(as stated in the title) comes to me as recently i was looking at Spring MVC 3.1 with annotation support and also considering DDD for an upcoming project. In the new Spring any POJO with its business methods can be annotated to act as controller, all the concerns that i would have addressed within a Controller class can be expressed exclusively through the annotations.

So, technically i can take any class and wire it to act as controller , the java code is free from any controller specific code, hence the java code could deal with things like checking security , starting txn etc. So will such a class belong to Presentation or Application layer ??

Taking that argument even further , we can pull out things like security, txn mgmt and express them through annotations , thus the java code is now that of the domain object. Will that mean we have fused together the 2 layers? Please clarify

**C1:** What does AOP have to do with this? – Dave Newton Jun 7 '12 at 9:45

## 2 Answers

**A1:** You can't take any POJO and make it a controller. The controller's job is get inputs from the browser, call services, prepare the model for the view, and return the view to dispatch to. It's still a controller. Instead of configuring it through XML and method overrides, you configure it through annotations, that's all.

The code is very far from being free from any controller specific code. It still uses ModelAndView, BindingResult, etc.

**A2:** I'll approach the question's title, regarding AOP:

AOP does not violate "layered architecture", specifically because by definition it is adding application-wide functionality regardless of the layer the functionality is being used in. The canonical AOP example is logging: not a layer, but a functionality--all layers do logging.

To sort-of tie in AOP to your question, consider transaction management, which may be handled via Spring's AOP mechanism. "Transactions" themselves are not specific to any layer, although any given app may only require transactions in only a single layer. In that case, AOP doesn't violate layered architecture because it's only being applied to a single layer.

In an application where transactions may cross layers IMO it still doesn't violate any layering principles, because where the transactions live isn't really relevant: all that matters is that "this chunk of functionality must be transactional". Even if that transaction spans several app boundaries.

In fact, I'd say that using AOP in such a case specifically preserves layers, because the TX code isn't mechanically reproduced across all those layers, and no single layer needs to wonder (a) if it's being called in a transactional context, or (b) which transactional context it's in.

844. <https://stackoverflow.com/questions/43426699/db-design-for-microservice-architecture>

**T:** DB design for microservice architecture [closed]

**Q:** I am planning to use the Microservices architecture for the implementation of our website. I wanted to know if it is right to share databases between services or if it is preferable to have a separate database for each service. In this regard, can I consider having one common database for all services or does it violate the very essence of Microservice architecture ?

## 2 Answers

**A1:** Microservices offers **decoupling**. You must **break down your application** into independent domains. Each domain can have a DB. In case other MS needs to access data owned by some other microservices, they have to communicate over the network.

In case you feel that there are too many dependent services and the network calls would be too much, then you can define a domain, clustering the dependent services together.

For instance -- Suppose I have an online Test evaluation Service where a manager of a company can post tests and he can view results of all the employees in his department.

My Microservices for this scenario would be:

### Initial Design

1. User Service: For login and user information.
2. Test Service: Service to evaluate tests.
3. Employee: Handles employee details
4. Company: Handles organization CRUD
5. Department: Handles department CRUD

After breaking it down, seems like employee, Organization and Department service would be making too much network/API calls as they are tightly dependent on each other. So it's better to cluster them.

### Updated design

1. User Service : For login and user information.
2. Test Service : Service to evaluate tests
3. Organization : Handles Company, Employee and Department related operations.

Each service could have its own DB and it's independently deployable. User and Test Service can use mongoDB or any NoSql DB and Organization service can use RDBMS.

Hope this helps.

**A2:** If you share the same database then you loose two of the most important advantages of microservices: [strong cohesion and loose coupling \(page 25\)](#).

You can share the same database if you don't share the tables in it. For example, microservice1 uses table1\_1 and table1\_2 and microservice2 uses table2\_1 and table2\_2. When I say uses I mean read and write. One microservice don't read and don't write on the other's tables.

**C1:** Thanks for the answer. But in my application, there is a case where one of the services makes use of data from a couple other services. In such a case, am I not risking too many API calls between services and from client to different services ? – user2288991 Apr 15 '17 at 15:03

**C2:** Microservices communicate only using the network – Constantin Galbenu Apr 15 '17 at 15:06

**C3:** You may want to look at your design, find the bounded context so you have nicely carved out verticals, that way you should not need to cross services boundaries to do data updates (state changes), data reads are less of a concern... – Sean Farmar Apr 20 '17 at 15:41

**C4:** you could use a message broker for sharing state, and each microservice saves this state to its own (maybe service local) database (or a cache). – sschraff Aug 25 at 15:19

845. <https://stackoverflow.com/questions/51015826/android-navigation-architecture-component-is-navigation-architecture-component>

**T:** Android Navigation Architecture Component - Is Navigation Architecture Component meant to use Single Activity Only?

**Q:** I currently learning on the new Android Navigation Architecture Component(<https://developer.android.com/topic/libraries/architecture/navigation/>).

I kind of confuse with its motive and concept, here are my uncertainties:

Is Android Navigation Architecture Component designed to eliminate the need of using multiple Activity in a single apps? Which mean, the whole apps just need a Single Activity and all other page will be Fragment?

Does using Multiple Activities in the apps, but in the same time using the Android Navigation Architecture Component to navigate the Fragment actually violate the purpose of Android Navigation Architecture Component?

Example Scenario for Question 2:

**C1:** Navigation lib supports multiple activities:

[developer.android.com/topic/libraries/architecture/navigation/](https://developer.android.com/topic/libraries/architecture/navigation/) – rafid059 Jun 25 at 3:47

**C2:** @rafid059 does it mean that, we do not actually need to purposely minimize the usage of activity in our apps, we just use Android Navigation Architecture Component to navigate the Fragment whenever it is necessary? – I am a Student Jun 25 at 3:52

**C3:** Completely my opinion: 1. Use less activites (less headaches due to maintaining multiple Intents. Also makes life easier if you have multiple entry points and many more advantages) 2. Use fragment backstack but make sure you don't have more than 2 fragments in the stack. I'm still not using the navigation lib. I'll use it once it's more mature – rafid059 Jun 25 at 4:02

**C4:** There is no restriction for using Single or Multiple activities by navigation component, It is moreover making easy to maintain the navigation between different screen of the app, Have you tried with multiple activities? – Pankaj Aug 9 at 6:51

**C5:** From my limited testing, support for Activities in the preview editor has some bugs. Not able to connect activities after adding to the graph. – Patrick 8 hours ago

**1 Answer**

**A1:** In theory, the Navigation library supports any architecture you might want to use. Out of the box it can handle Activities and Fragments as navigation destinations, but you can plug in your own solution by [implementing your own Navigator](#) (as an example, see [this article](#)).

However, quoted / paraphrased from the [Google I/O talk on Navigation](#):

*What is my Activity actually meant to do?*

Right now, some apps are very Activity-heavy, some are Fragment-heavy, or completely in a different system. We're moving towards a model where the Activity is more just an entry point into your app, rather than it being the owner of the content of your app. It's actually just going to store global state, for example global navigation like a navigation drawer or the bottom bar.

So Google does recommend having just a couple Activities for your app, because you only really need them to serve as entry points. For example, you can have one that opens from the launcher, and another that's opened by deep links. After that, when your app is started, you can do everything else inside it with Fragments.

To summarize and directly answer your two questions:

1. The Navigation Architecture Component isn't "designed to eliminate the need to use multiple Activities" per se, but it's something Google recommends doing when you're using it.
2. You can absolutely still use multiple Activities and multiple Fragments mixed together. You can even use a single Activity with purely View based navigation if you like. It's all up to you. If you find the Navigation library useful in combination with how you architect your app, use it.

The tooling of the library might not be that great for custom destinations (for example, the visual editor will probably only support Activities and Fragments for the time being), but you can use it however you'd like from code.

846. <https://stackoverflow.com/questions/797303/lattix-architecture-analysis-tool>

**T:** Lattix architecture analysis tool

**Q:** I came across Lattix for analysing the architecture by investigating the code. It supports C/C++, Java, .Net, etc. One can define certain rules to maintain the defined architecture. The tool can flag any violations at build time.

Has anybody used this or any other similar tool? I see some benefit of this tool in development but not sure if this kind of tool is must to have?

## 4 Answers

**A1:** We use both Lattix and NDepends to track dependencies of our assemblies.

Both tools support static visualizing dependencies between assemblies and classes through a dependency structure matrix (DSM). A DSM gives you the ability to show the architecture of your

application. For example if you use layering this should be visible in the DSM. Cyclic dependencies will also be visible in a DSM.

A nice practical introduction can be found in OOPSLA05-dsm.pdf

NDepends specifically targets .Net and has Visual Studio Integration. Lattix is also able to create DSM's for other languages. Both support build integration which allows you to create rules in your build to prevent incorrect dependencies.

Just try both tools and see if the generated DSM is what you expected. Check circular dependencies and see if there are invalid dependencies. For example, a user interface which directly uses the data access layer instead of using the business layer.

C1: More on Dependency Structure Matrix usage to spot design patterns here  
[ndepend.com/Doc\\_Matrix.aspx](http://ndepend.com/Doc_Matrix.aspx) – Patrick from NDepend team Oct 18 '10 at 17:48

**A2:** NDepend is a very complete tool to analyse software architecture for .Net programs. This kind of tool is very convenient to track dependencies and to measure various code metrics.

**A3:** I've used Lattix for primarily analyzing C++, .NET, Java and Fortran code. It is helpful for both new application development and improving the architecture of existing software. The tool supports direct import of .NET dlls, Java classes or jar files, and SQL connection. If you are looking at C++ or Fortran, a parser like Klockwork, Understand or Clang will be needed. It is possible to set up an ongoing update to your Lattix project with every software build - this will ensure that you have an updated DSM to continuously monitor the architecture of your software. This can let you know how your software is changing over time and if any code is violating rules that you set at the beginning of your design or if any rules need to be modified etc. For looking at existing software, the tool can quickly decompose a system for you and identify where there are cyclical dependencies. There are algorithms for partitioning the system based on proximity to other sub-systems (e.g. classes) or grouping sub-systems based on dependency patterns. This can be helpful if you are looking to improve the architecture of an existing software and make it modular.

There is a wealth of information on kb.lattix.com - just sign up to read the articles. Also, I think they offer an evaluation version, which you can explore to see if the tool will be useful for you.

**A4:** Well, the tool looks swell and fine and worked pretty when presented.

After that, well, all those tools making reverse engineering (in my experience with few versions of Rational Rose, StarUML, Sparx(the better one), Understand) from C++ well.. falls in troubles.

I can see why - code in C++ more complicated and less ordered than C#, have links to libraries, modules and COMs and so on.

In our real project its (based on Understand database) reverse engineering was freezed immediately and totally (I mean hard-reset-freezed).

May be we need to run it on WS or server.

May be it was Understand' fault.

After reset it became very slow when its matrices opened ~200 modules below. Well, I never said our project is developed well, right. We hoped to research it to make it better. I still believe it can be very helpful in long run (if your company agreed to pay checks on continuous re-work) but as all those tools it's better to START from scratch and continuously use it all the time. NB We tried to use it with bsc (Microsoft database), but it also failed.

847. <https://stackoverflow.com/questions/6587531/entity-framework-and-3-layer-architecture>

**T:** Entity Framework and 3 layer architecture

**Q:** I have a three layer architecture program. The questions are:

1. Data access is the layer of EF?
2. If i want to use an entity generated by EF from Presentation Layer, then i reference the Data Access, but this violates the principles of 3 layered architecture.

**C1:** croisharp when you reference your EF Model from Presentation layer or in your Handlers project (logic) you're just asking for the model definition (Classes), your data base access still remains in your Data Layer, so don't worry! – euther Jul 5 '11 at 19:36

## 5 Answers

**A1:** Yes EF would be your Data Access Layer. With EF you can use T4 templates with POCO support, you can then extract these POCO into a seperate dll and this will be reference from all of your layers.

**C1:** +1 Using POCO's provides the required level of abstraction that ensures that the integrity of the architecture is maintained. The proof? You can replace the data access implementation but retain the POCO's as the data contracts. – Steve Morgan Jul 5 '11 at 21:39

**A2:** Microsoft Spain released a pretty good documentation, guide and sample application for N-layered applications on codeplex, you can look it up here:

You will find many directions and helpful implementation patterns there.

**A3:** EF does two things: -

- 1) Generates an domain model for you (optional, but commonly used)
- 2) Gives you the ability to query / modify your database via that domain model.

This can give the appearance of blurring the lines between domain model and data access but the two are indeed separate.

As long as you're not doing stuff like creating object contexts and writing queries directly in your presentation tierthen IMHO you are not breaking abstraction - the only thing you are "breakin"g is the fact that you will need to reference System.Data.Objects (or whatever the EF dll is) in your presentation project(s) (which is just a physical artifact) unless you go down the route suggested by Jethro to generate your domain model into a separate project.

**A4:** What type of application are you building? If you are building an ASP.NET MVC 3 application, you can have your View be the presentation layer, your Model is your data access (which can use EF) and the controller and / or Action Filters can contain your business logic and in this scenario you will be using your EF Model in the presentation layer but still satisfy the separation of concerns principle.

**C1:** I build wcf services, using netTcpBinding, but with architecture that provie web service software factory. It will not be an error in architecture if i reference data access from my Service Implementation, or in any other application from Presentation Layer? – croisharp Jul 5 '11 at 19:34

**C2:** I think the key goal in any abstraction model is to limit dependencies, so if you had a SQL statement in your ServiceContract then I would say that your Service implementation is 'too dependent' on your Data Access. but EF, in and of itself, provides abstraction. What I would suggest for you is to create a repository class which abstracts your service from your EF Context. Am I answering your question? – Glenn Ferrie Jul 5 '11 at 19:42

**C3:** Sure, i did the abstraction with Manager, which performs the Delete, Edit, GetById, GetAll, Add methods, but that is Business Logic, i mean the entities that was generated like Customer, Producer... – croisharp Jul 5 '11 at 19:56

**A5:** For the three tier architecture. I would consider doing Abstraction using Domain Model and Data model pattern rather then doing direct EF from Presentation Layer.

So the idea is that you have your Data Model which has EF POCO classes with Repositories which knows how to access these Classes for various CRUDs.

Your Domain Model would have models related to your Client (so you can put various ViewModels or Validation related code), It can be a WPF or MVC web app. Now between these two there is a business which talks to both Domain and Data models.

Your Presentation Layer does know nothing about the EF/Data Layer/Repository. When you want to introduce new Data Framework or database, you just need to write new repository classes and data models classes (which prob. be with some sort of code gen).

This also allows your code to be Unit testable as well.

848. <https://stackoverflow.com/questions/3157465/storing-encrypted-personal-information-common-sense/3157747#3157747>

Title: Strong encrypted personal information – common sense?

Question: We're in the middle of developing a e-commerce application that will be used by our customers on a pay-monthly-plan.

We have thought a bit about offering encryption of all personal data that is stored in the database, to make our application a notch safer to the final consumers.

The encryption would be handled completely transparent in both front and backend and make sure that even if someone would gain pure database access, it would be impossible to decrypt the personal details of the final consumers without the encryption key.

Is this common sense, or are we taking on a too big bite to chew compared to the increased safety this would add to the final customers?

Answer: I might be out of my depth here, as I'm not a security expert, but here's a few questions that come to mind:

- What are the chances of an attacker gaining access to the data?
- Does the data contain anything confidential?
- What could an attacker stand to gain from accessing the data?
- What could you, or your company, stand to lose if an attacker gained access to the data? It's not just the data, it's potentially your reputation too.
- How much will it cost to implement?
- What are your legal obligations with regard to customer data?
- If data are encrypted using a single global key, how will you keep the key safe?
- If the key is really safe, how will you use it to encrypt and decrypt data?
- If data are encrypted using multiple keys (perhaps one for each customer login), how will you recover data if a customer loses their key/password?
- If you are able to recover customer data, how does that affect its safety?
- What access will computer repair technicians, sysadmins, etc., have to your database server, and how will that affect data security? (It's not just about external hackers).
- What are the performance effects of encryption and decryption?
- What other mechanisms, like firewalls, physical security and employee vetting can be put in place?

Here's a quote from the UK FSA [Your responsibilities for customer data security \(pdf\)](#):

Answer2: Doing this you lose many of the relational database advantages (searches, reports for the business intelligence and so on).

Furthermore, if you store the keys you just add a layer of 'security': an attacker will have to obtain the keys in order to read the data, but if he has full access to your database, he probably has access to the keys' repository, too (as must have access to that repository the frontend and backoffice applications).

If you instead give the users the responsibility to store their own keys, you lose the possibility to restore the data in case an user lose his key.

Get the real sensible information, put it in a separate server, put as much security as possible around it and acces the data only when needed.

In my opinion the main threat of your approach will be the (false) sense of security that the encryption will give. Sensible data must be treated with all the due caution in storing, but also during elaboration and use: put your money in good system administrators, prepared software engineers and periodical security assessments, if your business require.

Answer 3: Why is it safer?

You need to store the decryption key in order to provide that data to the user - it's not really relevant that its only held in the 'front-end' system - in order to get to the back end a hacker must get through the front end first.

You also eliminate a LOT of the searching functionality.

You have to do a lot of coding to imlpement this.

You're placing much heavier demands on the system (i.e. more hardware cost, poorer performance).

IMHO your money and time would be better spent on improving security elsewhere.

849. <https://stackoverflow.com/questions/25797405/cryptography-setup-and-secret-management-for-aesmanaged>

Title: Cryptography setup and secret management for AesManaged?

Question: I am implementing a shared-secret encryption scheme for moderately secure data transfer. When the server is provisioning a client, I can generate one or more strings representing the secret. The client will then use this secret information to encrypt data before sending it to the server. I want ensure the shared secret is as strong as practicable and sufficient to guarantee interoperability.

**Algorithm/class selection:** It seems one should "stick to AES unless you have a good reason not to." Is AesManaged a good choice for this? [Difference between symmetric crypto algorithms](#)

**Settings and default object:** I am using .NET 4.0 and .NET 4.5 in different parts of the system, and may upgrade over time. I cannot find documentation for the default properties of KeySize and BlockSize, nor the default length for IV. In .NET 4.0 it appears the default key size is 32 (bytes, 256-bit) and the default IV size is 16 (bytes). BlockSize and FeedbackSize are 128 (bits). Mode is CBC and Padding is PKCS7. Which properties should I set explicitly, and should I regenerate the key and IV afterwards?  
[Edits: Fixed 256-bit above and below. Added questions.]

Is a 256-bit key and a 16-byte IV strong enough for "non-government work?"

I have read that 256-bit keys are vulnerable to a certain kind of attack (which I don't think applies in my case). Is there any reason to use a 128-bit key instead? What is the performance differential?

Is it normal that the default key size is larger than the block size?

[Edits: Done.]

**Strength of default key and IV:** Is there any reason to use `RNGCryptoServiceProvider.GetBytes()` or is that what `AesManaged` is doing already?

**Interoperability:** I am assuming the shared secret consists of the key and the IV (encoded to Base64 strings). Will setting the Key and IV properties from the recovered byte arrays be sufficient to set the related properties (e.g. `KeySize`)?

Can any other properties be inferred and guaranteed to agree, or should I set them explicitly for key generation, encryption, and decryption?

Answer2: AES (or Rijndael) are pretty much standards, on Linux blowfish comes to my mind but in C# you want to stick with what you have for free.

I'd advise to set the values instead of leaving them at their defaults. This guarantees that silent malfunctioning is less probable. Of course, you'll have to know *exactly* what you are doing. But security is all about knowing what you do.

For the rest I can only say this. Increasing a key size from 128 to 192 or 256 bits (or other settings without actually changing the algorithm) is relatively easy, so start with common values and make it work. But if you can have better encryption with the same code base why settle for less? On the other hand, security is a compromise. Nothing is totally secure and it all depends on how much you are willing to spend.

What I say now won't please you. The shared secret renders ALL your efforts useless. If an eavesdropper can grab the secret, the encryption is completely useless.

For stored data that choice might be ok, as long as you ask for the key every time you want to decrypt the block and never store the secret on disk (much like KeePassX asks for a password to open a key file).

For data on the move (sent over a network) asymmetric encryption is indispensable unless you have alternative ways to communicate the secret. That is, NEVER send the secret over Internet but use out-of-Internet ways (plain old mail, maybe telephone or face-to-face).

As you can see, sharing the secret is the true problem here. The obvious solution is SSL but it's asymmetric and the C# implementation is highly unstable, especially for multi-platform applications that may run on mono/Linux/OpenSSL. Be ready for a hell of a nightmare if you go that way.

True feasible security over the Internet without SSL or external communication channels? No dice.

Depending on your use case you may want to avoid storing the secret in a string.

If there are lives or good money involved you want to do even more than that. Consider that users might install the client on a public computer such as an Internet cafe. Look into [SecureString](#) and algorithms that hash characters incrementally and never actually store the string in memory.

#### EDIT:

Because of how the VM manages memory and garbage collection, and how virtual memory works, you risk that unused sectors on a public PC might contain passwords in plain text. This happens when the OS swaps out virtual memory to disk. There is no programmatic way in C# to be absolutely sure it didn't occur. In these scenarios [SecureString](#) and memory pinning help you securing .NET clients (C# and VB).

850. <https://stackoverflow.com/questions/38282908/how-to-use-devise-and-devise-security-extension/39657076#39657076>

Title: How to use devise and devise\_security\_extension?

Question: I have a fully implemented User authentication module using all specs from Devise. The model is user and the table is users. I also have in the folder config the devise.rb configuration file and another configuration file devise\_security\_extension.rb. I installed devise\_security\_extension as recommended but now I am not clear which model shall I use, the original user model or shall I have something else. Shall I continue to use table users or shall I replace it with the\_resources? Or maybe I shall keep them both and use the User ID column as a foreign key between them? Can I keep both devise configuration files devise.rb and devise\_security\_extension.rb, or do I need to eliminate one of them? Both files are doing

```
Devise.setup do |config|
 # but the config statements are not the same in both of them
end
```

Also I am expecting something like has\_many and belongs\_to between the tables the resources and old\_passwords, somehow a User ID field to be shared between them and a relationships like has\_many and belongs\_to may be somewhere in some models but I don't know where?

Don't know how to make this working properly? Many other features implemented by this extensions I already have them implemented with Devise. What I need practically is an extension not a compete rewrite. What shall I do?

Answer: I followed the guidelines from this URL

[https://github.com/phatworx/devise\\_security\\_extension](https://github.com/phatworx/devise_security_extension)  
and I updated the file config/initializers/devise.rb to look like this one

851. <https://stackoverflow.com/questions/35334920/performance-issue-with-timestamp-in-mysql>

Title: Performance issue with timestamp in MySQL

Question: I am facing serious performance issues after fixing a query.

What are my options? How can I solve this performance issue?

#### UPDATE

I have fixed the 2016-02 23:59:59 typo and re-checked my numbers. I have updated my data above.

`SHOW INDEX FROM Order_SG` does not return entries for `Stamp`, but there is a `BTREE` index for `Creation_Date` and `Payment_Date` which are used to create `DATE`.

Answer: There is no index on `stamp`. So the DBMS has to read record for record from the table in order to check whether it's appropriate or not. With an index on `stamp` it could simply pick the appropriate records via the index.

So create the index, e.g.

```
create index idx_order_sg_stamp on order_sg(stamp);
and your query should run fast.
```

852. <https://stackoverflow.com/questions/6465330/any-good-high-performance-java-library-that-works-with-timestamp>

Title: Any good high performance java library that works with timestamp?

Question: I am looking for high performance Java library that provides methods that allows me to get:

- Current hour (0-24)
- Current day (1-31)
- Current week (1-52)
- Current month (1-12)
- Current season (1-4)
- Current year (YYYY or YY)

Performance is a most important issue for me. This is why I cannot use standard Calendar class. The best would be solution that does all calculations without creating new objects.

ADDED: To clarify I will mention one more time: more than 100000 operations per second.

Answer: I am looking for high performance Java library that provides methods that allows me to get:

- Current hour (0-24)
- Current day (1-31)
- Current week (1-52)
- Current month (1-12)
- Current season (1-4)
- Current year (YYYY or YY)

Performance is a most important issue for me. This is why I cannot use standard Calendar class. The best would be solution that does all calculations without creating new objects.

ADDED: To clarify I will mention one more time: more than 100000 operations per second.

Answer2: I am looking for high performance Java library that provides methods that allows me to get:

Current hour (0-24)

Current day (1-31)  
Current week (1-52)  
Current month (1-12)  
Current season (1-4)  
Current year (YYYY or YY)

Performance is a most important issue for me. This is why I cannot use standard Calendar class. The best would be solution that does all calculations without creating new objects.

ADDED: To clarify I will mention one more time: more than 100000 operations per second.

Answer3: I am looking for high performance Java library that provides methods that allows me to get:

1. Current hour (0-24)
2. Current day (1-31)
3. Current week (1-52)
4. Current month (1-12)
5. Current season (1-4)
6. Current year (YYYY or YY)

Performance is a most important issue for me. This is why I cannot use standard Calendar class. The best would be solution that does all calculations without creating new objects.

ADDED: To clarify I will mention one more time: more than 100000 operations per second.

Answer: I would recommend JodaTime when you need to create an instance of DateTime class every time before calling getters of fields. But when you call getters methods more than create instances it is better to use java.time library from JDK 8, or backport [ThreeTenABP](#).

It is because DateTime class of JodaTime stores only a long iMillis since the start of the epoch and all getters of certain fields like minuteOfHour, dayOfMonth, always calculates these values from scratch. But ZonedDateTime of java.time stores these fields in separate variables like: int year, short month, short day,...

I have created [some benchmarks for comparison](#)

853. <https://stackoverflow.com/questions/21044892/db-performance-of-storing-timestamp-as-date-vs-double-epoch>

Title: DB performance of storing timestamp as Date vs Double

Question: In DB2, I have to store records with granular level timestamps [microsec]. I went for double datatype and stored unix epoch time.

However, I need some recommendations from performance a standpoint of CRUD operations.

Note: My app doesn't need dates earlier than 1970.

Please advise.

Answer: Are you aware of the fact that floating point numbers are an approximation? If for some reason you insist on using the epoch values as opposed to the `TIMESTAMP` datatype, you may want to consider using `BIGINT` instead.

854. <https://stackoverflow.com/questions/6332975/mongodbs-isodate-vs-unix-timestamp>

Title: Mongo DB's ISODate() vs UNIX Timestamp

Question: Is there any sort of advantage (performance, indexes, size, etc) to storing dates in MongoDB as an ISODate() vs. storing as a regular UNIX timestamp?

Answer: The amount of overhead of a ISODate compared to a `time_t` is trivial compared to the advantages of the former.

An ISO 8601 format date is human readable, it can be used to express dates prior to January 1, 1970, and most importantly, it isn't prey to the [Y2038 problem](#).

This last bit can't be stressed enough. In 1960, it seemed ludicrous that wasting an octet or two on a century number could yield any benefit as the turn of the century was impossibly far off. We know how [wrong that turned out to be](#). The year 2038 will be here sooner than you expect, and `time_t` are already insufficient for representing – for example – the schedule of payments on a 30-year contract.

Answer: MongoDB's built-in Date type is very similar to a unix timestamp stored in `time_t`. The only difference is that Dates are a 64bit field storing milliseconds since Jan 1 1970, rather than a 32bit fields storing seconds since the same epoch. The only down side is that for current releases it treats the count as unsigned so it can't handle dates before 1970 correctly. This will be fixed in MongoDB 2.0 scheduled for release in about a month.

A possible point of confusion is the name "ISODate". It is just a helper function in the shell to wrap around javascript's horrible Date constructor. If you call either "ISODate()" or "new Date()" you will get back the exact same Date object, we just changed how it prints. You are still free to use normal ISO Date strings or `time_t` ints without using our constructors, but you won't get nice Date objects back in your language of choice.

855. <https://stackoverflow.com/questions/3900557/what-are-the-disadvantages-of-choosing-higher-timestamp-precision-in-oracle>

Title: What are the disadvantages of choosing higher timestamp precision in Oracle?

Question: Oracle allows to specify precision of `TIMESTAMP` type in a table - the number of digits in the fractional part of the `SECOND` datetime field. Are there any disadvantages of specifying maximal precision `TIMESTAMP(9)`?

One reason I could think is that this information may be used for prettier output by Oracle tools.

Maximum of 9 digits suggests that the field is stored as a 4 byte integer so it should not have any performance implications, please correct if I'm wrong here.

Answer: The problem is performance. You must trade it with precision. Smaller numbers are readen and written in fewer CPU instruction. A CPU instruction takes less than a nanosecond, but if your server serves millions of transactions you might find some performance decrease, and this suggests you to adopt less precision, or even no precision (round all timestamps to the seconds is quite acceptable in most scenario, even in banking).

But if you, for some reason, ie. real-time system logging, need more precision, you are forced to use a higher precision and thus get a performance decrease. If your server doesn't process a great number of tps you have almost no performance impact, but if you don't need precision you're wasting memory.

Hope to have been of help. If you want to share with us your DB requirements, we might help you choose your best compromise.

Answer2: The difference is not in the technical use of the Timestamp data type, but the application. FERC and NERC often require a certain precision when used in applications labeled critical infrastructure and as such they will use the highest precision made available.

Of course, making the suits happy with their sequence of events records often requires doing more than laid out by CIP-002 through CIP-009.

Answer 3: No disadvantages if you always going to use the data as "date/timestamp" datatype inside Oracle and in the middle tier, however you have to see how your entire application/solution is using that column.

Are you truncating the data before you display it ?

Is it a requirement for compliance and it is mainly read ?

Are you converting that column to a string to compare it to another column ?

is it a requirement for auditing or for order capturing ?

Don't worry too much about the reads and writes performance differences, there are negligible, evaluate your overall requirements as a on whole from storage to UI.

856. <https://stackoverflow.com/questions/51651646/postgres-select-next-following-timestamp-very-slow>

Title: Postgres select next following timestamp very slow

Question: I want to find for each timestamp in my table the next following one. The query works fine on a very small dataset (20 rows) but when I use it for a dataset with over 25000 rows it is extremely slow. Even after waiting several minutes I still get no result. Is there any way to improve the performance of my query?

Answer: You can use a window function to get a value from the next record in your result set. Combine this with sorting by your timestamp to achieve the same functionality.

```
select
mytime,
```

```
lead(mytime) over(order by mytime asc) as nexttime
from
mydata
```

- [Window function overview](#)
- [Window functions and operators](#)

857. <https://stackoverflow.com/questions/8263393/timestamp-generated-by-two-threads>

Title: Timestamp generated by two threads

Question: I have two thread in my code. One thread is a generator which creates messages.

A timestamp is generated before a message is transmitted. The other thread is a receiver which accepts replies from multiple clients. A timestamp is created for each reply. Two threads are running at the same time.

I find the timestamp generated by the receivers is earlier than the timestamp generated by the generator. The correct order should be the timestamp for the receiver is later than the timestamp for the generator.

If I give a high priority for the generator thread, this problem does not occur. But this can also slow down the performance.

Is there other way to guarantee the correct order and less effect on the performance?  
Thanks.

Answer: Based on the comment thread in the question, this is likely the effect of the optimizer. This is really a problem with the design more than anything else - it assumes that the clocks between the producer and consumer are shared or tightly synchronized. This assumption seems reasonable until you need to distribute the processing between more than one computer.

Clocks are rarely (if ever) tightly synchronized between different computers. The common algorithm for synchronizing computers is the [Network Time Protocol](#). You can achieve very close to millisecond synchronization on the local area network but even that is difficult.

There are two solutions to this problem that come to mind. The first is to have the producer's timestamp passed through the client and into the receiver. If the receiver receives a timestamp that is earlier than its notion of the *current time*, then it simply resets the timestamp to the current time. This type of normalization will allow assumptions about time being a monotonically increasing sequence continue to hold. The other solution is to disable optimization and hope that the problem goes away. As you might expect, your mileage may vary considerably with this solution.

Depending on the problem that you are trying to solve you may be able to provide your own synchronized *clock* between the different threads. Use an atomically incrementing number instead of the *wall time*. `java.util.concurrent.atomic.AtomicInteger` or one of its relatives can be used to provide a single number that is incremented every time that a message is generated. This allows the producer and receiver to have a shared value to use as a clock of sorts.

In any case, clocks are really hard to use correctly especially for synchronization purposes. If you can find some way to remove assumptions about time from distributed systems, your architectures and solutions will be more resilient and more deterministic.

858. <https://stackoverflow.com/questions/29222334/how-do-i-convert-the-date-time-of-an-event-into-a-variable-that-i-can-use>

Title: How do I convert the date/time of an event into a variable that I can use?

Question: This code works, with one exception. I am importing the dates of performances from a calendar. When the code grabs the next performance date, I want it to read whether it starts before 6PM or after. If before, I want it to say "Today" and if it is after, I want it to say "Tonight." I have tried using \$dateEvent("H"), but it says I'm calling a function. How do I convert the date of the event into a variable that I can use?

859. <https://stackoverflow.com/questions/23149142/whats-the-meaning-of-the-time-stamp-in-nlog-when-async-is-on>

Title: what's the meaning of the time stamp in nlog when async is on?

Question: I'm a little confused about NLog's behivor when I set `async=true` in NLog's configuration file.

1. Is the timestamp in the log file present the time when `logger.Debug/Error/Info/Trace` is called, or is it the time that the log got written from buffer to file on the file system?
  2. Answer [Nlog Async and Log Sequence](#) mentioned that the order of the log sequence is not guaranteed when `async` is on, is that true?
  3. If I set `async=true`, does it has influence to the result when doing performance testing?
- 
1. Answer: According to the NLog source: <https://github.com/NLog/NLog/blob/master/src/NLog/Logger.cs> the `LogEventArgs` object is created at the time of the logging call (and is timestamped at that point). The writing of the `LogEventArgs` object is then written, asynchronously, to the appropriate target(s). So, the timestamp in the logfile should represent the timestamp of the logging call itself, not the time of the logging info being written to the log file.
  2. I don't have anything to add to the linked answer. I will say that [xharze](#) is involved in NLog development, so he should know what he is talking about.
  3. My first guess is that setting `async=true` would improve performance of your application with respect to logging since the application would not have to wait for a logging request to complete before continuing execution.

860. <https://stackoverflow.com/questions/9922473/persisting-timestamp-field-as-date-or-long>

Title: Persisting timestamp field as date or Long?

Question: I need a consensus on the practice of persisting timestamps, specifically on the pros & cons of using `java.util.Date` compared to using `long`.

Scope of this discussion:

## Performance

Querying Flexibility (e.g. date range)

Any hazards in coding and querying

Portability (e.g. migration to other DB)

About myself: I consider myself to be a beginner in JPA, dabbling in it once in a while, not being able to apply it into production level projects until now. In my current project, I commit myself to use ObjectDB (embedded) through JPA calls.

Answer: The following class demonstrates 3 possible methods for persisting timestamps in JPA:

```
@Entity
public class Timestamps {
 private java.sql.Timestamp ts1;
 private @Temporal(TemporalType.TIMESTAMP) java.util.Date ts2;
 private long ts3;
 :
}
```

Regarding performance and memory consumption, ts3 is a bit more efficient.

ts3 may be less convenient to use than ts1 and ts2 (in ObjectDB Database Explorer, reports, etc.).

Basic queries such as retrieval by date range are supported for all the three, but extracting date and time parts (YEAR, MONTH, etc.) in queries is not supported for ts3.

All these forms are expected to be portable.

ts1 and ts2 are practically equivalent.

More details are provided in the [ObjectDB manual](#).

Answer: You should be aware about `java.sql.Timestamp`'s fact before using it:

*There are some classes in the Java platform libraries that do extend an instantiable class and add a value component. For example, `java.sql.Timestamp` extends `java.util.Date` and adds a nanoseconds field. The equals implementation for `Timestamp` does violate symmetry and can cause erratic behavior if `Timestamp` and `Date` objects are used in the same collection or are otherwise intermixed. The `Timestamp` class has a disclaimer cautioning programmers against mixing dates and timestamps. While you won't get into trouble as long as you keep them separate, there's nothing to prevent you from mixing them, and the resulting errors can be hard to debug. This behavior of the `Timestamp` class was a mistake and should not be emulated. (Bloch, Effective Java, 2nd Ed.)*

861. <https://stackoverflow.com/questions/11899330/delay-measured-by-tcpdump-timestamp-increases-without-a-reason>

Title: delay measured by tcpdump timestamp increases without a reason

Question: I am measuring the delay or latency faced by packets inside a gateway by capturing the packets using tcpdump in the entry and exit NICs of the gateway. I am sending about 800,000 packets from a source host to a destination host which are connected through two GWs(i.e. Source Host=>GW1=>GW2=>Destination Host). I measured

the latency on each GW by subtracting the timestamps at the entry NIC from that on the exit NIC. I found that the latency is continuously increasing from 2 to 3000 microsecond. When I interchanged the NICs, the latency is increasing for some time and sharply decreasing and increasing again.

And surprisingly even though the latency on GW increases, the end-to-end throughput remains the same of about 900Mbps when all nodes have 1000Mbps NIC.

Would you please let me know how such variation in the latency happened? Or how the tcpdump timestamp was delayed in the exit NIC? Is there any approach to have the timestamp in nanosecond granularity?

Thanks for responding.

The performance of the infrastructure is not a problem. Here we are measuring the performance by throughput and found that the throughput does not decrease even if the latency on GW increases from 2 micro second to 3000 micro second.

For additional information: I have been measuring the latency on GW when the GW is doing different roles, such as an IP router, a GRE tunneling point, or a NAT. When it works as an IP router, the delay experienced by packets inside the GW is almost <=4 microsecond. However when the GW functions as a GRE tunneling point, the delays continuously increase by 1000 times within a few seconds. This is the problem in my measurement. And since there is no change in end-to-end throughput, I guess this delays is not a real one, it might have been introduced by the packet capturing and timestamping functions of tcpdump.

Answer2: I could be thinking too obvious here but I'm thinking that what you're referring to is jitter and simple packet delay variation that is a fact of every day life.

These days, to save CPU cycles, there's TCP offload on NICs and performance varies across NICs, which could account for the differences when you switch.

Given the tiny time differences that you mention, is it causing a problem on the performance of your infrastructure?

You should also monitor the performance of the two gateways to see if the latency changes correspond to load increases on the gateways.

862. <https://stackoverflow.com/questions/37020658/mongodb-native-node-js-driver-server-side-insert-timestamp>

Title: MongoDB native Node.js driver server side insert timestamp

Question: I'm having problems with server-side insertion timestamp (in milliseconds) using MongoDB native Node.js driver.

I need server-side insertion timestamp in milliseconds because I will calculate the time between requestTime and insertTime to make same performance tests on different DBs.

863. <https://stackoverflow.com/questions/54629397/kafka-message-timestamps-for-request-response>

Title: Kafka message timestamps for request/response

Question: I am building a performance monitoring tool which works in a cluster with Kafka topics.

For example, I am monitoring two topics: request, response. I.e. I need to have two timestamps - one from request and another from response. Then I could calculate difference to see how much time spent in a service which received a request and produced a response.

Please take in the account that it is working on a cluster, so different components may run on different hosts, hence - different physical clocks - so they could be out-of-sync and it will distort results significantly.

Also, I could not reliably use the clock of the monitoring tool itself, as this will influence timing results by its own processing times.

So, I would like to design a proper way which is reliably calculate time difference. What is most reliable way to measure time difference between two events in Kafka?

Answer: Solution 1:

We had similar problem before and solution we had was setting up NTP ( network time protocol).

In this one of your node act as NTP server and runs demons to keep time in sync across all your nodes we kept UTC and all other nodes has NTP clients which kept same time across all the servers

Solution 2:

Build a clock common API for all your components which will provide current time. This will make your system design independent of node local clock.

864. <https://stackoverflow.com/questions/54861949/laravel-set-timestamps-from-datetime-to-now-as-int>

Title: Laravel: set timestamps from datetime to now as int

Question: I am creating a Laravel application. Earlier I used to design the database with the datetime datatypes for created\_at and updated\_at, but a friend of mine suggested me that I should use timestamp instead of datetime because it's good with different timezones.

Is this a good idea to use timestamp instead of datetime format? Will there be any performance issues? If "No" then how can we change the default format of timestamps from datetime to timestamp globally in a laravel application.

Answer: Unfortunately, I'm not able to answer your first two questions, but Laravel does provide an easy way to change the format your dates are stored in.

The Date Mutators documentation says that one can set the `$dateFormat` property on your model like this:

```
/**
 * The storage format of the model's date columns.
 *
 * @var string
 */
protected $dateFormat = 'U';
```

The 'U' format would be "Seconds since the Unix Epoch." More formats are available in the php date documentation.

You would also need to change your model's migration. Replace `$table->timestamps();` with `$table->unsignedInteger('created_at');` and `$table->unsignedInteger('updated_at');`.

To use a specific date format "globally", i.e. for all of your models, you could either set the date format on a base model and let all of your models inherit that model, or use a trait. See this question for an example.

865. <https://stackoverflow.com/questions/6786851/php-mysql-timestamp-a-few-questions>

Title: php mysql timestamp – a few question

Question: I have a products table to which I've added a new field to use as a timestamp. I'm not sure if it should be a bigint field or a timestamp field though. What's the difference and which will offer the best performance?

I want to compare the current date to the timestamp value and if the difference is greater than X days (meaning that the product is no longer available) to exclude the product from my query results.

I've never used timestamps before and I need a kick-start to understand the usage, Thanks.

Answer: To store time in MySQL down to the second you may choose between

- `TIMESTAMP`
- `DATETIME`

Their relationship is discussed [here](#).

But to make a long story short, a timestamp is an integer and is, if no value is provided, automatically set. so it's a good choice if you want to store the time of the last insert for example. datetime has to be set explicitly and is "optically" a string of the format 'YYYY-MM-DD HH:MM:SS'. But MySQL processes both very fast, so TS isn't faster just b/c it's an integer.

Especially if you want to operate on the time beyond <,>,= then I'd recommend DATETIME. There are a lot of functions available.

Answer2: The general idea is that you use `timestamp` to record changes in the MySQL records since they are updated every time you update the record and you use `datetime` to store a particular event.

For your operations on field itself, MySQL supports [functions](#) that can do the calculations on datetime.

In terms of performance, timestamp uses more space than datetime and is generally faster.

Answer3: Mysql timestamps are human readable. (Below taken from MySQL website)

E.g. TIMESTAMP columns are displayed in the same format as DATETIME columns. In other words, the display width is fixed at 19 characters, and the format is 'YYYY-MM-DD HH:MM:SS'.

Using these lets you use MySQL functions like DATE\_ADD, which you can use in your queries.

Or you can use a UNIX timestamp (MySQL field type INT). Then you can do maths on the value, and then format it how you like using the PHP DATE function (second parameter is the timestamp).

Answer: FOA, we have to examine the differences between TIMESTAMP and DATETIME.

- TIMESTAMP
  - need 4 bytes
  - '1970-01-01 00:00:01' UTC to '2038-01-19 03:14:07' UTC ( same as UNIX Epoch )
  - UTC conversion will be occurred when you read/write.
  - Table can have only one TIMESTAMP column.
- DATETIME
  - need 8 bytes
  - '1000-01-01 00:00:00' to '9999-12-31 23:59:59'
  - No conversion.
  - Table can have one or more DATETIME columns.

Usually, I use TIMESTAMP when I want to trace changes of the records ( like modified datetime ) and use DATETIME if I want to record invariable date and time. ( like created datetime )

So, If you have a plan to handle lots of records and do not need over epoch time, TIMESTAMP is smaller and faster solution. But Note that it has limitations that I mentioned above.

## References:

- <http://dev.mysql.com/doc/refman/5.0/en/datetime.html>
- <http://dev.mysql.com/doc/refman/5.0/en/storage-requirements.html>

866. <https://stackoverflow.com/questions/6786851/php-mysql-timestamp-a-few-questions>

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Question: I have a products table to which I've added a new field to use as a timestamp. I'm not sure if it should be a bigint field or a timestamp field though. What's the difference and which will offer the best performance?

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I've never used timestamps before and I need a kick-start to understand the usage, Thanks.

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For your operations on field itself, MySQL supports [functions](#) that can do the calculations on `datetime`.

In terms of performance, `timestamp` uses more space than `datetime` and is generally faster.

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So, If you have a plan to handle lots of records and do not need over epoch time, TIMESTAMP is smaller and faster solution. But Note that it has limitations that I mentioned above.

References:

- <http://dev.mysql.com/doc/refman/5.0/en/datetime.html>
- <http://dev.mysql.com/doc/refman/5.0/en/storage-requirements.html>

867. <https://stackoverflow.com/questions/25706642/mysql-extract-newest-log-entries-by-timestamp-and-user>

Title: MySQL extract newest log entries by timestamp and user

Question: I have a table like this:

```
id (PRIMARY KEY, AUTO_INCREMENT) || user_id || timestamp || data1 || data2 || data3
(...)
```

I need to extract a single data for every user\_id ("the newest row") that is, with respect to latest timestamp in the table.

The answer given here works fine, but I am concerned with performance of this query:  
MySQL - using GROUP BY and DESC

I have also tested some answers here, but receive "Too few arguments" error and empty query: <https://stackoverflow.com/a/7306288/2715309>

Select only newest grouped entries

What am I doing wrong and what is the most optimal way, given the fact that I have unique auto\_inc column as primary key?

Answer: The selected answer in your first answer uses a MySQL extension that is explicitly documented not to always work (and I've commented on that answer). Interestingly, Stack Overflow doesn't seem to allow me to put in a link to the documentation page, but it is here: <http://dev.mysql.com/doc/refman/5.7/en/group-by-extensions.html>.

868. <https://stackoverflow.com/questions/32643464/c-sharp-countsample-timestamp-to-datetime>

Title: C# CountSample TimeStamp to Data time

Question: I have code that collects performance information from Windows and it seems the TimeStamp value in the CounterSample class does not make sense.

I have tried multiple options and it seems the closest I could get the DateTime calculation is to some date in 2013 which is clearly wrong.

The Class produces a TimeStamp "1377758421268" which seems to be in milliseconds but I'm not sure how to get this number to the correct DateTime format.

869. <https://stackoverflow.com/questions/5325854/how-do-i-add-seconds-to-a-timestamp-of-a-start-date-so-that-i-can-get-an-estimat/5326016#5326016>

Title: How do I add seconds to a timestamp of a start date so that I can get an estimated end date?

Question: I have a Task object with a start\_time and an estimated time in seconds. The start\_time is stored in the database as a MYSQL DATETIME and the estimated time is stored as seconds. I would like to add the seconds to the start\_time to get an estimated finish date.

Answer: There is a lot in the link Neville gave, but cutting slightly to the chase...

my\_date\_time + INTERVAL xx SECOND

I think it is more correct to use DATE\_ADD(), but as far as I know there is no performance difference.

870. <https://stackoverflow.com/questions/21593692/convert-unix-timestamp-to-date-without-system-libs>

Title: Convert unix timestamp to date without system libs

Question: I am building a embedded project which displays the time retrieved from a GPS module on a display, but I would also like to display the current date. I currently have the time as a unix time stamp and the project is written in C.

I am looking for a way to calculate the current UTC date from the timestamp, taking leap years into account? Remember, this is for an embedded project where there is no FPU, so floating point math is emulated, avoiding it as much as possible for performance is required.

Answer: First divide by 86400; the remainder can be used trivially to get the HH:MM:SS part of your result. Now, you're left with a number of days since Jan 1 1970. I would then adjust that by a constant to be the number of days (possibly negative) since Mar 1 2000; this is because 2000 is a multiple of 400, the leap year cycle, making it easy (or at least easier) to count how many leap years have passed using division.

Rather than trying to explain this in more detail, I'll refer you to my implementation:

[http://git.musl-libc.org/cgit/musl/tree/src/time/\\_secs\\_to\\_tm.c?h=v0.9.15](http://git.musl-libc.org/cgit/musl/tree/src/time/_secs_to_tm.c?h=v0.9.15)

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Rather than trying to explain this in more detail, I'll refer you to my implementation:

Answer3: Here's a portable implementation of `mkttime()`. It includes support for DST that you might remove in order reduce the size somewhat for UTC only. It also normalizes the data (so if for example you had 65 seconds, it would increment the minute and set the seconds to 5, so perhaps has some overhead that you don't need).

It seems somewhat more complex than the solution you have arrived at already; you may want to consider whether there is a reason for that? I would perhaps implement both as a test (on a PC rather than embedded) and iterate through a large range of epoch time values and compare the results with the PC compiler's own `std::mktime` (using C++ will avoid the name clash without having to rename). If they all produce identical results, then use the fastest/smallest implementation as required, otherwise use the one that is correct!

I think that the typical library `mktime` performs a binary convergence comparing the return of `localtime()` with the target. This is less efficient than a direct calendrical calculation, but I presume is done to ensure that a round-trip conversion from `struct tm` to `time_t` (or vice versa) and back produces the same result. The portable implementation I suggested above uses the same convergence technique but replaces `localtime()` to remove library dependencies. On reflection therefore, I suspect that the direct calculation method is preferable in your case since you don't need reversibility - so long as it is correct of course.

871. <https://stackoverflow.com/questions/11899330/delay-measured-by-tcpdump-timestamp-increases-without-a-reason/11905918#11905918>

Title: delay measure by tcpdump timestamp increase without a reason

Question: I am measuring the delay or latency faced by packets inside a gateway by capturing the packets using tcpdump in the entry and exit NICs of the gateway. I am sending about 800,000 packets from a source host to a destination host which are connected through two GWs(i.e. Source Host=>GW1=>GW2=>Destination Host). I measured the latency on each GW by subtracting the timestamps at the entry NIC from that on the exit NIC. I found that the latency is continuously increasing from 2 to 3000 microsecond. When I interchanged the NICs, the latency is increasing for some time and sharply decreasing and increasing again.

And surprisingly even though the latency on GW increases, the end-to-end throughput remains the same of about 900Mbps when all nodes have 1000Mbps NIC.

Would you please let me know how such variation in the latency happened? Or how the tcpdump timestamp was delayed in the exit NIC? Is there any approach to have the timestamp in nanosecond granularity?

Thanks for responding.

The performance of the infrastructure is not a problem. Here we are measuring the performance by throughput and found that the throughput does not decrease even if the latency on GW increases from 2 micro second to 3000 micro second.

For additional information: I have been measuring the latency on GW when the GW is doing different roles, such as an IP router, a GRE tunneling point, or a NAT. When it works as an IP router, the delay experienced by packets inside the GW is almost <=4 microsecond. However when the GW functions as a GRE tunneling point, the delays continuously increase by 1000 times within a few seconds. This is the problem in my measurement. And since there is not change in end-to-end throughput, I guess this delays is not a real one, it might have been introduced by the packet capturing and timestamping functions of tcpdump.

Answer: I could be thinking too obvious here but I'm thinking that what you're referring to is jitter and simple packet delay variation that is a fact of every day life.

These days, to save CPU cycles, there's TCP offload on NICs and performance varies across NICs, which could account for the differences when you switch.

Given the tiny time differences that you mention, is it causing a problem on the performance of your infrastructure?

You should also monitor the performance of the two gateways to see if the latency changes correspond to load increases on the gateways.

Answer

872. <https://stackoverflow.com/questions/29525050/nearest-timestamp-price-ready-data-structure-in-python>

Title nearest timestamp price – ready data structure in python?

Question: Price interpolation. Python data structure for efficient near miss searches?

I have price data

[1427837961000.0, 243.586], [1427962162000.0, 245.674], [1428072262000.0, 254.372],  
[1428181762000.0, 253.366], ...

with the first dimension a timestamp, and the second a price.

Now I want to know the price which is nearest to a given timestamp e.g. to 1427854534654.

What is the best Python container, data structure, or algorithm to solve this many hundred or thousand times per second? It is a standard problem, and has to be solved in many applications, so there should be a ready and optimized solution.

I have Googled, and found only bits and pieces that I could build upon - but I guess this question is so common, that the whole data structure should be ready as a module?

EDIT: Solved.

I used [JuniorCompressor's solution](#) with my [bugfix for future dates](#).

The performance is fantastic:

3000000 calls took 12.82 seconds, so 0.00000427 per call (length of data = 1143).

Thanks a lot! StackOverFlow is great, and you helpers are the best!

873. <https://stackoverflow.com/questions/45908419/mysql-now-method-vs-timestamp>

Title: MySQL now method vs timestamp

Question: I need to keep the connected users synchronized with the changed values in my database. To do that, users send me a timestamp and I send back every record where the changed\_time > timestamp. This should be in database level so I need to use the time from the database. I am calling SELECT NOW() SQL to get the time and then read this from the result set and finally attach to the response. Next time client synchronizes, the returned timestamp value will be used.

My question is, should I use `TIMESTAMP` and `now()` method for every incoming synchronization request or keep the value in `UNIX` time as `LONG`? Just to add, testing the performance for about 1,000 clients performing synchronization requests every 10 seconds. Using Tomcat and MySQL.

What's your advice? Is my approach right? How'd you do this?

Answer: You can take one more column and assign datatype CURRENT\_TIMESTAMP ON UPDATE CURRENT\_TIMESTAMP and it will automatically update timestamp while any record update and insert new record. using this you can fetch record on given timestamp by user. Hope it will works for you.

874. <https://stackoverflow.com/questions/16448959/absolutely-no-functions-surrounding-a-tstamp-in-a-sql-hourly-historical-data-qu/16449064#16449064>

Title: absolutely NO functions surrounding a tstamp in a SQL? Hourly historial data query

Question: I need to obtain for some specific hours data for a specific week day back to 10 weeks. The DB I work on is Oracle. I came up with the following conditions with the time stamp field:

```
TO_CHAR(hy.tstamp,'HH24')='10'
AND hy.tstamp > sysdate - 70
AND mod(extract (day from sysdate-1) - extract (day from hy.tstamp), 7) =0
Someone told me "absolutely NO functions surrounding a tstamp" (for performance
reasons?). How would you to specify the conditions without operations on the time stamp
field?
```

Answer: This sounds like the person complaining about performance has never heard of function based indexes.

`Create index char_hy_stamp on my_table(to_char(hy.tstamp,'HH24'));`

This should avoid the full table scan that is undoubtedly part of your explain plan. As soon as you get your sqlfiddle functioning we can go from there.

875. <https://stackoverflow.com/questions/1656383/how-much-faster-is-timestamp-than-datetime-column-in-mysql>

Title: How much faster is timestamp than datetime column in MySQL

Question: This consists of two questions:

1. Is MySQL's timestamp field really faster than datetime field in "order by" query?
2. If the answer to above question is yes, how much faster it could be? Supposed in a table of 100 million rows and frequently sort a bunch of 100-200k rows based on timestamp field inside MySQL, will the sort time improvement be offset by converting timestamp to readable string format in outside program?

Answer: The easiest way to find out is to write a unit test, and actually get some numbers.

My theory was that timestamp would be faster, but according to this blog I am wrong:<http://dbscience.blogspot.com/2008/08/can-timestamp-be-slower-than-datetime.html>

This is why I tend to get numbers, by profiling, before I decide where to optimize, as my gut feeling can be quite wrong at times.

So, it may depend on the version of MySQL you are using, but it appears that datetime may be faster.

Answer2: From what I can tell, the major benefit of using TIMESTAMP over DATETIME is being able to automatically set a value to the current time on row creation and being able to set it (or another column with a little effort) to the current time on row update. This allows for an automatic created and modified date.

Because of the other limitations on the TIMESTAMP column (for example, not being to accept dates outside of a certain range or changing if the server time zone changes), DATETIME is going to be preferable if you're not needing one of the two features from above.

However, if you're merely interested in storing a Unix timestamp in the database and not needing the database to ever convert it, you could probably store it as an unsigned integer directly and achieve slightly performance.

876. <https://stackoverflow.com/questions/35301269/which-date-class-should-i-use-in-java-8>

Title: which date class should I use in Java 8?

Question: There is a whole set of date's classes in Java 8:

- `java.time.LocalDateTime`;
- `java.time.ZonedDateTime`;
- `java.time.Instant`;
- `java.time.OffsetDateTime`;
- `java.sql.Timestamp`;
- `java.util.Date`.

I already passed over their JavaDocs and paid attention that all these classes contain all the methods I need. Thus, for the moment, I can select them randomly. But I guess that

there is some reason why there are 6 separate classes and each of them is dedicated to the specific purpose.

Technical information & requirements:

1. The input is in `String`, which is converted to one of these date formats.
2. I don't need to display the time zones but when I compare two dates it's important to be capable to compare correctly the time in New York and in Paris.
3. The precise level is seconds, there is no need to use milliseconds.
4. The required operations:
  - find max/min date;
  - sort objects by date;
  - calculate date & time period (difference between two dates);
  - insert objects to MongoDB and retrieve them from a db by date (e.g. all objects after specific date).

My questions:

1. Which aspects should I bear in mind in order to choose the optimal format among these four options from the performance & maintainability points of view?
2. Is there any reason why I should avoid some of these date classes?

Answer: Each one of the Date classes are for specific purposes:

- If you want to use your Date in an SQL/JDBC context, use the `java.sql.Timestamp`.
- `java.util.Date` is the old Java API, it is not thread safe, you can difficultly handle time zoning, and on the top of all, it is poorly designed: one simple uniformity is that months start from 1 while days start from 0.
- `java.time.LocalDateTime` is an immutable date-time object that represents a date-time, often viewed as year-month-day-hour-minute-second, which you need exactly.
- `java.time.ZonedDateTime` class stores all date and time fields, so you can use it to deal with values like: 27th January 1990 at 15:40.30.123123123 +02:00 in the Europe/Paris time-zone.

To do your task, the `ZonedDateTime` class handles conversion from the local time-line of `LocalDateTime` to the instant time-line of `Instant` (which models a single instantaneous point on the time-line). The difference between the two time-lines, represented by a `ZoneOffset`, is the offset from UTC/Greenwich.

To calculate duration and period: there is the `java.time.Duration` which is a time-based amount of time, such as '20.5 seconds', and `java.time.Period`, which is a date-based amount of time (like: 26 years, 2 months and 2 days).

To get max and min dates, you can use the Java 8 lambdas in something like:

877. <https://stackoverflow.com/questions/55306494/how-to-address-moddatetime-apparently-bypassing-precision-of-column>

Title: How to find time of day or range in TIMESTAM column

Question: I have a list of events with begin and end timestamps in GMT UTC+0. The column is type DATE but has time as well (not designed by me).

The begin timestamp is plainly indexed

I need to find events the occur between, say, 06:00 and 22:00 Localtime which is Eastern Daylight Time UTC-4. on any day between March 31th and April 2nd.

The Only way I've found to do it is convert it TO\_CHAR() then. It's also not using the index because it's using TO\_CHAR function.

Answer: When trying to grab data based on a portion of a date field, of course the index will not be used. there just ain't any workaround to that. You could look into adding a function-based index, however, to index on the minutes of the day in EST. Or, perhaps, add a new column to hold minutes\_est, have it populated by an insert/update trigger and then base your query on that.

If this is a regularly used query, and the performance of a full table scan isn't cutting it, then yes - I think this is one of those times where you might need to do some redesign based on your needs for this.

878. <https://stackoverflow.com/questions/51867237/how-to-replace-part-of-a-string-in-java-where-it-matches-1st-few-characters-es/51867536#51867536>

Title: how to replace of a string in Java, where it matches 1<sup>st</sup> few characters escape some in between and matches some character at the end

Question: I'm working on a Java which does some changes to an SQL file and covert it to an Oracle compatible format.

It seems for changing the Timestamp\date values, I need to use an oracle function "To\_TIMESTAMP" to change it to some oracle understandable formart.

Now to the real question. Below I have a String line;

```
(1, 'Ctx_Log-Log', '', '08.03.2017', '2017-03-08 10:59:31', '10:59:32', '2017-03-08
10:59:41')
```

where I'm interested in only values like '2017-03-08 10:59:31' and '2017-03-08 10:59:41' and these value can occur more than 2 times. I want to change\replace them to To\_TIMESTAMP('2017-03-08 10:59:31', 'YYYY-MM-DD HH24:MI:SS') and To\_TIMESTAMP('2017-03-08 10:59:41', 'YYYY-MM-DD HH24:MI:SS') and I don't want to disturb the other values. I tried to regex solution, but I could only match and replace the start of the string, like

```
string.replaceAll(",201", ",To_TIMESTAMP(201")
which replace it to To_TIMESTAMP('2017-03-08 10:59:31' but I don't know how to replace
the end part of '2017-03-08 10:59:31' to '2017-03-08 10:59:31', 'YYYY-MM-DD
HH24:MI:SS') Any help will be appreciate. It doesn't matter which way or method is
performed, as far as gives me the right solution. Thanks
```

## Answer: Smart objects, not dumb strings

Why use mere text when you can use objects to communicate with your database?

## JDBC 4.2

As of JDBC 4.2, we can directly exchange *java.time* objects with the database. No need to mess with passing strings, or using regex, or calling the Oracle `TO_TIMESTAMP` function.

### `LocalDateTime`

For your inputs such as `2017-03-08 10:59:31`, use `LocalDateTime`. This class represents a date and a time-of-day lacking any concept of time zone or offset-from-UTC. As such, it is appropriate for database columns of a data type akin to the SQL-standard type `TIMESTAMP WITHOUT TIME ZONE`.

### `ISO 8601`

Your input strings nearly comply with the [ISO 8601](#) standard. Replace the SPACE character in the middle with a `T` to fully comply. The *java.time* class use these standard formats by default when parsing/generating strings. So no need to specify a formatting pattern.

879. <https://stackoverflow.com/questions/154964/how-do-you-avoid-adding-timestamp-fields-to-your-tables/485643#485643>

Title: How do you avoid adding timestamp fields to your tables?

Question: I have a question regarding the two additional columns (`timeCreated`, `timeLastUpdated`) for each record that we see in many solutions. My question: Is there a better alternative?

Scenario: You have a huge DB (in terms of tables, not records), and then the customer comes and asks you to add "timestamping" to 80% of your tables.

I believe this can be accomplished by using a separate table (`TIMESTAMPS`). This table would have, in addition to the obvious timestamp column, the table name and the primary key for the table being updated. (I'm assuming here that you use an int as primary key for most of your tables, but the table name would most likely have to be a string).

To picture this suppose this basic scenario. We would have two tables:

`PAYMENT` :- (your usual records)

`TIMESTAMP` :- {current timestamp} +

{`TABLE_UPDATED`, `id_of_entry_updated`, `timestamp_type`}

Note that in this design you don't need those two "extra" columns in your native payment object (which, by the way, might make it thru your ORM solution) because you are now indexing by `TABLE_UPDATED` and `id_of_entry_updated`. In addition, `timestamp_type` will tell you if the entry is for insertion (e.g "1"), update (e.g "2"), and anything else you may want to add, like "deletion".

I would like to know what do you think about this design. I'm most interested in best practices, what works and scales over time. References, links, blog entries are more than welcome. I know of at least one patent (pending) that tries to address this problem, but it seems details are not public at this time.

Answer: While you're at it, also record the user who made the change.

The flaw with the separate-table design (in addition to the join performance highlighted by others) is that it makes the assumption that *every* table has an identity column for the key. That's not always true.

If you use SQL Server, the new 2008 version supports something they call [Change Data Capture](#) that should take away a lot of the pain you're talking about. I think Oracle may have something similar as well.

Answer: If you set up the time-stamp stuff to run off of triggers, than any action that can set off a trigger (Reads?) can be logged. Also there might be some locking advantages.

(Take all that with a grain of salt, I'm no DBA or SQL guru).

Answer2: One nightmare with your design is that every single insert, update or delete would have to hit that table. This can cause major performance and locking issues. It is a bad idea to generalize a table like that (not just for timestamps). It would also be a nightmare to get the data out of.

If your code would break at the GUI level from adding fields you don't want the user to see, you are incorrectly writing the code to your GUI which should specify only the minimum number of columns you need and never select \*.

Answer 3: Our solution is to maintain a "Transaction" table, in addition to our "Session" table. UPDATE, INSERT and DELETE instructions are all managed through a "Transaction" object and each of these SQL instruction is stored in the "Transaction" table once it has been successfully executed on the database. This "Transaction" table has other fields such as transactionType (I for INSERT, D for DELETE, U for UPDATE), transactionDateTime, etc, and a foreign key "sessionId", telling us finally who sent the instruction. It is even possible, through some code, to identify who did what and when (Gus created the record on monday, Tim changed the Unit Price on tuesday, Liz added an extra discount on thursday, etc).

Pros for this solution are:

1. you're able to tell "what who and when", and to show it to your users! (you'll need some code to analyse SQL statements)
2. if your data is replicated, and replication fails, you can rebuild your database through this table

Cons are

1. 100 000 data updates per month mean 100 000 records in Tbl\_Transaction
2. Finally, this table tends to be 99% of your database volume

Our choice: all records older than 90 days are automatically deleted every morning

880. <https://stackoverflow.com/questions/18478807/comparing-and-interpreting-two-time-counters>

Title: comparing and interpreting two time counters

Question: I have two counters that denote time. One of them is a 64-bit counter which should be interpreted as follows.

- 1) Most significant 32 bits indicate the number of seconds since a fixed point in time

2) Lower 32 bits indicate a fraction of a second.

I don't know how to interpret the other 48 bit counter.?

What I do know is this.

What COUNTER 1 increased by 508032,COUNTER 2 increased by 5914.

Meaning COUNTER1 (time 2 - time 1) = 508032  
during that time

COUNTER2 (time 2 - time 1) = 5914.

I need a formula to figure out how to interpret the resolution of COUNTER2.

Answer: Counter 2 increments 50 million times per second.

$5914/(508032/2^{32}) \approx 50 \text{ million}$

To put it in words: Counter 1 increments  $2^{32}$  times per second. So if it increments 508,032 times, that's 1/8454 of a second. In that time, counter 2 incremented 5,914 times. So it would increment  $5,914 * 8,454$  times in a full second. That's so close to 50 million (49.997 million) that it's almost certain counter 2's resolution is intended to be 50 million counts per second.

881. <https://stackoverflow.com/questions/53478532/elasticsearch-5-5-query-or-algorithm-required-to-extract-values-against-times>

Title: ElasticSearch query or algorithm required to extract values against timestamp with an inference pattern.

Question: Let's say that I need to get results back for a query that asks for the point value every 5 seconds. An inference pattern arises where sometimes there will be an exact match (for simplicity's sake, let's say in the example above that 12:45 is the only sample to land on a multiple of five).

On these times, I want elastic to provide me with the exact value recorded at that time if there is one. So at 12:45 there is a match so it returns value 24.4

In the other cases, I require the last (previously recorded) value. So at 12:50, having no data at that precise time, it would return the value at 12:48 (25.5), being the last known value.

Previously I have used aggregations but in this case this doesn't help because I don't want some average made from a bucket of data, I need either an exact value for an exact time match or a previous value if no match.

I could do this programmatically but performance is a real issue here so I need to come up with the most performant method possible to retrieve the data in the way stated. Returning ALL the elastic data and iterating over the results and checking for a match at each time interval else keeping the item at index i-1 sounds slow and I wonder if it isn't the best way.

Perhaps I am missing a trick with Elastic. Perhaps somebody knows a method to do exactly what I am after?! It would be much appreciated...

Answer: For a performance improvement, consider to not doing `epoch_to_date_time()` every second (or even every timer tick), but to selectively increment a time unit only when the lesser unit overflows, e. g. like

882. <https://stackoverflow.com/questions/56097807/extract-data-by-day-from-sql-server>

Title: Extract data by day from SQL Server

Question: 1

I need to get all the values from a SQL Server database by day (24 hours). I have timestamps column in `TestAllData` table and I want to select the data which only corresponds to a specific day.

For instance, there are timestamps of `DateTime` type like '`2019-03-19 12:26:03.002`', '`2019-03-19 17:31:09.024`' and '`2019-04-10 14:45:12.015`' so I want to load the data for the day `2019-03-19` and separately for the day `2019-04-10`. Basically, it is needed to get `DateTime` values with the same date.

Is this possible to use some functions like `DatePart` or `DateDiff` for that?  
And how can I solve such problem overall?

As in this case, I do not know the exact difference in hours between a timestamp and the end of the day (because there are various timestamps for 1 day) and I need to extract the day itself from the timestamp. After that, I need to group the data by days or something like this and get block by block. For example:

'`2019-03-19`' - 1200 records '`2019-04-10`' - 3500 records '`2019-05-12`' - 10000 records and so on

**I'm looking for a more generic solution not supplying a timestamp (like '`2019-03-19`') as a boundary or in a where clause because the problem is not about simply filtering the data by some date!!**

**UPDATE:** In my dataset, I have about 1,000,000 records and more than 100 unique dates. I was thinking about extracting the set of unique dates and then kind of run a query in the loop where the data would be filtered by the provided day. It would look in such a way:

```
select * from TestAllData where dayColumn = '2019-03-19'
select * from TestAllData where dayColumn = '2019-04-10'
select * from TestAllData where dayColumn = '2019-05-12'
...
```

I might use this query in my code, so I may run it in the loop from Scala function. However, I am not sure that in terms of performance it would be ok to run separate unique dates extraction query.

Answer: Depending on whether you want to be able to work with all the dates (rather than just a subset), one of the easiest ways to achieve this is with a cast:

```
:with cte as (SELECT cast(my_datetime as date) as my_date, * from TestAllData)
SELECT * FROM cte where my_date = '2019-02-14'
```

Note when casting datetime to date, times are truncated, ie just the date part is extracted.

As I say though, whether this is efficient, depends on your needs, as all datetime values from all records will be cast to date, before the data is filtered. If you want to select several dates (as opposed to just one or two), however, it may prove overall quicker, as it reads the whole table once and then gives you a column upon which you can much more efficiently filter.

If this is a permanent requirement, though, I would probably use a persisted computed column, which effectively would mean that the casting is done once initially and then only again if the corresponding value changed. For a large table I would also strongly consider an index on the computed column.

883. <https://stackoverflow.com/questions/33878188/2-signatures-added-to-wse-security>

Title: Signatures added to wse security

Question: I needed to signature in the wse security with SAML token similar to Need signature after SAML token in client request But when I followed the example I get signature for both the soap body and the timestamp. Where as the server where I send the request to need only the timestamp signature (error: Two references found in the signature for the timestamp. Expected one reference). I spent many hours searching in the google and tweaking the WCF settings but to no avail. Following is the signature with 2 references (to body and to the timestamp). Is there anything I can do before manually creating the wse header and its contents.

884. <https://stackoverflow.com/questions/41193473/web-service-provider-cxf-websphere-validates-signed-body-but-not-signed-times>

Title: Web Service Provider (CXF/WebSphere) Validates Signed Body, But Not Signed Timestamps in Security Header.

Question: I am using Apache CXF 3.0.11, integrated with WebSphere 8.5.5.8, and I have implemented a WebSphere-installed application that provides a Web Service that was developed top-down/WSDL-first. This Web Service uses WS-Security configured through policies in the WSDL.

The Web Service, WebServiceA, runs on an application called AppAlpha. The client, a standalone Java application, is called AppBravo.

The policies are:

1. Include timestamps in the security header.
2. Digitally sign the body as well as the header (which is basically just the timestamps in the security header) with an X.509 digital certificate.

In examining the logs, I can see that...

- AppBravo is signing the body and timestamps.
- AppAlpha recognizes the timestamps in the security header.
- **AppAlpha fails to validate the digital signature on the timestamps -- that is, the actual digest as computed by AppAlpha does not match the expected digest, contained in the request XML.**

- AppAlpha seemingly successfully validates the digital signature on the body -- that is, the actual digest as computed by AppAlpha does match the expected digest, contained in the request XML.

*Does anyone know why the Web Service provider would successfully validate the request message body, but not the timestamps in the message security header?*

885. <https://stackoverflow.com/questions/18910814/best-practice-to-generate-random-token-for-forgot-password/18910943#18910943>

Title: best practice to generate random token for forget password

Question: I want to generate identifier for forgot password . I read i can do it by using timestamp with mt\_rand(), but some people are saying that time stamp might not be unique every time. So i am bit of confused here. Can i do it with using time stamp with this ?

### Question

What's best practice to generate random/unique tokens of custom length?

I know there are lot of questions asked around here but i am getting more confused after reading different opinion from the different people.

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What's best practice to generate random/unique tokens of custom length?

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886. <https://stackoverflow.com/questions/1206025/can-anyone-recommend-a-good-book-or-other-resource-on-ntfs-semantics>

Title: can anyone recommend a good book or other resource on NTFS semantics

Question: I'd like to improve my understanding of NTFS semantics; ideally, I'd like some kind of specification document(s).

I could (in theory) figure out the basics by experimentation, but there's always the possibility that I'd be ignoring some important variable.

For example, I'm having difficulty finding definitive information on the following:

- (1) When do file times (created/modified/accessed) get set/updated? For example, does copying and/or moving a file affect any or all of these times? What about if the file is being copied/moved between volumes? What about alternate streams?
- (2) How do sharing modes and read/write access interact?
- (3) What happens to security information (SACL, DACL, ownership etc.) when a file is copied and/or moved?

As I said, I could probably "answer" these questions by writing some code, but that would only tell me how the specific operations I tested behaved across any machines that I ran the code on. I'd like to find a resource that can tell me how this stuff is *supposed* to behave, identifying all the variables that could affect the behaviour.

Answer: Apparently there are no public non-NDA specifications. Projects such as [NTFS-3G](#) would greatly benefit from them, but they don't mention anything. A predecessor of NTFS-3G, called [linux-ntfs](#), has made some documentation on its own [here](#). Maybe that's good enough for you, maybe not.

887. <https://stackoverflow.com/questions/50461906/php-black-image-detection-and-ignore-text-how>

Title: PHP-Black image detection and ignore text. How?

Question: My security cam has a failure, sometimes at the movement, the first snaps are black. That's not a really a problem but I was looking for a way to delete those black images via a PHP script.

888. <https://stackoverflow.com/questions/56278817/how-to-change-the-timestamp-security-header-in-a-wcf-client/56287964#56287964>

Title: How to change the timestamp security header in a wcf client

Question: I am trying to modify the default expiration time of the security header which is 5 min to 1 min. One of the security policies of the server is a timestamp (the date of the request), with a Time to live of one minute.

Any idea?

889. <https://stackoverflow.com/questions/41175246/c-sharp-external-web-service-requires-timestamp>

Title: C# external web service requires timestamp

Question: I am trying to automate a web service call using C#. I managed to get it working from SoapUI. The service call requires authentication with valid username/pw as well as timestamp. But I don't know how to add this timestamp to C# service call.

Details of the web service.

1. URL: <https://prod.decisionpoint3.com/fleet/bsm/api/JobExecutionService?WSDL>
2. Authorization Basic
3. Credentials. Username:xxxx, Password:xxxx
4. **In SoapUI, under Outgoing WS-Security Configurations, Add Username using the credential above and then add Timestamp, with Time to Live as 60**

890. <https://stackoverflow.com/questions/18910814/best-practice-to-generate-random-token-for-forgot-password/29137661#29137661>

Title: best practice to generate random token for forget password

Question: I want to generate identifier for forgot password . I read i can do it by using timestamp with mt\_rand(), but some people are saying that time stamp might not be unique every time. So i am bit of confused here. Can i do it with using time stamp with this ?

### Question

What's best practice to generate random/unique tokens of custom length?

I know there are lot of questions asked around here but i am getting more confused after reading different opinion from the different people.

Answer: In PHP, use `random_bytes()`. Reason: you are seeking the way to get a password reminder token, and, if it is a one-time login credentials, then you actually have a data to protect (which is - whole user account)

So, the code will be as follows:

```
//$length = 78 etc
$token = bin2hex(random_bytes($length));
```

**Update:** *previous versions of this answer was referring to uniqid() and that is incorrect if there is a matter of security and not only uniqueness. uniqid() is essentially just microtime() with some encoding. There are simple ways to get accurate predictions of the microtime() on your server. An attacker can issue a password reset request and then try through a couple of likely tokens. This is also possible if more\_entropy is used, as the additional entropy is similarly weak. Thanks to @NikiC and @ScottArciszewski for pointing this out.*

For more details see

- <http://phpsecurity.readthedocs.org/en/latest/Insufficient-Entropy-For-Random-Values.html>

891. <https://stackoverflow.com/questions/40629126/is-it-possible-to-modify-browsers-date-object/40629228#40629228>

Title: Is it possible to modify browsers data object

Question: Is it safe to use the Date.now() object to store timestamps? Or is it possible for a user/person to modify the Date object in browser console and change the behavior of the Date.now()?

Answer: The Date object will contain the date of the computer the browser runs on. It is not magically knowing that the user changed the date. If they allow the location API to run, you may be able to double check.

The Date methods are not read-only so you can override them.

892. <https://stackoverflow.com/questions/6726382/is-there-a-way-to-digital-sign-documents-to-prove-they-existed-at-a-certain-po>

Title: is there a way to digitally sign documents to prove they existed a certain point in time

Question: I'm curious if there is way to digitally sign documents (technically any piece of data), such as contracts or photos, so that 10 years from now, it can be proven that they are from this time, not forged 9 years from now.

For example, I could write a prediction of the future and sign it with conventional means to prove that I wrote it, then timestamp-sign it so that when it comes true, I can prove I predicted it.

One way I thought of is that there could be a timestamping authority. You send them the data, they make a hash of the data + timestamp and encrypt the hash with RSA using their private key. A signed document thus exists of: data, timestamp, encrypted hash.

10 years from now, I hash the data + supposed timestamp, and check if it matches with the encrypted hash that I decrypt using the authority's public RSA key (which I trust). If it does, I know the timestamp is valid.

I can see 2 problems with that though:

- An external authority is needed
- The authority's private key would need to be kept extremely secret, because if it's revealed, all documents signed with it turn invalid.

Can you think of a solution without (one of) these problems?

Answer: This is called *timestamping*. The most widely used mechanism is defined in TSP specification ([RFC 3161](#)) and some others. The alternative method is used in MS Authenticode, but it's not documented and is not compatible with TSP.

TSP is used as a supplementary function in several encryption and digital signature standards, such as PDF, XAdES, CAdES, PAdES (AdES stands for "Advanced encryption standard"). PDF, XAdES and PAdES standards are applied to certain type(s) of data. CAdES is universal format (as it can be applied for any generic data).

[RFC 5544](#) offers a way to apply TSP to any generic data without signing this data. TSP specification makes heavy use of PKI and X.509 certificates.

Timestamping services are provided by certificate authorities as a supplementary service. There also exist independent timestamping services.

You can run your own timestamping service, however timestamping requires use of special certificate (its key usage extensions are to be set in a specific way), so regular SSL or code signing certificates won't work.

Talking about "timestamping authorities" - you send them a hash (calculated during signing) and they sign this hash using their certificate. It's their business to keep the private key protected, and they usually charge for it.

The idea about third-party authority is that it certifies time. If you sign the data, you can put any time to the signature, and there's no way to check if it's correct or you have forged it. Only trusted third-party authority can be a proof of correctness of the timestamp.

Answer2: Here is a timestamping service that has been in continuous operation since 1995.

<http://www.itconsult.co.uk/stamper/stampinf.htm>

You send your data (or a hash of your data) by email, and get back a signature of your data plus a timestamp with a serial number. The detached signatures (but not the data itself) are posted publicly, and anyone can archive them for themselves, so that if the site operators ever tried to tamper with the timestamp record, people would know. So in principle, you don't have to place much trust in the service itself.

893. <https://stackoverflow.com/questions/7494323/php-using-a-unix-timestamp-as-a-key/7577803#7577803>

Title: PHP Using a Unix Timestamp as a key

Question: So, I've been looking into encryption lately, and I've heard of people using timestamps as keys for encryption. I think this is a great idea, but if I want to decrypt the data, how would I retrieve that specific timestamp? Timestamps are unique, and I'm not really sure how this would work.

Answer: Two problems here.

You would need to store the timestamp somewhere. So why not just use "rand()" and store that.

It's possible to get hundreds of duplicate timestamps on a modern multi-threaded, multi-core processor. So you may as well just use date().

Answer2: The only way would be to save the timestamp. (assuming there is no backdoor to your encryption, which would nullify it's purpose)

What I would do is save the timestamp along with the encrypted string in a different format Ex: 09/21/2011 03:09:53 and use a combination of strtotime() and salting to store both bits of information in a secure manner.

09/21/2011 03:09:53 becomes 13165--Salt--74593

Answer3: Timestamps make **awful** keys. A program could blaze through all possible keys in the blink of an eye.

The time is often used as a component in priming a random number generator. It can't be the only component for the same reason it can't be used as a key, though.

The time could be used semi-successfully as the salt for a hashing algorithm. It's still not as good as something random since it allows the attacker to generate rainbow tables in advance.

Answer4: I don't want to hurt your feelings, but...

It is very obvious that you have never studied crypto.

So, *please do not design your own cryptographic protocols*, and do not assemble cryptographic primitives yourself either (like the "WiFi" designers/amateurs cryptologists did with WEP).

Protocols designed to meet specific security goals (I am not saying "secure protocols" on purpose) have been invented and implemented by specialists.

You first need to define your security goals, then choose an adequate protocol.

894. <https://stackoverflow.com/questions/2872105/alternative-timestamping-services-for-authenticode/9819808#9819808>

Title: Alternative timestamping services for authenticode

Question: We perform code signing and timestamping for all our production builds. Occasionally (usually when we are about to RTM (!)) the timestamp server at Verisign ("<http://timestamp.verisign.com/scripts/timestamp.dll>") decides to go offline intermittently. What should we do in this case?

- Does the timestamp server have to be hosted by your root certification authority?
- Are there any other network-hosted timestamp servers we could use instead of Verisign if their server is down? Suggestions for other highly available and *free* alternatives are welcome :)

Answer: I'm not sure if the timestamp server has to be owned by the root CA or not.

We use <http://timestamp.comodoca.com/authenticode> (and have a Comodo authenticode certificate) but actually have a similar issue, in that their server seems to give an error or time out occasionally. We do signing as part of a nightly (or on-demand) build on our continuous integration server for Release builds only (not for Debug builds). I got around this (mostly) in two ways:

- If the call to signtool.exe fails, it tries again (immediately) twice more
  - The build script used to sign every exe in one step (and we have several as part of our product), and now it does one-by-one - takes slightly longer, but is less likely to fail
- Between these, build failures caused by timestamp server issues have gone from once or twice a week thing to virtually never.

EDIT: I have an MSBuild task that does this (as well as [reads a certificate password stored outside the repository](#)) at <https://gist.github.com/gregmac/4cfacea5AAF702365724>

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Answer: The VeriSign timestamping service is free of charge. That may be perhaps why it's reliability is less than adequate; they don't give it a maintenance a budget!

Definitely this is a *big* problem. Wasted time due to failed builds from code timestamping failures is a growing issue throughout the software development industry. Sure, you can write a complex script to rotate through, until you find a working time stamping server.. but, really?

We should demand better. We pay A LOT for these certificates.

Note that I later found alternate time-stamp servers that few have heard of were fine to use in periods where Verisign and Comodo is down (usually happens during working hours on workdays).

Answer: I had the same problem. verisign server wasn't reachable sometime for some files I tried to sign (but other files in the same build was correctly signed).

I usually retry and it works but today, no way.

So after some unusefull research on internet I tried to put http://\*.verisign.com in trusted zone sites and it works... Finally I don't know if the server had a problem and now works or if I did the right thing, will see in next days I think. Hope it may helps other which are blocked.

The server config: Windows server 2003 sp2, IE8, enhanced security on.

895. <https://stackoverflow.com/questions/44340193/oracle-timestamp-with-timezone-replace-date-portion-to-current-date>

Title: Oracle timestamp with timezone: replace date portion to current date

Question: I have a oracle table for maintaining cutoff time. here we are storing cutoff time for various securities.. currently we are defaulting date portion of cutoff to 1st Jan 1970. The requirement is to replace this date portion with current date without changing time and timezone portion of cutoff.

Answer: You could calculate the number of days between today and 1970-01-01, and then add that as a day-to-second interval to your cutoff timestamp value:

896. <https://stackoverflow.com/questions/6726382/is-there-a-way-to-digitally-sign-documents-to-prove-they-existed-at-a-certain-po/6726918#6726918>

Title: Is there a way to digitally sign documents to prove they existed at a certain point in time

Question: I'm curious if there is way to digitally sign documents (technically any piece of data), such as contracts or photos, so that 10 years from now, it can be proven that they are from this time, not forged 9 years from now.

For example, I could write a prediction of the future and sign it with conventional means to prove that I wrote it, then timestamp-sign it so that when it comes true, I can prove I predicted it.

One way I thought of is that there could be a timestamping authority. You send them the data, they make a hash of the data + timestamp and encrypt the hash with RSA using their private key. A signed document thus exists of: data, timestamp, encrypted hash.

10 years from now, I hash the data + supposed timestamp, and check if it matches with the encrypted hash that I decrypt using the authority's public RSA key (which I trust). If it does, I know the timestamp is valid.

I can see 2 problems with that though:

- An external authority is needed
- The authority's private key would need to be kept extremely secret, because if it's revealed, all documents signed with it turn invalid.

Can you think of a solution without (one of) these problems?

Answer: This is called *timestamping*. The most widely used mechanism is defined in TSP specification ([RFC 3161](#)) and some others. The alternative method is used in MS Authenticode, but it's not documented and is not compatible with TSP.

TSP is used as a supplementary function in several encryption and digital signature standards, such as PDF, XAdES, CAdES, PAdES (AdES stands for "Advanced encryption standard"). PDF, XAdES and PAdES standards are applied to certain type(s) of data. CAdES is universal format (as it can be applied for any generic data).

[RFC 5544](#) offers a way to apply TSP to any generic data without signing this data. TSP specification makes heavy use of PKI and X.509 certificates.

Timestamping services are provided by certificate authorities as a supplementary service. There also exist independent timestamping services.

You can run your own timestamping service, however timestamping requires use of special certificate (its key usage extensions are to be set in a specific way), so regular SSL or code signing certificates won't work.

Talking about "timestamping authorities" - you send them a hash (calculated during signing) and they sign this hash using their certificate. It's their business to keep the private key protected, and they usually charge for it.

The idea about third-party authority is that it certifies time. If you sign the data, you can put any time to the signature, and there's no way to check if it's correct or you have forged it. Only trusted third-party authority can be a proof of correctness of the timestamp.

Answer: RFC3161 is not the only way of secure timestamping.

A current area of research is to develop schemes where you have to put less trust in the third-party authority issuing the time stamps. With RFC3161-based timestamps you are more or less required to completely trust the authority. This presentation gives an overview of alternatives, most based on [linking schemes](#). The idea is quite attractive because the timestamps would be under public scrutiny and there's no secret key

involved that could possibly be leaked, thus providing inherently better security than today's standard RFC 3161 timestamps

897. <https://stackoverflow.com/questions/3829546/how-can-i-digitally-sign-logs-to-ensure-that-they-have-not-been-modified>

Title: How can I digitally sign logs to ensure that they have not been modified

Question: In our application logs must be signed in order to prove that they have not been changed after they happened.

This means that they must be signed using some sort of timestamp that links the signature with the time at which the log was written and signed.

This way the log cannot be modified and signed again without changing that timestamp - and therefore any modification attempt could be detected.-

Is there a standard way to do this?

Answer1: Eugene Mayevski is right, CAdES signature timestamped with the use of external timestamping service will do the job. However, everything depends on the exact threats to the logs your application creates and their potential originators. In the first approximation, signing a hash of the log with an external TSA (without local CAdES signing) would be enough for you.

Answer: Timestamping is part of CAdES standard, and this standard allows detached signatures. So yes, you can use digital signing with timestamping. The problem of altering the signed data or misusing the private key (stored in your application) is addressed by timestamping quite efficiently.

If you develop a .NET or Windows application, you can use PKIBlackbox package of our [SecureBlackbox](#) product to make CAdES signatures with timestamping.

898. <https://stackoverflow.com/questions/10440147/how-to-convert-java-timestamp-to-php-timestamp/22937702#22937702>

Title; how can I convert a Java timestamp like this one 1335997853142 to a format that php can read? 1335997853142 should be 02 May 2012 22:30:53.

But what ever I try I get errors or PHP says 1970-01-01 01:00:00 or 2038-01-19 04:14:07  
PLS help!!! I'm searching for over 1.5h for a soloution!

Answer: Date/Time: April / 08 / 2014 12:17:42pm UTC

Java timestamp: 1396959462222

PHP timestamp: 1396959462

Dividing by 1000 doesn't give exactly the right answer because it will give a double or float value, i.e. 1396959462.222 which is not what we want. We need an integer here

like 1396959462. So correct way to convert Java timestamp to PHP timestamp would be by using intval():

```
$php_timestamp = intval($java_timestamp/1000);
```

In a real example, in one of my Android apps where I send Java timestamp to a PHP server, I do it as mentioned above. Also, for good security practice, I add a preg\_replace() to make sure if someone added hack code in this field, it is removed:

899. <https://stackoverflow.com/questions/5846855/datetime-vs-timestamp-performance>

Title: Datetime VS timestamp performance

Question: i have a query.this should fetch records created 2 months ago. mysql table type is Innodb. which type do i use for date (time). Datetime or Timestamp int(11) or Timestamp for better performance. records is about 50000-100000

Answer: You're only dealing with a hundred thousand records?

Then this qualifies as a *micro-optimization*.

Pick the column type that *best fits* the data. DATETIME is going to end up being the best, most flexible column type for storing date and time information, because that's what it's designed to do.

Change this *only* when you can *prove* that another method is faster. Do this by **[benchmarking and profiling your code](#)** to find *real* bottlenecks.

900. <https://stackoverflow.com/questions/2695093/how-to-maintain-precision-using-datetime-now-ticks-in-c-sharp>

Title: How to maintain precision using datetime now ticks in C#

Question: I know that when I use DateTime.Now.Ticks in C# it returns a long value but I need to store it in an int variable and I am confused as to whether or not I can maintain that precision. As of right now I just have a cast

```
int timeStampValue = (int)DateTime.Now.Ticks;
```

This is a project constraint so I understand there is tons of precision lost. I guess I just couldn't think of another way to do a timestamp thing stored in an int that I could then compare to other timestamps.

Any suggestions or advice on how to maintain the precision, if possible, would be much appreciated.

Everyone's answers were illustrative. I actually ended up just setting up a process involving counters where when an item is used its counter is set to '0' and all other counters are incremented by 1. Then whatever is the highest counter is the next item to use.

Answer: Do you need all the most-significant bits? (e.g. which year)

Do you need all the least significant bits? (e.g. sub-nanosecond precision)

How long an interval do you need to measure over?

If you need millisecond precision only, why not lose the least significant bits

```
int timeStamp = (int)(DateTime.Now.Ticks >> 10) // lose smallest 10 bits
edit
```

the OP wants to store times of recently used items: if this is user selections for a single user, you probably don't want anything shorter than a second! as there are  $10^7$  ticks per second, there are  $\log(10^7)/\log(2)=23$  excess bits in the long value!

So how much space do you need? Well, your values ought to specify year, month, day, hour, minute and second; There are about 32 million seconds in a year = about 24 bits. add 3 bits if you want to store the last 10 years worth. So will easily fit into an int32. I'd suggest

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902. <https://stackoverflow.com/questions/15630565/maintain-server-time-even-in-offline-mode-javascript-html5>

Title: maintain server time even in offline mode

Question: I am stuck in a design scenario where I have a javascript/html5 based application which runs in **offline mode**. It is browser based and there are crud operations that happen.

Now when in **offline mode** I would like to maintain the **server time** in my application.

This server time will be needed for my crud operations etc

How do I maintain the **server time** using **javascript/html5** when running locally?

NOTE : The application contacts the server the first time and downloads some data, so I can fetch the time too.

\*\*

***I cannot calculate the server time by using the device's local time because the user can change the device's time and create fraud entries.***

Answer: You can't, there's no way of stopping users changing the time on the device and you can't contact an online server if you have no network connection.

If a verifiable audit is crucial then you should record the time when the updates hit the server rather than attempting to record the time the updates hit the device. Of course, nothing is stopping you doing both.

903. <https://stackoverflow.com/questions/39261767/is-it-possible-to-reduce-the-length-of-datetime-now-ticks-tostringx-and-stil>

Title: Is it possible to reduce the length of DateTime.Now.Ticks.ToString("X") and still maintain uniqueness?

Question: I have a limitation with some hardware with which I am working wherein I can only broadcast ( wirelessly ) 26 characters.

To overcome this limitation, the first broadcast transmits a timestamp converted into hexadecimal ( `DateTime.Now.Ticks.ToString( "X" )` ), along with the length of the message being transmitted ( also as a hexadecimal string ).

The receiving software tests for header messages, and when it confirms that it receives one, stores the time stamp ( reconverted into a long ) in a dictionary :

```

* _pendingMessages.Add(DateTime.Now.Ticks, Tuple.Create(MessageLength, string.Empty));
* T.Item1 = Message Length
* T.Item2 = Message (when Message.Length == Length, Pop Message)

```

`private static Dictionary<long, Tuple<long, string>> _pendingMessages;`

Unfortunately, the time stamp has to be passed each time, and it's... over half the allotted character length ( at 15 characters right now ).

So I was thinking that, rather than pass the entire time stamp, that I might be able to reduce it by summing the value of the characters of the hex string :

Answer: Here's something to kick-start some answers. I'm not claiming this is an optimal solution but I can get you millisecond precision with only 11 characters 8 characters 7 characters of encoded data.

Assuming millisecond accuracy is good enough, we can reduce the precision of our algorithm from the get-go. A tick represents 100 nanoseconds. There are 10,000 ticks in a millisecond. Here's the algorithm:

904. <https://stackoverflow.com/questions/49662295/how-to-maintain-the-milisecond-precision-of-a-sql-datetime6-when-extracting-an>

Title: How to maintain the milisecond precision of a SQL datetime(6) when extracting and reinserting with JDBC.

Question: I need to write a Java program which reads from a MariaBD instance, assembles an instance of a model class, and saves it into a mirror database instance, downstream. The upstream database uses the data type datetime(6), for microsecond precision. I need the field in the downstream database to have the same precision as the upstream database. However, as the data moves through the JDBC code, the last 3 decimal places of precision are lost.

I have experimented with different Java data types (LocalDateTime, Calendar, long) to represent the field while it exists in the Java app, but without success.

Finally, I tried skipping the model class, just to see what would happen, and passed the value from the upstream result set directly into a prepared statement to insert into the downstream (see code example below). Incredibly, that truncated the value to seconds.

Answer: This is an interesting idea. I'm assuming that you mean to use some SQL function to convert the data type as part of the select statement, rather than do all my manipulation in Java code. If I've interpreted incorrectly, please clarify. I'll see what I can do. It may take a bit of time to try it out. Thanks for the suggestion. – [ds390s](#) Apr 5 '18 at 3:38

905. <https://stackoverflow.com/questions/907048/change-timestamp-of-svn-revision/907069#907069>

Title: Change timestamp of SVN revision

Question: the situation is likely the one described in another thread (I am not allowed to add a hyperlink, because I am a new user) Of course, I have also already tried the solution suggested in that thread (i.e. changing the svn:date property in my case from 2003-01-01 to 2009-05-16), and checked that it really has changed. (What I've done for checking was: opened the property dialog with TortoiseSVN, issued the svnlook date command, and even tried svn log -r {2009-05-01}:{2009-05-25} According to all three checks, the timestamp of the last revision was set correctly (i. e. the first two checks returned the timestamp I had just set, and the log of the head revision was dumped as expected for the specified time interval.)

Thus the svn:date property seems to be set correctly, however, when I tell TortoiseSVN to display the list of logs, it still displays the entry for the head revision as if it had been committed with the old timestamp (2003-01-01). I have already updated the working

copy, and even checked it out again, and before that I manually updated the timestamp of the file corresponding to the head revision, but still the old date is displayed by TortoiseSVN.

After struggling with this issue for hours, I really do not know where else can that timestamp be stored. (And I am almost convinced that this whole issue is not a TortoiseSVN bug, as checking it out again should have removed the problem in that case).

Answer: Thanks, Peter that did the trick. I did not mention that I had even tried killing TSVNCache process, so I thought I had got rid off any cached information. Seems it's kind of too persistent...

(Not sure this should go as an answer, however I am not allowed to comment, as I do not have 50 points yet...)

906. <https://stackoverflow.com/questions/5702764/php-timestamps-between-dates/5702838#5702838>

Title: PHP: timestamps between dates

Question: I have an array with timestamps. If this timestamps are between two given dates I need to collect them into another array. Let me use an example:

Lets say \$array1[] has:

```
Array ([0] => 1299147500 [1] => 1299147453 [2] => 1299146476 [3] => 1299143220 [4] => 1297934349 [5] => 1297845742 [6] => 1297695551 [7] => 1296134251 [8] => 1295948452 [9] => 1295554308 [10] => 1295369389 [11] => 1295345559 [12] => 1295261432 [13] => 1295014784 [14] => 1294929846 [15] => 1294832875)
```

I need to create \$array2[] with those values from \$array1[] that are between Thursday February 17, 2011 and Thursday March 3, 2011 How can I do this?

1. Answer: Convert first and last date to timestamps using [strtotime\(\)](#)
2. For each item in the array, if it is between min and max, copy it to the second array.  
Sort the array of timestamps

907. <https://stackoverflow.com/questions/45945410/can-i-create-an-applescript-that-will-paste-a-web-text-clip-appended-with-source>

Title: Can I create an Applescript that will paste a web text clip appended with source attribution and a timestamp, while maintaining embedded links?

Question: Complete newbie here so please let me know if I need to clarify or otherwise improve my question. I have searched multiple times using different keywords and have not been able to find a solution to my issue.

I want to create a script (Applescript) that when triggered will allow me to paste a web text clip appended with source attribution and a timestamp, without loosing any possible embedded links within the selected text.

908. <https://stackoverflow.com/questions/19903490/how-to-read-timestamp-and-how-to-subtract-two-timestamps/19903585#19903585>

Title: How to read timestamp and how to subtract two timestamps

Question: I have the following code to get (timestamp) and (NOW timestamp). I subtract them to get the difference between them but I get a number like 123456 and I can not understand how much this number represent. I want to check if the difference between those two dates are less than one hour, how?

Answer: Instead of directly subtracting the timestamps try to diff the dates from which you can individually get hours. From then on one can do a simple maths to do the difference.

That's a more clear and maintainable approach

909. <https://stackoverflow.com/questions/6151084/which-timestamp-type-should-i-choose-in-a-postgresql-database/6158432#6158432>

Title: which timestamp type should I choose in a PostgreSQL database

Question: 116

I would like to define a best practice for storing timestamps in my Postgres database in the context of a multi-timezone project.

I can

1. choose `TIMESTAMP WITHOUT TIME ZONE` and remember which timezone was used at insertion time for this field
2. choose `TIMESTAMP WITHOUT TIME ZONE` and add another field which will contain the name of the timezone that was used at insertion time
3. choose `TIMESTAMP WITH TIME ZONE` and insert the timestamps accordingly

I have a slight preference for option 3 (timestamp with time zone) but would like to have an educated opinion on the matter.

Answer: First off, PostgreSQL's time handling and arithmetic is fantastic and Option 3 is fine in the general case. It is, however, an incomplete view of time and timezones and can be supplemented:

1. Store the name of a user's time zone as a user preference (e.g. `America/Los_Angeles`, not `-0700`).
2. Have user events/time data submitted local to their frame of reference (most likely an offset from UTC, such as `-0700`).
3. In application, convert the time to `UTC` and stored using a `TIMESTAMP WITH TIME ZONE` column.
4. Return time requests local to a user's time zone (i.e. convert from `UTC` to `America/Los_Angeles`).
5. Set your database's `timezone` to `UTC`.

This option doesn't always work because it can be hard to get a user's time zone and hence the hedge advice to use `TIMESTAMP WITH TIME ZONE` for lightweight applications. That said, let me explain some background aspects of this this Option 4 in more detail.

Like Option 3, the reason for the `WITH TIME ZONE` is because the time at which something happened is an **absolute** moment in time. `WITHOUT TIME ZONE` yields a **relative** time zone. Don't ever, ever, ever mix absolute and relative TIMESTAMPs.

**Answer2:** My preference is towards option 3, as Postgres can then do a lot of the work recalculating timestamps relative to timezone for you, whereas with the other two you'll have to do that yourself. The extra storage overhead of storing the timestamp with a timezone is really negligible unless you're talking millions of records, in which case you probably already have pretty meaty storage requirements anyway.

910. <https://stackoverflow.com/questions/32330575/what-are-the-advantages-of-the-created-at-and-updated-at-column-in-laravel/32330779#32330779>

Title: What are the advantages of the created\_at and updated\_at column in Laravel

Question: I am new to laravel. Recently, I have created my ER diagram for my app. While learning laravel I see that they have this timestamp property in the schema builder that creates a created\_at and updated\_at column. Base on my modeling I don't really need these extra columns, so it's a must to have them or what are the benefits of having these columns on every table.

Answer: Well, timestamps allows you to track about when the record has been updated recently. But its not mandatory in laravel. Certainly, there are times when you really don't need these columns. If you don't want to use the timestamps, remove it from the migration file and disable `created_at` and `updated_at` columns by specifying `public $timestamps = false` in your respective model.

**Answer2:** How to prevent timestamps usage in a model?

First of all to stop using the timestamps in a table don't include `$table->timestamps()` in your `Schema::table()` or `Schema::create()` implementation, then in every corresponding model class that has no timestamps included in its table write `protected $timestamps = false;`

What is the purpose of timestamps in Laravel?

The purpose of the timestamps is to track the date and time at which new records are inserted or updated so, whenever you insert a new record (which means creating a new model) the `created_at` and `updated_at` columns will be automatically filled with the current date and time, and every time you update a record its `updated_at` column gets updated with the date and time of the update.

I don't know which version of Laravel you are using but, [here's the Eloquent Model documentation](#) and, the [migration documentation too](#) for your reference.

Please try to go through the Laravel documentation carefully, it will give you a concrete understanding of how things work, and how to go through your development with it easily.

911. <https://stackoverflow.com/questions/22573455/daily-cron-to-poll-mysql-and-update-status-based-on-timestamp/22573528#22573528>

Title: Daily cron to poll mysql and update status based on timestamp

Question: I have a db full of email users that lists the date and time they signed up in a column called `signup_date` using the DATETIME type (it uses `now()`) and I also have an `expire_date` column which lists the same format but exactly a year later using `ADDDATE(NOW(), INTERVAL 365 DAY)`

I have added a status column with values being either 0 or 1. I guess this can be an ENUM type. Upon registration, status is set to 1 for active.

What I want is that if the timestamp of the `expire_date` is older than the current time, the cron should execute an update on that row of the user setting the status to 0. In postfix, I altered the query and appended the `status=1` so that it will select the user with only status of 1. If the status isn't 1, then the user will not be found and won't be able to log in. This cron can run daily. I'm not too anal about having it run every second. Users can renew their emails within the next day. So this is my simple way of expiring emails, if they are not active or so after a year. What I need help with is constructing the cron. Should this be done with just php or does some bash need to be used? Im unclear of how to structure the script. Thanks.

912. <https://stackoverflow.com/questions/18384242/entity-framework-db-first-timestamp-column-not-working>

Title: Entity framework DB First Timestamp column not working

Question: Using db first approach, I want my application to throw a concurrency exception whenever I try to update an (out-of-date) entity which its corresponding row in the database has been already updated by another application/user/session.

I am using Entity Framework 5 on .Net 4.5. The corresponding table has a `Timestamp` column to maintain row version.

Answer: have done this in the past by adding a timestamp field to the table you wish to perform a concurrency check. (in my example i added a column called `ConcurrencyCheck`)

There are two types of concurrency mode here depending on your needs :

**1 Concurrency Mode: Fixed :**

**2. Concurrency Mode: None**

If you wish to handle your own concurrency checking , i.e. raise a validation informing the user and not even allowing a save to occur then you can set Concurrency mode None.

1. Ensure you change the **ConcurrencyMode** in the properties of the new column you just added to "**None**". 2. To use this in your code , i would create a variable to store your current timestamp on the screen you which to check a save on.

913. <https://stackoverflow.com/questions/13928589/mysql-table-indexing-on-null-timestamp>

Title: mysql table indexing on null timestamp

Question: I have a mysql table with a timestamp field.

Most of the queries on this table will be where someIntegerField=? and theTimestampField is null.

Should I use the timestamp field as part of the index?

Or should I create and maintain another filed that will be set to 0 when the timestamp field is null and 1 otherwise ?

Other alternatives are also welcome.

Answer: Yes, you can use an index for "time between timestamp1 and timestamp2".

Default index type in MySQL / InnoDB is BTREE, which works with comparisons too (<, >, between), as well as prefixes. And yes, MySQL does use IS NULL/ IS NOT NULL in index conditions. <http://dev.mysql.com/doc/refman/5.5/en//is-null-optimization.html> for some table types (including InnoDB).

If you are on an earlier version of MySQL, you can always try "EXPLAIN": it will tell you if it uses an index or not (and which) for your query

914. <https://stackoverflow.com/questions/29672870/sql-server-timestamp-not-updating-on-data-update>

Title: SQL server TimeStamp not updating on data update

Question: We have a SQL Server database upgraded from version 2005 to version 2008. This database has a table in which we are using a `TimeStamp` column. We use this column to update another table in the database.

Recently we noticed data not being updated on the client table. On a close look into the data we realised that some columns have different values, but the timestamp in both master and client tables is the same.

We understand that timestamp is calculated and maintained by SQL Server on addition/updation. My question: is there a scenario where data on the row is changed, but timestamp does not get updated?

Answer: I believe Timestamp is just a datatype.

If you do not want to supply the current time with each UPDATE, You could add a trigger to the table, and code in an update of the timestamp column (UPDATE inserted).

The value you are seeing now is either supplied in the INSERT statement or set by default, eg to `get_date()` by the table definition.

915. <https://stackoverflow.com/questions/7291104/update-timestamp-column-in-application-or-database>

Title: Update timestamp column in application or database?

Question: I have date\_created and date\_modified columns on each table in database.

What are advantages/disadvantages setting timestamp columns at database using MySQL triggers vs setting them at application layer using PHP?

Which is easier to maintain and have better time synchronization when deployed across on many servers?

EDIT: since Johan suggested setting timestamps in database is good, are these correct implementations? additionally, is it good practice to have date\_created and date\_modified on every table? or do you recommend adding them on certain tables?

Answer: Timestamp in the database.

If you replicate in a master-slave setup, database timestamps are correctly replicated (using the original timestamp).

You do not (!) set timestamps in triggers.

Instead you specify them in the table definition, MySQL will automatically set the correct timestamp on insert and/or update.

You only have to set them once, when you create (or alter) the table and that's it.

Could not be easier.

It's you

r discretion regarding which tables should have timestamp columns. In our production environment, every table has these columns.

However, we also set the values in code. I believe that this was done so that the dates were in full control of the application. Know that either way you do it, replication will be fine. If you do set the dates in the application and you want DB server time instead of application server time, simply set the columns using MySQL's NOW() function.

916. <https://stackoverflow.com/questions/1759645/connection-time-zone-issue-with-jora-eclipse-plugin/1759863#1759863>

Title: connection time zone issue with jOra eclipse plugin

Question: -1

I started using the jOra eclipse plugin. The plugin seems pretty robust and I'm hoping to stop using SQLDeveloper for 95% of my database needs.

Many of our tables have columns of type TIMESTAMP with LOCAL TIME ZONE. I can connect to the oracle DB using a jdbc string and the plugin seems to function very well. However, when I try to update one of these TIMESTAMP with LOCAL TIME ZONE values, I get a sql exception: java.sql.SQLException: connection session time zone was not set.

Does anyone know how I can set the time zone through the jdbc connection url? jOra doesn't seem to support adding custom connection properties, so the connection URL is really my only option.

Update: Running version 1.0.1, which I believe is the latest version.

Update2: Apparently I can perform an update statement in the sql worksheet just fine, just can't use their detail browser interface to update.

Answer: What version do you use? According to their release notes this issue was already fixed in 0.9.0. Consider upgrading. If still in vain, I'd report a bug over there, they seem to maintain it well enough.

917. <https://stackoverflow.com/questions/57068602/is-there-a-reason-not-to-put-timestamps-in-every-table/57075412#57075412>

Title: Is there a reason not to put timestamps in every table?

Question: 1

I'm adding `created` and `updated` timestamp columns to some important tables and wondering to myself why I shouldn't put them in nearly every table 'just to have' since storage is cheap. Is that bad practice in some way? Am I being pedantic?

918. <https://stackoverflow.com/questions/57068602/is-there-a-reason-not-to-put-timestamps-in-every-table/57075412#57075412>  
Title: setting creation or change timestamps

Question: Using `utimes`, `futimes`, `futimens`, etc., it is possible to set the access and modification timestamps on a file.

Modification time is the last time the file data changed. Similarly, "ctime" or change time, is the last time attributes on the file, such as permissions, were changed. (Linux/POSIX maintains three timestamps: `mtime` and `ctime`, already discussed, and '`atime`', or access time.)

Is there a function to set change timestamps? (Where "change" is the attribute modification or '`ctime`', *not* modification time '`mtime`'.) (I understand the cyclic nature of wanting to change the change timestamp, but think archiving software - it would be nice to restore a file exactly as it was.)

Are there any functions at all for creation timestamps? (I realize that `ext2` does not support this, but I was wondering if Linux did, for those filesystems that do support it.) If it's not possible, what is the reasoning behind it not being so?

Answer: According to <http://lists.gnu.org/archive/html/coreutils/2010-08/msg00010.html> `ctime` cannot be faked (at least it's not intended to be fakeable):

POSIX says that `atime` and `mtime` are user-settable to arbitrary times via the `utimensat()` family of syscalls, but that `ctime` *must* unfakeably track the current time of any action that changes a file's metadata or contents.

If you just need to change a file's `ctime` for some testing/debugging, `bindfs` might be helpful. It's a FUSE filesystem which mounts one directory into another place, and can do some transformation on the file attributes. With option `--ctime-from-mtime` the `ctime` of each file is the same as its `mtime`, which you can set with `touch -t`.

919. <https://stackoverflow.com/questions/44340193/oracle-timestamp-with-timezone-replace-date-portion-to-current-date>

Title: Oracle timestamp with timezone: replace portion to current data

Question: I have a oracle table for maintaining cutoff time. here we are storing cutoff time for various securities.. currently we are defaulting date portion of cutoff to 1st Jan 1970. The requirement is to replace this date portion with current date without changing time and timezone portion of cutoff.

Answer: You could calculate the number of days between today and 1970-01-01, and then add that as a day-to-second interval to your cutoff timestamp value.

920. <https://stackoverflow.com/questions/28140159/php-set-timestamp-on-sideload-and-on-form-submit/28140337#28140337>

Title: Php time stamp on sideload and on form submit?

Question: How is it possible to have two different timestamps in a form? The first one has to have the value from the sideload and the second one from the submission, so that I can compare the values and check if the form is sent between a period of time?

Answer: basically you want to know since how much time was the form sent to the client? You can send an input with the initial request time to calculate how much time has elapsed when you receive the form.

921. <https://stackoverflow.com/questions/16852813/retrieving-timestamp-of-mysql-row-creation-from-meta-data>

Title: Retrieving timestamp of MySQL row creation from meta data

Question: I have been maintaining a MySQL table of rows of data inserted from PHP code for about a year and a half. Really stupid, I know, I didn't include the timestamp for insertion of these rows.

Is there any possible way that I can retrieve the timestamp of creation of these rows through some metadata or some other way? (Of MySQL or PHPMyAdmin or some other possible ways?)

Answer: Unfortunately, there's nothing you can do in this case. If MySQL had a secret timestamp field, the general size of tables would increase by 4 bytes per row.

Answer: The only way you can get that timestamp, if it is saved somewhere on one of your servers. You have a web server, which you may keep archive of logs for. Or some other place where there is a timestamp of activity of PHP script making requests to the database.

Say you have web server logs and there is an entry for each or most of PHP script activity, then, potentially, you can parse that log, get the timestamp and map it to the rows in your database. As you can see it is quite labourious, but not utterly impossible.

As for MySQL (or any other database) normally they do not keep a big archive of past information. Main reason for that - it is updo developer or designer of the application to decide what information should be kept or not. Database keeps only data needed for all its parts to run healthy.

Just had an idea, that is you have transaction log archive (which I really doubt), then you can re-run them on a back up of a database and may be they (transaction logs) contain timestamp of a row being added or changed.

922. <https://stackoverflow.com/questions/8130594/how-to-convert-date-strings-to-timestamp-without-knowing-the-date-format/8133916#8133916>

Title: How to convert date strings to timestamp without knowing the date format

Question: I am trying to write a query to insert a value into a `timestamp with no timezone` data type field. The value is coming from CSV file.

The version I am working with is **PostgreSQL 8.1.21**.

The CSV file upload is done by the client and it has a date column. The date sometimes comes as '28-Sep-13' and sometimes as '28/09/2013' formats.

I tried to use the following to cast the string into timestamp: `str_date::timestamp`.

This works fine if `str_date` is something like '28-Sep-13' but it won't work if the incoming date has the format '28/09/2013', when this error occurs:

ERROR: date/time field value out of range: "28/09/2013"

HINT: Perhaps you need a different "`datestyle`" setting

Basically the client keeps changing the date format in the uploaded CSV file.

Is there a way to convert the date strings into timestamp depending on its actual format?

Answer: I agree with Erwin, but I would try create database function (PL/pgSQL, PL/Python or other language) that can convert various date strings into date. In Erwins answer you can see WHEN ... THEN and you can use it. Such function will be easier to test and maintain.

923. <https://stackoverflow.com/questions/1638579/how-to-determine-the-localtime-of-a-timestamp-for-different-timezones/1663037#1663037>

Title: How to determine the localtime of a timestamp for different timezones?

Question: I got UTC timestamps and want to display them for different timezones.

Maybe an example can clarify what I am trying to do:

Given the timestamp 1259431620000 those times should be displayed:

Atlanta 13:07

San Francisco 10:07

London 17:07

Sydney 04:07

The cities might change but I guess you get what I am looking for.

Is there a javascript library or a common solution that deals with the daylight saving?

I all ready have a list of all the time zones.

**As the daylight saving is an easy and common problem I thought there might be a library or a script dealing with them.**

Answer: A comprehensive source for timezone information is the Olson list. It is widely used in the UNIX world, and also available in e.g. Python in the form of pytz. It appears that someone has created some code that makes it available in JavaScript also, as mentioned in an older SO question.

This seems to be pretty much exactly what you're looking for ;)

924. <https://stackoverflow.com/questions/57370800/how-to-access-global-nativeperformancenow-in-react-native-production-build-or>

Title: How to access global.nativePerformanceNow() in react native production build? Or any other way to measure timestamps.

Question: I am trying to measure how long does it take for images to load in a react native app on my users' devices in different countries.

In debug mode there is performance.now() that creates timestamp that I then send as a property of the event to Amplitude.

But performance.now() is a JS method and is not available in Release builds for users. There is an undocumented global.nativePerformanceNow method

```
const loadStartAmplitudeEvent = () => {
 if (R.not(__DEV__)) {
 const timeStamp = global.nativePerformanceNow();
 amplitude.logEvent('Photo On Load Start', {
 uri, timeStamp,
 });
 }
};
```

For example, that's how I create an event with a timestamp to send to amplitude, but I get an error, what am I doing wrong? Thanks a lot! Should i use some other method? Is the global.nativePerformanceNow → g.nativePerformanceNow transformation messing it up?

925. <https://stackoverflow.com/questions/57012480/datetime-fromtimestamp-takes-longer-than-datetime-utcfromtimestamp>

Title: datetime.fromtimestamp() takes longer than datetime.utcfromtimestamp()

Question: I have written a statistics / ML program that performs some data analysis on Time Series data. Surprisingly, when I get timestamps using the fromtimestamp() method, my program executes in roughly 15 seconds, whereas when using the utcfromtimestamp(), it executes in a second or less.

To test and compare their runtimes, I ran a python program:

```
timestamp = datetime.now().timestamp()

start = datetime.now()
date1 = datetime.fromtimestamp(timestamp)
print(datetime.now() - start)
```

```
start = datetime.now()
date2 = datetime.utcfromtimestamp(timestamp)
print(datetime.now() - start)
```

But I found `fromtimestamp()` to be consistently faster in this case.

Runtime of `fromtimestamp` - 00.000004

Approx Runtime of `utcfromtimestamp` - 0.000267

In my program though, `fromtimestamp()` takes roughly 0.4 seconds.

Are there some hidden factors at play here? Note, in my ML program I do threading, and multiprocessing. I'm not sure if that may be the factor at play here.

Answer: The hidden factor is that `datetime.fromtimestamp()` produces **local time**. From the [documentation](#):

Return the local date and time corresponding to the POSIX timestamp

while `datetime.utcfromtimestamp()` returns UTC time:

Return the UTC datetime corresponding to the POSIX timestamp

A POSIX timestamp represents time in UTC, *always*. So it is much simpler to convert that number into a UTC `datetime` object (no timezone conversion required) versus having to look up the system timezone and then applying the timezone adjustments required.

The difference between the functions basically comes down to using `time.localtime()` vs `time.gmtime()`, which are covered by the `localtime_r` / `gmtime_r` functions (on POSIX systems) or the `localtime_s` / `gmtime_s` functions (on Windows).

926. <https://stackoverflow.com/questions/54629397/kafka-message-timestamps-for-request-response>

Title: Kafka message timestamps for request/response

Question: I am building a performance monitoring tool which works in a cluster with Kafka topics.

For example, I am monitoring two topics: `request`, `response`. I.e. I need to have two timestamps - one from `request` and another from `response`. Then I could calculate difference to see how much time spent in a service which received a request and produced a response.

Please take in the account that it is working on a cluster, so different components may run on different hosts, hence - different physical clocks - so they could be out-of-sync and it will distort results significantly.

Also, I could not reliably use the clock of the monitoring tool itself, as this will influence timing results by its own processing times.

So, I would like to design a proper way which is reliably calculate time difference. What is most reliable way to measure time difference between two events in Kafka?

Answer: We had similar problem before and solution we had was setting up NTP ( network time protocol).

In this one of your node act as NTP server and runs demons to keep time in sync across all your nodes we kept UTC and all other nodes has NTP clients which kept same time across all the servers

### Solution 2:

Build a clock common API for all your components which will provide current time. This will make your system design independent of node local clock.

927. <https://stackoverflow.com/questions/51651646/postgres-select-next-following-timestamp-very-slow>

Title: Postgres select next following timestamp very slow

Question: I want to find for each timestamp in my table the next following one. The query works fine on a very small dataset (20 rows) but when I use it for a dataset with over 25000 rows it is extremely slow. Even after waiting several minutes I still get no result. Is there any way to improve the performance of my query?

Answer: You can use a window function to get a value from the next record in your result set. Combine this with sorting by your timestamp to achieve the same functionality.

```
select
 mytime,
 lead(mytime) over(order by mytime asc) as nexttime
from
 mydata
• Window function overview
• Window functions and operators
```

928. <https://stackoverflow.com/questions/44138590/get-last-modified-time-in-javascript>

Title: Get last modified time in JavaScript?

Question: Appending "?" + Math.floor((Math.random() \* 10000)) disables caching altogether. What I would like to do instead, is append a time stamp of the last modified time of the file. Then the file can be cached but only when it is up to date. How can I efficiently get the last modified time of the file?

Answer: The file that contains the loadJS, already contains a timestamp generated in PHP. I've decided to include in that file a variable containing the last time any script was modified. I can automate all of that in PHP, considering the JavaScript files are modified from within my website. To do this I will use file\_get\_contents, modify the line with a timestamp, then file\_put\_contents. This may seem extremely inefficient but considering, only I will be able to modify JavaScript files and none of my clients will, then I guess it will suffice.

929. <https://stackoverflow.com/questions/27579104/easy-and-fast-way-to-format-a-timestamp>

Title: Easy and fast way to format a timestamp

Question: We have some timestamps represented as long in millis since epoch. Within strings for logging, exceptions, or `toString()` methods, these timestamps need to be formatted. A simple and clean format is enough.

So, what is the simplest and fastest method for formatting a timestamp in Java?

## Requirements:

- input timestamps represented as long in millis since epoch
- output should be a string
- fast
- low CG overhead
- a simple and clean output is sufficient, since it is only for internal purposes (debugging and logging), e.g. something minimal: 20141220 174522.23
- if possible within JDK
- the time zone is the system time zone

In particular, did somebody did a benchmark of JDK methods that can be used for this?

Actually I don't want to use `SimpleDateFormat`, since I believe its flexibility comes with too much overhead.

Answer: Apache Commons Lang's `FastDateFormat` class is absolutely a good alternative to `SimpleDateFormat`. It's fast and also Thread-Safe (especially useful in multi-threaded server environments). All patterns are compatible with `SimpleDateFormat` (except time zones and some year patterns).

The summary of the constructor is :

```
FastDateFormat(String pattern, TimeZone timeZone, Locale locale)
You could find more info at FastDateFormat
```

930. <https://stackoverflow.com/questions/21044892/db-performance-of-storing-timestamp-as-date-vs-double-epoch>

Title: DB performance of storing timestamp as Date vs Double [epoch]

Question: In DB2, I have to store records with granular level timestamps [microsec]. I went for double datatype and stored unix epoch time.

However, I need some recommendations from performance a standpoint of CRUD operations.

Note: My app doesn't need dates earlier than 1970.

Answer: Are you aware of the fact that floating point numbers are an approximation? If for some reason you insist on using the epoch values as opposed to the `TIMESTAMP` datatype, you may want to consider using `BIGINT` instead

931. <https://stackoverflow.com/questions/21044892/db-performance-of-storing-timestamp-as-date-vs-double-epoch>

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932. <https://stackoverflow.com/questions/18593903/find-rare-events-in-flowing-window-on-timestamp>

Title: Find rare events in flowing window on timestamp

Question: which is dead slow. :-(

Any suggestions on how to improve performance? I am working on > 1 mio rows here and might need to find those "rare events" on a regular basis.

Answer: This can be faster, yet (improving the [1st solution of @Roman](#)).

```
SELECT id, ts, ct
FROM (
 SELECT id, ts, ct
 ,lag(ts, 1, '-infinity') OVER (ORDER BY ts) as prev_ts
 ,lead(ts, 1, 'infinity') OVER (ORDER BY ts) as next_ts
 FROM tbl
 WHERE ct <> 0
) sub
WHERE ct = 1
AND prev_ts < ts - interval '10 min'
AND next_ts > ts + interval '10 min'
ORDER BY ts;
```

- Handling of the corner cases of "no leading / lagging row" can be much simplified with the following two pieces of information:
  - Postgres knows the [special timestamp values -infinity and infinity](#).
  - [lead\(\)](#) and [lag\(\)](#) support default values.
- **Subqueries** are generally more efficient than CTEs (some exceptions apply), since CTEs introduce optimization barriers (by design and on purpose). If performance matters, use CTEs only when you *need* them.

Also:

- I use **proper column names** instead of `timestamp` and `count`, thereby removing the need to double-quote identifiers. Never use reserved words or basic type or function names as identifiers.
- None of this has anything to do with [plpgsql](#), which is the default procedural language of Postgres.

[SQL Fiddle](#).

Index

Since we are dealing with a **big table** (> 1 mio rows) and are only interested in "rare events" the important thing for performance is a [partial index](#) like the following:

```
CREATE INDEX tbl_rare_idx ON tbl(ts) WHERE ct <> 0;
```

If you are on **Postgres 9.2 or later** and given some preconditions, make that a [covering index for index-only scans](#).

```
CREATE INDEX tbl_rare_covering_idx ON tbl(ts, ct, id)
WHERE ct <> 0;
```

- Order of columns is important. `ts` must come first, `ct` should come next. Other columns you need in the `SELECT` follow.
- Read the [page about index-only scans in the Postgres Wiki](#) for details!

Test with [EXPLAIN ANALYZE](#) to see which query is faster and whether the index is used.

933. <https://stackoverflow.com/questions/16767885/mysql-timestamp-column-sometimes-receives-value-which-is-well-after-the-insert-c>

Title: MySQL timestamp column sometimes receives value which is well after the `INSERT` completes

Question: **NOTE** The problem was solved: it seems this was caused by a later `REPLACE` on the same record.

I have a table with a timestamp column marking when a record was inserted:

```
insert_timestamp timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE
CURRENT_TIMESTAMP
```

The table has grown quite big over time - currently ~5.7M records.

To help you understand why I'm asking this, I need to explain that I have an application that tries to make use of the inserted data as soon as it's inserted, in an asynchronous manner from the code that inserts the record into the DB. In many cases it works nicely, and I see that the process is nearly instantaneous. However, I also see some cases where the `insert_timestamp` value is much larger than the time the record was inserted. The MySQL documentation for the `TIMESTAMP` data type does not have any explanation why this might happen.

My suspicion is that this might be due to index rebuilding issues, although I don't understand why the timestamp cannot be set to the moment of the insertion.

Do you have idea why this happens ? any insight or thoughts will also be appreciated.

Thanks, Yaron

Note: although the `insert_timestamp` column is defined with `ON UPDATE`, records in this table are never really updated.

934. <https://stackoverflow.com/questions/16202612/best-way-to-check-for-updated-rows-in-mysql>

Title: Best way to check for updated rows in MySQL

Question: I am trying to see if there were any rows updated since the last time it was checked. I'd like to know if there are any better alternatives to

```
"SELECT id FROM xxx WHERE changed > some_timestamp;"
```

However, as there are 200,000+ rows it can get heavy pretty fast... would a count be any better?

"SELECT count(\*) FROM xxx WHERE changed > some\_timestamp;"

I have thought of creating a unit test but I am not the best at this yet :)

Thanks for the help!

---

EDIT: Because in many cases there would not be any rows that changed, would it be better to always test with a MAX(xx) first, and if its greater than the old update timestamp given, then do a query?

Answer: If you just want to know if *any* rows have changed, the following query is probably faster than either of yours:

`SELECT id FROM xxx WHERE changed > some_timestamp LIMIT 1`

Just for the sake of completeness: Make sure you have an index on `changed`.

#### Edit: A tiny performance improvement

Now that I think about it, you should probably do a `SELECT` change instead of selecting the `id`, because that eliminates accessing the table *at all*. This query will tell you pretty quickly if any change was performed.

`SELECT changed FROM xxx WHERE changed > some_timestamp LIMIT 1`

It should be a tiny bit faster than my first query - not by a lot, though, since accessing a single table row is going to be very fast.

#### Should I select MAX(changed) instead?

Selecting `MAX(changed)`, as suggested by Federico should pretty much result in the same index access pattern. Finding the highest element in an index is a very cheap operation. Finding any element that is greater than some constant is potentially cheaper, so both should have approximately the same performance. In either case, both queries are extremely fast even on very large tables if - and only if - there is an index.

#### Should I first check if any rows were changed, and then retrieve the rows in a separate step

No. If there is no row that has changed, `SELECT id FROM xxx WHERE changed > some_timestamp` will be *as fast as* any such check making it pointless to perform it separately. It only turns into a slower operation when there are results. Unless you add expensive operations (such as `ORDER BY`), the performance should be (almost) linear to the number of rows retrieved.

935. <https://stackoverflow.com/questions/8733718/calculate-number-of-concurrent-events-in-sql>

Title: Calculate number of concurrent events in SQL

Question: I have a table that holds phone calls, with the following fields:

- ID
- STARTTIME
- ENDTIME
- STATUS
- CALL\_FROM

- CALL\_TO

There are 2,9 million records loaded into a local PostgreSQL database. I added indexes on ID (unique index), starttime and endtime.

Searching on stackoverflow, I found some useful SQL and modified it to what I think logically should work. The problem is that the query runs for many hours and never returns:

```
SELECT T1.sid, count(*) as CountSimultaneous
FROM calls_nov T1, calls_nov T2
WHERE
 T1.StartTime between T2.StartTime and T2.EndTime
 and T1.StartTime between '2011-11-02' and '2011-11-03'
GROUP BY
 T1.sid
ORDER BY CountSimultaneous DESC;
```

Can someone please either suggest a way to fix the query/index so that it actually works or suggest another way to calculate concurrent calls?

Answer: 1.) Your query did not catch all overlaps - this was fixed by the other answers, already.

2.) The data type of your columns `starttime` and `endtime` is `timestamp`. So your `WHERE` clause is slightly wrong, too:

```
BETWEEN '2011-11-02' AND '2011-11-03'
```

This would include '2011-11-03 00:00'. The upper border has to be **excluded**.

3.) Removed the mixed case syntax without double-quotes. Unquoted identifiers are cast to lower case automatically. To put it simple: Best don't use mixed case identifiers at all in PostgreSQL.

4.) Transformed the query to use explicit JOIN which is always preferable. Actually, I made it a LEFT [OUTER] JOIN, because I want to count calls that overlap with no other calls, too.

5.) Simplified the syntax a bit to arrive at this base query:

```
SELECT t1.sid, count(*) AS ct
FROM calls_nov t1
LEFT JOIN calls_nov t2 ON t1.starttime <= t2.endtime
 AND t1.endtime >= t2.starttime
WHERE t1.starttime >= '2011-11-02 0:0'::timestamp
AND t1.starttime < '2011-11-03 0:0'::timestamp
GROUP BY 1
ORDER BY 2 DESC;
```

This query is **extremely slow** for a big table, because every row starting on '2011-11-02' has to be compared to every row in the whole table, which leads to (almost)  $O(n^2)$  cost.

936. <https://stackoverflow.com/questions/5753461/comparing-timestamps-between-different-machines>

Title: Comparing timestamps between different machines

Question: The environment I'm working in involves **multiple machines (Linux) on a LAN processing data in a chain**. I'd like to **timestamp** things in a way so I can see when it

is received/sent by each node to later compare the timestamps for the whole chain. This is a low-latency system.

I would like to understand if it is feasible to compare timestamps taken on different machines with resolution microseconds. What kind of services does one usually use to synchronize the clocks and what resolution is possible to expect? What about clock drifts and other things?

E.g. N nodes and all need to have the clocks synchronized on the second/millisecond/microsecond, is that possible, what is required and what is the overhead?

And of course I'd like it to be as non-intrusive to the network and processing time as possible. ;-)

Am I completely looking at something impossible or can this be done?

Answer: If all your machines are within a LAN you can probably achieve an accuracy of 200-500 microseconds using a local NTP server. This isn't particularly network or CPU intensive.

937. <https://stackoverflow.com/questions/4209731/cheapest-way-to-generate-timestamps-under-windows>

Title: Cheapest way to generate timestamps under windows

Question: What would be the fastest way to generate a timestamp for tons of events on windows?

A resolution of milliseconds is fine.

The obvious options are GetLocalTime(), GetTickCount() or even QueryPerformanceCounter().

Which of those (or some other candidates) requires the least amount of clock cycles?

Answer: The fastest possible way is to use x86 instruction [RDTSC](#). It has several drawbacks, so please read the documentation. If you don't like inline assembly, VS has an intrinsic for it: `_rdtsc()`

Answer2: QueryPerformanceCounter() and GetTickCount() will get you the amount of time elapsed since the machine was started, and won't directly yield a timestamp. You could, in theory, store the time the machine was started and use those as an offset to get the current time, however I'm not sure how accurate that would be.

If millisecond accuracy isn't required, you could also look at the [timeQ](#) function and its variants. It will give you the time elapsed since the epoch in seconds. This should be quite fast and can be stored in its raw format until you need to display or manipulate it. If performance is your biggest concern then you should profile each of the alternatives you come up with (most likely using QueryPerformanceCounter) and let that decide for you. I also think that the performance of a timestamp function is probably of little importance in most serious applications, so maybe give focus to the more complex parts of your application first.

938. <https://stackoverflow.com/questions/2917342/sql-timestamp-function>

Title: SQL timestamp function

Question: When is the timestamp function required? Is there a difference in performance?

Answer: If ts is a string type:

- 1st one is comparing like for like as strings
- 2nd one will cause ts to be converted to date/time

If ts is a date/time type,

- 1st one will convert the constant to the same date time type as the ts column
- 2nd one is comparing like for like as date/time

If ts is string type, the 2nd one is worst to use because ts will be converted thus invalidating any indexes.

If ts is date/time, there is no difference

Data type precedence applies to most DB engines.

Answer: It depends on your SQL implementation, although assuming the column "ts" is some date/time type, there's practically no difference.

Most SQL implementations have a cast mapping that instructs the engine how to automatically convert data types that fit some pattern, especially if a literally comparison makes no sense. For example, literally comparing a timestamp to a string doesn't make much sense. However, most engines have a mapping that lets it know a string formatted like a date can be automatically converted to a timestamp, in order to be compared to another timestamps.

939. <https://stackoverflow.com/questions/19349849/getting-a-secure-timestamp-that-cannot-be-spoofed>

Title: What is the best approach to fetching a certified time stamp from the internet from within my app?

I have a licence file that expires at a regular period and I must make sure that the certificate is not expired.

Is such a thing even possible/ does it exist? Ideally when my app runs, it should get a secured/certified time stamp representing current time, but I want to make sure it cannot be faked by the application runner.

Are there any services that offer this out there? It can be commercial, I just don't know where to start and am looking for some pointers

Answer: Look at Timestamping protocol (RFC 3161). It gives you secure time. To properly use the protocol you can ask the server timestamp some random hash (the server doesn't care), then validate the timestamp and if it's ok, use the time in the timestamp. That would be the most effective approach.

There was a TSP client available in BouncyCastle, if memory serves, and our SecureBlackbox product (including free [CryptoBlackbox](#) package) also includes a TSP client and powerful validation mechanisms.

940. <https://stackoverflow.com/questions/18910814/best-practice-to-generate-random-token-for-forgot-password>

Title: best practice to generate random token for forgot password

Question: I want to generate identifier for forgot password . I read i can do it by using timestamp with mt\_rand(), but some people are saying that time stamp might not be unique every time. So i am bit of confused here. Can i do it with using time stamp with this ?

### Question

What's best practice to generate random/unique tokens of custom length?

I know there are lot of questions asked around here but i am getting more confused after reading different opinion from the different people.

Answer: In PHP, use `random_bytes()`. Reason: your are seeking the way to get a password reminder token, and, if it is a one-time login credentials, then you actually have a data to protect (which is - whole user account)

So, the code will be as follows:

```
//$length = 78 etc
$token = bin2hex(random_bytes($length));
```

---

**Update:** *previous versions of this answer was referring to uniqid() and that is incorrect if there is a matter of security and not only uniqueness. uniqid() is essentially just microtime() with some encoding. There are simple ways to get accurate predictions of the microtime() on your server. An attacker can issue a password reset request and then try through a couple of likely tokens. This is also possible if more\_entropy is used, as the additional entropy is similarly weak. Thanks to [@NikiC](#) and [@ScottArciszewski](#) for pointing this out.*

For more details see

- <http://phpsecurity.readthedocs.org/en/latest/Insufficient-Entropy-For-Random-Values.html>

Answer2: The earlier version of the accepted answer (`md5(uniqid(mt_rand(), true))`) is insecure and only offers about  $2^{60}$  possible outputs -- well within the range of a brute force search in about a week's time for a low-budget attacker:

- [mt\\_rand\(\) is predictable](#) (and only adds up to 31 bits of entropy)
- [uniqid\(\) only adds up to 29 bits of entropy](#)
- `md5()` doesn't add entropy, it just mixes it deterministically

Since a [56-bit DES key can be brute-forced in about 24 hours](#), and an average case would have about 59 bits of entropy, we can calculate  $2^{59} / 2^{56} =$  about 8 days. Depending on how this token verification is implemented, [it might be possible to practically leak timing information and infer the first N bytes of a valid reset token](#).

Since the question is about "best practices" and opens with...

I want to generate identifier for forgot password

...we can infer that this token has implicit security requirements. And when you add security requirements to a random number generator, the best practice is to always use a **cryptographically secure pseudorandom number generator** (abbreviated CSPRNG).

941. <https://stackoverflow.com/questions/10022053/how-does-timestamp-helps-in-preventing-replay-attacks-in-webservices>

Title: How does Timestamp helps in preventing Replay Attacks in webservices

Question: I am trying to understand the concept of timestamps in request headers in web services but somehow still can't understand fully how it works.

I would appreciate it if someone can explain the end-to-end use of timestamps in request and response of web services.

Is it really a foolproof method of preventing replay attacks?

Answer: A timestamp by itself wouldn't be sufficient, but usually it is combined with a hashing mechanism to guarantee that the values haven't been tampered with.

The idea is that the client generates the parameters, and uses their private key to hash the parameters. The [hash + original values + public key] are then sent with the request. The server can use the public key to look up the private key, and ensure that the parameters are correct.

The timestamp is used, along with some threshold, to ensure that particular request can't be used more than once. If the threshold is small (a few hundred milliseconds) then a replay attack is virtually impossible.

942. <https://stackoverflow.com/questions/9330234/how-to-add-timestamp-to-flowplayer-secure-streaming-plugin-using-rtmpe-wowza>

Title: How to add timestamp to flowplayer secure streaming plugin (using rtmpe/wowza)

Question: I have been searching for the past 2 days to find a solution to this problem so any help would be greatly appreciated.

I am using a custom token (I recompiled plugin swf) with wowza server at the other end. It works fine but people can still copy our player code and play it on their site by linking to our swf.

I want to implement a timestamp into my secure streaming config. I added a timestamp and added the urlResolvers to the clip part but then my flowplayer gives me an error that it couldn't find the video (the invalid link is with the hash and timestamp).

My question is, if I use the timestamp in my player, what other configuration do I need to do? Do I need to do something to my wowza server? Because clearly, adding the timestamp, the server cant find the video.

943. <https://stackoverflow.com/questions/6726382/is-there-a-way-to-digitally-sign-documents-to-prove-they-existed-at-a-certain-po>

Title: Is there a way to digitally sign documents to prove they existed at a certain point in time.

Question: I'm curious if there is way to digitally sign documents (technically any piece of data), such as contracts or photos, so that 10 years from now, it can be proven that they are from this time, not forged 9 years from now.

For example, I could write a prediction of the future and sign it with conventional means to prove that I wrote it, then timestamp-sign it so that when it comes true, I can prove I predicted it.

One way I thought of is that there could be a timestamping authority. You send them the data, they make a hash of the data + timestamp and encrypt the hash with RSA using their private key. A signed document thus exists of: data, timestamp, encrypted hash.

10 years from now, I hash the data + supposed timestamp, and check if it matches with the encrypted hash that I decrypt using the authority's public RSA key (which I trust). If it does, I know the timestamp is valid.

I can see 2 problems with that though:

- An external authority is needed
- The authority's private key would need to be kept extremely secret, because if it's revealed, all documents signed with it turn invalid.

Can you think of a solution without (one of) these problems?

Answer: This is called *timestamping*. The most widely used mechanism is defined in TSP specification ([RFC 3161](#)) and some others. The alternative method is used in MS Authenticode, but it's not documented and is not compatible with TSP.

TSP is used as a supplementary function in several encryption and digital signature standards, such as PDF, XAdES, CAdES, PAdES (AdES stands for "Advanced encryption standard"). PDF, XAdES and PAdES standards are applied to certain type(s) of data. CAdES is universal format (as it can be applied for any generic data).

[RFC 5544](#) offers a way to apply TSP to any generic data without signing this data. TSP specification makes heavy use of PKI and X.509 certificates.

Timestamping services are provided by certificate authorities as a supplementary service. There also exist independent timestamping services.

You can run your own timestamping service, however timestamping requires use of special certificate (its key usage extensions are to be set in a specific way), so regular SSL or code signing certificates won't work.

Talking about "timestamping authorities" - you send them a hash (calculated during signing) and they sign this hash using their certificate. It's their business to keep the private key protected, and they usually charge for it.

The idea about third-party authority is that it certifies time. If you sign the data, you can put any time to the signature, and there's no way to check if it's correct or you have forged it. Only trusted third-party authority can be a proof of correctness of the timestamp.

Answer: Yes, there are commercial services that would securely timestamp documents or software.

There's an article in [Wikipedia](#) explaining this. Google quickly revealed [one such service](#) (I am not affiliated), I'm sure there are many more. There used to be a free one as well, but it's all a question of trust (i.e. whether the courts would trust "someone on the internet" vs. VeriSign).

Answer2: RFC3161 is not the only way of secure timestamping.

A current area of research is to develop schemes where you have to put less trust in the third-party authority issuing the time stamps. With RFC3161-based timestamps you are more or less required to completely trust the authority. This presentation gives an overview of alternatives, most based on [linking schemes](#). The idea is quite attractive because the timestamps would be under public scrutiny and there's no secret key involved that could possibly be leaked, thus providing inherently better security than today's standard RFC 3161 timestamps.

Answer3: I guess that depends on your controls. An external authority would work, but it's the same thing as certifying it internally, technically speaking. It just depends on who you trust. Are you looking at preventing users from falsely certifying documents, or your developers?

Answer4: So long as you aren't looking for something that lasts a really long time:

Encrypt the document and post it to one of the Usenet binary groups. Anyone can check the headers and see when it was received, you can decrypt the file (or provide the key as the case may be) and prove that it really is the data in question.

Since you don't control the file once it's posted games like only revealing the prediction that worked aren't possible.

944. <https://stackoverflow.com/questions/1206025/can-anyone-recommend-a-good-book-or-other-resource-on-ntfs-semantics>

Title: Can anyone recommend a good book or other resource on NTFS semantics?

Question: I'd like to improve my understanding of NTFS semantics; ideally, I'd like some kind of specification document(s).

I could (in theory) figure out the basics by experimentation, but there's always the possibility that I'd be ignoring some important variable.

For example, I'm having difficulty finding definitive information on the following:

(1) When do file times (created/modified/accessed) get set/updated? For example, does copying and/or moving a file affect any or all of these times? What about if the file is being copied/moved between volumes? What about alternate streams?

(2) How do sharing modes and read/write access interact?

(3) What happens to security information (SACL, DACL, ownership etc.) when a file is copied and/or moved?

As I said, I could probably "answer" these questions by writing some code, but that would only tell me how the specific operations I tested behaved across any machines that I ran the code on. I'd like to find a resource that can tell me how this stuff is *supposed* to behave, identifying all the variables that could affect the behaviour

Answer: Apparently there are no public non-NDA specifications. Projects such as [NTFS-3G](#) would greatly benefit from them, but they don't mention anything. A predecessor of NTFS-3G, called [linux-ntfs](#), has made some documentation on its own [here](#). Maybe that's good enough for you, maybe not.

945. <https://stackoverflow.com/questions/57778496/how-to-fix-stalled-browser-sync-client-causing-extremely-long-load-times>

Title: How to fix stalled browser-sync client causing extremely long load times?  
Question: My company site often has incredibly long load times. Though loading asynchronously, and so not often directly impacting user experience, our browser-sync client can take over a minute to return a timeout/stall/block, during which time the site appears to be loading in the tab. This also affects other tools which we may like to employ in connection with the site. We have a bit of a Frankenstein site at the moment, as it's partially hard coded and partially created through Wordpress - we hope to redo the site at some point.

Site: <https://piecestech.com> Stalled script: <https://piecestech.com:3000/browser-sync/browser-sync-client.js?v=2.18.12>

Any insight into why this is happening and what I can do about it? Thank you!

Reviewed in dev-tools, ensured a-sync loading, likely part of our Hubspot connection.

Firefox devtools shows "Blocked" return after 76 seconds last test round.

946. <https://stackoverflow.com/questions/50580392/firefox-javascript-while-loop-running-too-slow>

Title: Firefox: javascript while loop running too slow.  
Question: I was looking into getting all mondays in a month, in order to create a full list of weeks between two predefined dates and I found [this solution](#) on stackoverflow. It works like charm on chrome but not on firefox: takes too long and breaks. Debugging the code it turns out this bit of code takes a lot of time to execute:

```
// Get the first Monday in the month
while (d.getDay() != 1) {
 d.setDate(d.getDate() + 1);
}
```

I usually run my apps on chrome but I want the users to be able to run it on firefox if they prefer. So is there a way to do this without it breaking?

Answer: What exactly is d? The current date?

947. <https://stackoverflow.com/questions/45236853/how-do-i-compare-latency-and-timeouts-at-server-side-between-two-aerospike-clust>

Title: How do I compare latency and timeouts at server side between two Aerospike clusters of different versions - 3.8 and 3.14?

Question: I have two aerospike clusters running community editions -

- Older cluster with the servers having the following combinations - storing data in disk + i2.2xlarge instances + Aerospike build version 3.8.2.3
- Newer cluster with the servers having the following combinations - storing data in memory + r3.4xlarge instances + Aerospike build version 3.14.1.1 + using partition-tree-sprigs

I wanted to compare the server side latencies and timeouts on them. I enabled the asgraphite daemon which comes in-built with Aerospike, by the following command -

```
python /opt/aerospike/bin/asgraphite --start --prefix aerospike.stats -g <URL> -p <port>
```

I cannot see the latency stats against the old cluster in the graphite console (see highlight in screenshot) –

Answer: As you mentioned, the best resource is the [metrics reference manual](#) in the deployment section of the Aerospike docs. Locate the older, deprecated stat, and the description will tell you what the equivalent post [release 3.9](#) metric is called.

The [Stats and Benchmark Migration Guide for the 3.9 Release](#) details the different statistics. Specifically to latency, [Histograms from Aerospike Logs](#) has the breakdown of the latency histograms post-3.9, with the [pre-3.9 latency histograms](#) in a separate article.

Answer2: A convenient list of almost every stat and where they moved can be found in the schema file for our collectd plugin:

[https://github.com/aerospike/aerospike-collectd/blob/develop/aerospike\\_schema.yaml](https://github.com/aerospike/aerospike-collectd/blob/develop/aerospike_schema.yaml)

[Comment added here:]

Specifically for stat\_rw\_timeout:

It was originally under `service.stat_rw_timeout`. It is now split up to be `client_read_timeout` and `client_write_timeout`. It is under the `namespace` section. So in Graphite, it would have moved from `aerospike.{HOSTNAME}.service.stat_rw_timeout` to:

`aerospike.{HOSTNAME}.{NAMESPACE}.client_write_timeout` and `aerospike.{HOSTNAME}.{NAMESPACE}.client_read_timeout`.

Now this also means you'd need to add `-n` to your asgraphite parameters, since you're monitoring namespace metrics.

Don't look under the latency section (`aerospike.{HOSTNAME}.latency`).

948. <https://stackoverflow.com/questions/45013516/simple-sql-server-query-always-time-out>

Title: Simple SQL Server query always time out?

Question: We have a stored procedure that has been working perfectly for over 10 years. A few days ago it started timing out. I run it from the Query console in SQL Management Studio and it times out. I restart the server and then it runs in 1 second...

Answer: You should consider the changes happened to your system over these 10 years, maybe you have added some background services that is doing some heavy sql updates/insertions while you are running your query.

I think you can have a clear vision on the performance of your query if you run it on a staging server or a local machine( which normally have a different load of sql operations ), observe the time it takes to execute your query, do your tries from time to time.

If the execution time of your query on staging server is constant, then your query is not the cause of the issue.

949. <https://stackoverflow.com/questions/42498558/node-js-application-performance>

Title: Node.js Application Performance

Question: I currently have a node.js script sitting on Azure that gets a file (via a download URL link to that file) and base64 encodes it, and then sends this base64 encoded file back to the request source. The problem I am running into is performance based. The script below, in some instances, is timing out a separate application by having a run time over 30 seconds. The file in question on one of these timeouts was under a MB in size. Any ideas?

Answer: One idea: you are missing error handling.

If you get an error on the https.get(), you will just never send a response and the original request will timeout.

950. <https://stackoverflow.com/questions/36928554/mysql-query-working-for-hours-and-hours-and-never-finishing>

Title: MySQL query working for hours and hours and never finishing.

Question: I have been slowly building up a query, and when I got to this point, I did not change the number of rows to return or the number of "pitchers" to return data for; just how much data for each one, and my query has been spinning for 12 hours with no resolution in sight. Is there anything I could have done wrong in writing my query to make it be taking so long without any results? If you take away the "rsgames2" and "teamdata" tables, this same query only took about 25 minutes.

951. <https://stackoverflow.com/questions/34891477/cassandra-datatieredcompactionstrategy-sstables>

Title: Cassandra DateTieredCompactionStrategy SSTables

Question: My question is, Is it normal to have so many SSTables (2000)?

The other thing is we are experiencing `readtimeout` Exception for selection query. The selection query uses primary key `num_id` and clustering key `timestamp`.

The `readtimeout` is set to 10 seconds.

So, the other question is the `readtimeout` exception is caused by many SSTables or wide row? How to solve avoid this exception?

Answer: the problem is "`timestamp_resolution': 'MILLISECONDS'`" I've filed <https://issues.apache.org/jira/browse/CASSANDRA-11041> to improve documentation about this parameter

Answer2: My question is, Is it normal to have so many SSTables (2000)?

No, it's not normal. I think that in your case, the compaction is not fast enough to keep up with the ingestion rate. What kind of hard drive do you have for the Cassandra server ? Spinning disk ? SSD ? Shared storage ?

So, the other question is the readtimeout exception is caused by many SSTables or wide row?

It can be both, but in your case, I'm pretty sure that it's related to the huge number of SSTables

How to solve avoid this exception?

Check that your disk I/O can keep up. Use *dstat* and *iostat* Linux tool to monitor the I/O

952. <https://stackoverflow.com/questions/31959138/a-very-long-time-to-load-the-site>

Title: A very long time to load the site

Question: Help me find the reason why before downloading any of the pages is a delay of about 2 minutes, and then abruptly loaded site. No changes to the site did not do throughout the year. Before, everything was fine, 2 weeks ago is started. Site:

[www.proudandcurvy.co.uk](http://www.proudandcurvy.co.uk).

Answer: It's probably some kind of DNS timeout, is the web server configured to do DNS lookups? You really want to turn that off.

You use the Apache HTTPD, the configuration option that you should be looking for is

**HostnameLookups** and it should be set to **Off**.

953. <https://stackoverflow.com/questions/10175422/sql-runs-fast-in-ssms-slow-in-asp-net>

Title: sql runs fast in ssms slow in asp.net

Question: I have the same query running on 2 other site which work just fine. The only difference between the sites is that they are run on different databases and the slow site has a bit more than double the products (54000 products) on it compared to the other 2. All three sites and their databases are hosted on the same machine.

Answer: Chances are that you are hitting on a problem with parameter sniffing.

I suggest reading [Slow in the Application, Fast in SSMS?](#) by Erland Sommarskog to get a full understanding of the issue (long article but very good).

Answer2: Take a look at sys.dm\_exec\_sessions for your ASP.Net application and for your SSMS session. I will hazard a guess that at least one of your SET settings is different. This can contribute to different plans (ultimately this gets attributed to parameter sniffing) and the app side usually ends up worse off.

See these other questions for a lot more details:

[Stored procedure slow when called from web, fast from Management Studio](#)  
[Procedure times out from ADO.NET but not in SSMS](#)

## [Query times out when executed from web, but super-fast when executed from SSMS](#) [ADO .NET vs. SQL Server Management Studio - ADO performs worse](#)

Answer3: I had same issue, in my case it was related to MARS, so I removed `MultipleActiveResultSets=True;` from connection string and now running time are almost same (0.2s difference comparing to 4.5s)

Note: MARS = Multiple Active Result Sets. If you set this property on a connection string, you can run multiple queries on the same connection in an interleaved fashion. It's mainly intended to permit you to submit UPDATE statements as you are iterating through a result set.

Answer4: Are you using any `orm`? If you are using `nhibernate`, you can enable db tracing in `nhibernate` and see what could be the issue. Following are some of the scenarios that I observed in such scenarios:

1. implicit conversion which leads to bad plan choice (`nvarchar` being used instead of `varchar`). You can observe the `nhibernate` parameter mapping in its logs.
2. Lack of index

`Nhibernate` uses `log4net` and you just need to add an appender as mentioned here: <https://devio.wordpress.com/2010/04/14/logging-sql-statements-generated-by-nhibernate/>

954. <https://stackoverflow.com/questions/26127055/nginx-cant-serve-more-than-40-contemporary-users>

Title: Nginx can't serve more than 40 contemporary users

Question: I'm testing my Nginx web server (configured with CentminMod) with <https://www.blitz.io/> and the server returns timeouts when the connected users are about 40.

I can't understand why! It's Nginx, not Apache! Can anyone help me?

Answer: Questions on professional server- or networking-related infrastructure administration are off-topic for Stack Overflow unless they directly involve programming or programming tools. You may be able to get help on **Server Fault**

955. <https://stackoverflow.com/questions/21582226/tornado-asynchttpclient-requests-timing-out-under-medium-load>

Title: Tornado AsyncHTTPClient requests timing out under medium load

Question: I'm running a simple web app that uses a few web services for each request and I've found that the requests that our server makes sometimes time-out (the synthetic 599 error) even though the other service is responsive at all times (I've verified that).

Those are the kind of error messages that I get:

`HTTP 599: Connection timed out after 7005 milliseconds  
(timed out while connecting)`

`HTTP 599: Operation timed out after 5049 milliseconds with 0 out of -1 bytes received`

(timed out before receiving data)

```
HTTP 599: Operation timed out after 10005 milliseconds with 11197 out of 13047
bytes received
```

(timed out with data partially transferred)

I've been able to reproduce this in two different environments, in an Amazon EC2 mini instance and my Macbook Pro (i7). In the EC2 instance the timeouts start happening with as few as 2 concurrent clients making requests, the Macbook holds up until 8 concurrent clients, then it starts showing timeouts as well.

I've tried a few things like updating the Tornado version (2.2, 2.3.1, 2.4.1 and 3.1.1 if I remember well), changing the underlying AsyncHTTPClient implementation from the default simple one to the pycurl based and increasing the number of async clients (to 200), but the error is still happening.

I'm not sure what can I be possibly doing wrong, because this does not look like the promised scalability that Tornado should deliver at all...

Any hints?

#### **update**

just for the record, we were using memcache in an async callback, but the library wasn't async itself. I replaced it with: <https://github.com/dpnova/tornado-memcache/>  
That was the biggest issue I think, although we are still getting a 599 from time to time.

Answer: It sounds like your code might be blocking the event loop somewhere (for an integer number of seconds - do you have any calls to time.sleep()?). Try using IOLoop.set\_blocking\_log\_threshold to find places where the event loop is being blocked.

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957. <https://stackoverflow.com/questions/20150033/how-do-i-timeout-a-blocking-call-inside-an-ejb>

Title: How do I timeout a blocking call inside an EJB?

Question: I am in the process of developing an EJB that makes 10+ calls to other components (EJBs, Web services, etc.) as part of its business logic. In my case, performance is a huge concern. This EJB will be servicing a few million requests a day.

My question is: **For each of those 10+ calls, how can I enforce a timeout?**

I cannot wait more than 'n' seconds for any one of the calls to return. If a call takes longer than 'n' seconds, I will use a default response for processing.

I would normally use a Executor to solve this problem but, from what I understand, one shouldn't spawn threads from within an EJB as it may potentially interfere with the EJB's lifecycle.

Answer: since you are not providing much detail of your environment:

- use bean managed transactions and set the transaction timeout
- EE7: provides an managed executor service
- EE6: custom executor service as a JCA connector

958. <https://stackoverflow.com/questions/19689468/how-to-calculate-proper-timeout-or-eta-value>

Title: How to calculate proper timeout or ETA value

Question: The problem is as follows: I have a service broker which distributes different types of tasks to workers. These tasks are of different size and complexity and thus require a different amount of time to process.

Now I would like to calculate a time-out value for each type of service, so that after it has elapsed the client can be notified that the task took too long, and that likely something went wrong.

There are two options which I've tried, but both have flaws.

1. Do not calculate the time-out, but make it an configurable setting (annoying since it's pretty arbitrary)
2. Start with a very generous time-out and after each task calculate some sort of running statistic (like a running average + variance). This has the problem that it converges to the mean since longer running tasks get censored. Eventually allowing a far too narrow band of task durations.

Since the tail of the distribution of task durations is likely long (i.e. longer than a normal distribution) it is likely that some more complicated statistic is needed.

Is there an accepted way of calculating time-out values based on task durations?

959. <https://stackoverflow.com/questions/15126389/longer-send-timeouts-means-longer-delays-too>

Title: Longer send timeouts means longer delays too

Question: I'm getting frequent send timeout errors possibly from too much load on the database and the bulkiness of data. If sending the reply to a wcf request takes up 3 mins, then setting the timeout to 3+ mins would be enough.

**But does that also mean that port 80 will be busy for 3 mins and won't be sending other replies until the current one finishes?**

If that is the case then I would need to optimize my WCF and rebuild my indexes as well as probably do a few upgrades to the hardware of the server.

Answer: Yes, the WCF threading system does have a specific number of concurrent threads/processes it can handle based on your service throttling configuration and instance mode. It does not block port 80 for a single request so it will not hamper that; however, if you have a lot of simultaneous users, it could bog down the system if they are all running long service operation calls and using all your threads.

You should still take a look at optimizing your service/db. What are your normal clients using it for? If it is web, then obviously 3 mins is way too long to wait. At least I know I would be gone if something took that long!

As the phrase goes, there are many ways to skin a cat and without knowing your full system it would be hard to pick the single one to use, so here are some options (throwing more hardware at it should be last resort):

From a DB perspective, if getting the data is taking a long time, maybe you should look at possibly de-normalizing/pre-crunching the data to make it easier to retrieve.

From a service perspective there are ways to at least give control back to client so it can continue processing while waiting for the service operation to complete.

1. Use duplex calling with callbacks to client when finished
2. Use one way requests with an Id, with a manual client 'check for complete'
3. Use MSMQ to process and keep results for client to check when complete

960. <https://stackoverflow.com/questions/14001623/mod-rewrite-engine-enabled-slows-my-dedicated-beast-of-a-box-to-a-crawl>

Title: Mod\_rewrite engine enabled slows my dedicated beast of a box to a crawl

Question: I've been troubleshooting an issue with .htaccess on a script that I've purchased and it's causing me quite a bit of strife. If I have rewrite enabled and use Blitz.io for a 1-250 test, it gets to about 5 users before timing out on all requests. There is no server resource contention that I can see, when this event occurs, yet I do on occasion see the event from Apache that I've used the maximum connections up. This can't be right as I've set it to handle several thousand connections.

Further backing up the rewrite theory, if I disable rewrite and run a Blitz against the same php page it completes the test without errors or timeouts of any significance (it also breaks most of the script :)). I also notice that my response time in Blitz with rewrite off is about 250ms max, whereas if I enable the rewrite engine it shoots up to past one second.

Any suggestions would be greatly appreciated, I've searched quite a bit and haven't come up with much, granted I'm a re-write n00b.

Answer: Have you looked at your access logs and rewrite.logs (if you can temporarily enable the latter)?

One thing that does jump out is the Header directive for your furniture (css, jpegs, etc.) and specifically the must revalidate flag. This will force client browsers to issue a conditional GET for every image etc. This is not the default behaviour. Browsers will assume a cacheable life of 10% of the age of any static file (that is if it is 10weeks old, the browser will only revalidate the file once per week). OK most of these GETs will result in 304 "not modified" response, but this still means that Apache has to validate these requests, and this could easily increase the overall request rate to your server by 5-10x.

The "non last slash redirect" will fire for all URIs other than php, html, xml and txt files including jpeg's etc. The two REQUEST\_FILENAME conditions should immediately precede the REQUEST\_URI condition. Viz the ErrorDocument directive needs to be moved up 4 lines.

You also need to use test vectors to check out the single and other page regexps. They are valid syntax but won't give you what I think you want (e.g. [^//] is the same as [/]; .ht(m?m1?) matches shtmm1; the ^/\* should probably read [^/]\* so this rule currently only matches if ^([^//]+)/\* matches to the null string and thus degenerates to (^/\*)?.ht(m?m1?)\$.

I'd ask for my money back if I were you :-)

961. <https://stackoverflow.com/questions/12164172/slow-php-mysql-query-re-factor-assistance-requested-160k-and-300-row-table-le>

Title: Slow PHP/MySQL Query. Re-factor assistance requested. (160k and 300 row table lengths)

Question: Specifically we are migrating select data from a MsCRM to SugarCRM. This being the accounts/notes/users phase of the project.

So now the question....how can I best re-factor the above code to be more performant? Any and all help is greatly appreciated.

962. <https://stackoverflow.com/questions/7001495/can-a-resource-slow-down-a-webpage-load>

Title: Can a resource slow down a webpage load?

Question: If I call a resource in a webpage (e.g. a pixel from tracker.com at the beginning of body), and tracker.com is very slow to answer (e.g. >10s or even timeout), what are the consequences to my webpage load?

Will the other resources (script, images, css, etc) be displayed as usual? If not, is asynchronous tag an option?

Answer: Loading resources, as you call it, will not delay the `domready` or `document ready` page event, however it will delay the `load` page event. The actual behaviour of page loading depends on browser - the browser should download the resources from different hosts in parallel. It will not affect the whole page rendering, unless you use images with unspecified width and height - in that case browser must re-render the page after receiving the image. So when well designed, the only problem would be the delayed load event.

In case of very slow-loading resources you can avoid that by the use the "asynchronous tag" - just handle the `domready` event and place new tags. E.g. in jquery use:

963. <https://stackoverflow.com/questions/6738132/string-concatenation-causing-timeout>

Title: String concatenation causing timeout

Question: I realize there are plenty of threads addressing string concatenation, but they only address *part* of my problem. I know this is a horribly inefficient way of doing this. and they show a better way of doing it, but that's easy to find.

What I *really* want to know is **why** it took my 5 second run time PHP to its 30 second timeout.

Of course, better solutions are also welcome.

Answer: Well, it depends on the size of the array, but what you're doing here is reallocating that string in every iteration using a rather inefficient function. This will probably work fine as long as your array is small, but when it contains a couple of thousands of items, it's no wonder that execution takes long.

A better solution would be to use the `implode` function, like this:

964. <https://stackoverflow.com/questions/5071710/how-do-large-blobs-affect-sql-delete-performance-and-how-can-i-mitigate-the-imp>

Title: How do large blobs affect SQL delete performance, and how can I mitigate the impact?

Question: I'm currently experiencing a strange issue that my understanding of SQL server doesn't quite mesh with. We use SQL as our file storage for our internal storage service, and our database has about half a million rows in it. Most of the files (86%) are 1mb or under, but even on fresh copies of our database where we simply populate the table with data for the purposes of a test, it appears that rows with large amounts of data stored in a BLOB frequently cause timeouts when our SQL server is under load. My understanding of how SQL server deletes rows is that it's a garbage collection process, i.e. the row is marked as a ghost and the row is later deleted by the ghost cleanup process after the changes are copied to the transaction log. This suggests to me that regardless of the size of the data in the blob, row deletion should be close to instantaneous. However when deleting these rows we are definitely experiencing large numbers of timeouts and astoundingly low performance.

In our test data set, it's files over 30mb that cause this issue. This is an edge case, we don't frequently encounter these, and even though we're looking into SQL filestream as a solution to some of our problems, we're trying to narrow down where these issues are originating from.

We ARE performing our deletes inside of a transaction. We're also performing updates to metadata such as file size stats, but these exist in a separate table away from the file data itself. Hierarchy data is stored in the table that contains the file information.

Really, in the end it's not so much what we're doing around the deletes that matters, we just can't find any references to low delete performance on rows that contain a large amount of data in a BLOB. We are trying to determine if this is even an avenue worth exploring, or if it has to be one of our processes around the delete that's causing the issue. Are there any situations in which this could occur? Is it common for a database server to come to the point of complete timeouts when many of these deletes are occurring simultaneously? Is there a way to combat this issue if it exists?

Answer: You are describing a performance issue, and as with any performance issue you need to approach it by first **measuring**. Guessing will get you nowhere fast. So use an appropriate investigation methodology, and [Waits and Queues](#), yet again, applies perfectly. Observe, collect data, and analyze. You will certainly discover what is causing the queries to time out (is it blocking? is it IO? is it CPU?), and based on the actual finds we can recommend a proper fix.

As to answer your immediate question: no, deleting BLOBS will not cause any of the symptoms you describe. Those are typical [contention](#) symptoms.

965. <https://stackoverflow.com/questions/5022529/session-timeout-and-page-response-time>

Title: Session timeout and page response time

Question: I'm load testing an asp.net app. The load test is simulating 500 user doing searches on the site and browsing the results. I'm observing that the more I reduce the session timeout limit (in web.config) the better the page response time. For example,

with a timeout at 10 minutes, I got an average response time of 8.35 seconds. With a timeout at 3 minutes, the average response time for the same page is 3.98 seconds. The session is stored "InProc". I supposed the memory used by the "no more used but still actives" sessions may be in cause. But, even if there is more memory used when the timeout is at 10, there is still plenty of memory available (about 2.7Gb). Any ideas?

Answer: It really sounds like you're not using session as it's intended. Have you considered rather than using session variables, you might be better off using one of the caching mechanisms available, whether that's through downlevel or in-proc caching? Here's the best place to start:

<http://msdn.microsoft.com/en-us/library/xsbffd8c%28v=vs.71%29.aspx>

It's also strongly recommended that you disable viewstate at either the page or control level wherever it's not needed. If you use a view state decoder such as:

<http://ashishware.com/ViewStatePeeker.shtml>

..you'll be horrified by the amount of useless junk it stores!

Answer2: For my case, storing the session state out-of-process (StateServer) greatly improved performance, even if the state server is on the same physical machine than the web server.

966. <https://stackoverflow.com/questions/3495109/how-to-detach-the-local-git-repository-from-its-working-directory>

Title: How to detach the local git repository from its working directory?

Question: Is this feasible?

I would like to have the `.git` directory on another drive than the checkout directory. I could not find a way to detach both.

The reason is: there is an exchange area on a very slow network drive and limited space and this is a real nightmare with timeouts. At least the repository operations (synchronization with a svn repository) could then be done fast enough to avoid the timeouts and file copy can be done afterwards on checkout with the poor performance. I could not find any way to cope with this situation (which is out of my control)

I would not like to but if there is no better suggestion I would replace it by a local git repository and rsync'ing the checkout dir in both directions to and from the slow drive.

I bet you have a better idea!

Answer: I'd really suggest keeping your *entire* repo on your preferred drive. You can then put a bare repo on the beyond-your-control drive, and push to it. This is the best way to minimize your interactions with the bad storage.

If for some reason you *must* split a repo across drives, why not just create the repo on one drive, move the `.git` directory to the other drive, then symlink `.git` in your repo to the relocated `.git` directory.

967. <https://stackoverflow.com/questions/2840273/how-to-give-users-a-certain-time-to-enter-something-vb-net>

Title: How to give users a certain time to enter something? (VB.Net)

Question: I'm making a speed game in VB.Net (Console Application) and users have a certain time to press a certain key. So how can I give the Console.ReadKey function a timeout without just waiting until a key was pressed?

Answer: You should use a timer. When the user selects the correct key you can disable it. If the user is to then choose a different key you can just reset it.

968. <https://stackoverflow.com/questions/2914702/how-to-increase-the-timeout-to-a-web-service-request>

Title: How to increase the timeout to a web service request?

Question: I have an ASP.NET web application that I can't modify (I only have the binaries). This application connects to a web service and it seems like the connection is closed from the client side (my web app). I have increased the "executionTimeout" in the machine.config of the destination server but my web app seems to still stop after waiting for a while.

Is there a way to increase the timeout time for my web application by simply modifying the web.config? As I said... I can't modify the timeout in the code so my only option would be through config files.

Answer: The default timeout of web application is 90 seconds which is usually more than enough for general purpose use. It is important to note where the timeout is coming from. Is it from the page itself or something in the page that is causing it. In either case, it would appear that the "the page" is timing out.

I stumbled upon this question as my page was timing out too. Found out the exception was coming from SQL (read the the actual error) so it was really SQL problem. Once I knew it, I could easily fix it.

969. <https://stackoverflow.com/questions/1642252/the-timeout-period-elapsed-prior-to-obtaining-a-connection-from-the-pool>

Title: The timeout period elapsed prior to obtaining a connection from the pool

Question: Our site works fine for 90% of the day, then during our peak hours when traffic is about twice as heavy as normal, everything slows down to a crawl. Page load times that are normally 1 second take 30 seconds. Checking our error logs, it looks like it may be a connection pool issue. We have 3 web servers connected to 1 sql server db. The SQL server is flying under 25% utilization on all cores.

I look at the User Connections counter on our SQL server and see that during our peak we have 400+ User Connections, but off-hours it is around 120+.

I am pretty sure we are just using whatever default settings MS comes with to deal with our app pool. What can I do to test to see if is an app pool issue? What are the negatives of increasing the app pool size to 1000 (and how do I do this?).

Answer: In my experience there are 3 primary types of timeouts you can receive from SQL Server:

- 1) `InvalidOperationException` - A failure for the client to obtain a pooled connection from its own pool before the timeout specified on the command string (default 15 seconds). The client's pool is at its maximum size, and all pooled connections are in use and stay in use before the timeout elapses.
- 2) `SQLException` - Connection Timeout. The client's connection pool is creating a new connection to the database, but the database does not respond before the timeout specified in the command string (default 15 seconds).
- 3) `SQLException` - Command Timeout. A connection was obtained, but the time taken for the SQL statement to exercise the command exceeded the timeout specified on the command's `CommandTimeout` property (default 30 seconds)

Your circumstances of a server performing normally until load is added sounds like case #1. I've found the timeouts come very fast - usually 2 seconds.

I've found the solution to this is to increase the maximum threads in SQL Server. The default is zero - let SQL Server decide. I've seen cases where a stout server sits with little resource use while it has restricted itself by allocating too few threads.

Answer2: This could be related to sql connections not being properly disposed (returned to the pool). Make sure you are calling `SqlConnection.Dispose`.

Here's some suggestions to improve the performance of your SQL Server under sustained high load:

- Throw hardware at the problem (especially RAM on the SQL Server)
- Attach SQL Server Profiler to the server, get a trace of one high-load period, and follow its suggested indexes
- From the trace log, examine long running queries, and improve those together with a T-SQL developer

Good luck, these things can be pretty complex!

Answer: I had this issue with Powershell and back to back queries (**invoke-sqlcmd** followed by another **invoke-sqlcmd**). Both queries involved data modifications. Resolved by adding **-connectiontimeout 1** to the parameter call.

970. <https://stackoverflow.com/questions/401872/web-service-not-caring-about-timeout-property>

Title: Web Service not caring about Timeout property

Question: I'm using an automatically created (with wsdl.exe and the GUI-based "Add web reference" command) web service for [LyricWiki.org](#). However, since my internet connection is sucking lately, it's been taking *ages* to complete and is annoying me.

I'm trying to make it timeout in 2000ms by using the .Timeout property, but it still hangs. I also tried using the CallWithTimeout function from this [page](#), but no go. Have also tried the async versions of the commands, but I want to cancel it after the mentioned time.

```
var lw = new LyricWiki();
lw.Timeout = 1000;
LyricsResult result = lw.getSong(artistName, trackName);
// Hangs for a long time...
lyrics = result.lyrics;
lyricsURL = result.url;
```

Any suggestions? Been scouring StackOverflow for the past hour, but I haven't found a solution yet :(

Answer: I believe the timeout is specified in seconds, not milliseconds. At least that's the way it works with manually-created WCF stuff.

971. <https://stackoverflow.com/questions/26169860/securing-my-private-api>

Title: Securing my private API

Question: I'm finishing an API for my own consumption, it's for communicating my own Javascript client made with Backbone with my API made with Laravel.

I have a root route that serves all the js necessary to load my app in the browser, and several routes under a group named "api/v1" that serves the JSON that feeds my client app.

I need that my user can erase data with that app, like soft deleting old users and modify other data, but some of that data contains sensitive information that I don't want to somebody else's see.

I've been reading some information about OAuth2, and I've seen that "Implicit Grant" is well suited for clients that can't maintain the confidentiality of the Secret key, but it requires that I send the user to a login platform and then redirect him back to the app. But I want to make that with my Client App without affecting my user workflow.

I've seen the "Resource Owner Password Credentials Grant" but it requires that my client stores the Secret Key of my app, and that's not secure.

I think that I'm missing something, can anybody point me in the right direction? thanks in advance

Answer: You can use Laravel's route filters to protect your routes from unauthorized users. However, since your Laravel application has now become an endpoint only, the frontend framework (in your case it's Backbone) will be doing the heavy lifting as far as authentication and authorization.

Once you have route filters set, that doesn't prevent authorized users from attempting to do actions that they are not authorized to do.

What I mean by the above is for example:

You have an API endpoint: /api/v1/users/159/edit

The endpoint is one of the RESTful 7, and can be used to edit a user. Any software engineer or developer knows that this is a RESTful endpoint, and if authorized by your application, could send a request with data to that endpoint.

You only want the user 159 to be able to do this action, or administrators.

A solution to this is roles/groups/permissions whatever you want to call them. Set the users permissions for your application in your Backbone application.

Read this great article (in AngularJS) on how to authenticate/authorize properly using frontend JavaScript frameworks. Like I said, it's in Angular, but it's the same idea.

Article: <https://medium.com/opinionated-angularjs/techniques-for-authentication-in-angularjs-applications-7bbf0346acec>

972. <https://stackoverflow.com/questions/18270938/mozilla-firefox-doesnt-retain-css-when-printing>

Title: Mozilla firefox doesn't retain CSS when printing

Question: In my application I am trying to print a page on click of the print button. It shows perfectly in print preview, but in print the CSS is not maintained in Mozilla Firefox. However, it prints as shown in Chrome and Internet explorer.  
I can't attach the snapshot because data is confidential here.

Below is the code I used for printing..

Answer: You probably shouldn't use `document.write`. I suspect the `document.write` might interfere with Firefox's ability to load the resource in time. Without the `mywindow.print` it would be able to start loading the CSS file as soon as this function was completed, but now it simply hasn't done that yet before it has to start printing.

973. <https://stackoverflow.com/questions/16174978/fake-name-data-to-mysql-query>

Title: Fake Name Data to MySQL Query

Question: I have a database that contains some confidential personal information. For data analysis purposes, I'd like to send that data out to some people. However, the anonymity of the data needs to be maintained.

Is there a way for me to generate fake tables to do JOINS on i.e. instead of a JOIN to the `user` table that has real names, I generate a table `fakeuser` dynamically and JOIN to that table instead.

I know it can be done manually but the the query doesn't run on all the users in the whole database and it would be nice to have it done dynamically i.e. when the query calls for `fakeuser` ID 23 and the ID does not exist, it just picks a random name from somewhere and populate the table and query.

I'm open to doing this via other types of scripting if MySQL is not flexible enough for this.

Answer: This seems a quite simple task but it involve several steps and I'm not sure where you are stuck.

You need a list of names which you can obtain by generating randomly combinations of letters (giving unreadable names) or you can find out a public source of names (maybe <http://www.listofbabynames.org/>).

Then you just need a loop to insert records in your fakeuser table by picking names randomly from the list. You just need to make sure you don't assign the same name to different records in fakeuser. This can be done by removing the name from the list when you choose one. If the list is not big enough, you can generate combinations.

I also would carefully consider the advice/article given by @eggyal to see if it applies to your situation. I think there is a lot of work on anonymization data if you need a better solution.

974. <https://stackoverflow.com/questions/56273156/how-ordering-service-in-hyperledger-make-blocks/56276930#56276930>

Title: How ordering service in Hyperledger make blocks

Question: In Hyperledger fabric suppose Peer1 and Peer2 are communicating using channel1 (Transaction1) and Peer3 and Peer4 are communicating using channel2 (Transaction2). My question is once Transaction1 and Transaction2 arrived at ordering service, will it be placed in same Block by Orderer? If yes, then will this block be broadcasted to all peers in network who are not related to Transaction1 and Transaction2?

Answer: Channels in Hyperledger Fabric designed to provide data segregation, that is to separate information to provide confidentiality and decouple information based on business rules.

In your example both transactions will enter different blocks, since each channel maintains separate ledger and therefore there is no need for total order. Hence transactions for separate channels ordered independently.

For more information please take a look [official documentation](#).

Answer: Each channel is a separate chain of blocks, so in your example Transaction1 and Transaction2 will not appear in the same block.

If TransactionA and TransactionB were both submitted on channel1 in quick succession they could both be ordered in the same block. However if there is a delay between the 2 Transactions they will be ordered into separate blocks. (I don't know what the delay time is to create separate blocks but it is probably configurable.)

You could try installing the [Hyperledger Blockchain Explorer](#) on top of your fabric to see the blocks and transactions.

975. <https://stackoverflow.com/questions/55144619/any-way-to-read-entity-schema-from-revit-document-in-viewer/55145184#55145184>

Title: Any way to entity from revit document in viewer

Question: In the Revit project, a schema is attached to the Document.ProjectInformation field. How can I get it in the viewer?

Answer: The Revit extensible storage data and schema is completely lost in the Forge viewer.

Remember that the Forge viewer is completely generic, supporting all CAD formats, and strongly optimised for performance.

Therefore, it cannot maintain any purely internal Revit or BIM specific data.

Furthermore, the extensible storage data is potentially confidential to an individual Revit add-in.

All data in the viewer is public for all to see.

Therefore, all extensible storage data *must* be removed in the Forge viewer.

976. <https://stackoverflow.com/questions/35147277/visual-basic-2010-windows-form-application-read-excel-file-values-into-array>

Title: How do I configure read request timeout in WildFly12? Are read timeout and read request timeout one and the same?

Question: My WebApplication is running on WildFly12 server and I want to set the `read request timeout` parameter? How do I set this?

My requirement is to configure a timeout on the server. If a client fails to send header or body data within the configured time, the request should timeout.

977. <https://stackoverflow.com/questions/43309707/session-timeout-security-concerns>

Title: Session timeout security concerns

Question: I've red about the security risks of the long session timeout. On the other hand I can return to great websites after a month and I see that I'm still logged in.

It is the case with the stacoverflow.com itself, but the gog.com or g2a.com works in the same way. So what is the golden rule about this?

I will create an e-commerce site and the long session timeout would be really convenient to the customers. I guess that is not easy answer, because on an e-commerce site people can spend money. Despite it a short timeout (e.g. 1 hour) would be extremely inconvenient. I think the shortest acceptable timeout (from the aspect of customers) is a week.

Some site use a short session timeout, but automatically(!) put a "remember me" or token cookie which result are the same. Are there any difference?

Answer: If you by default allow long session timeouts, then the risk is on shared computers - future user accesses the session of the current user. If you try to blame the user for not logging out, then you will find your user base dwindle and you will have to deal with a lot of end user complaints.

Best practice is to have short timeout by default, but allow an option 'remember me on this device' so that people can opt to long sessions if they are in a trusted environment. The golden rule is "**secure by default**".

978. <https://stackoverflow.com/questions/36210452/can-you-help-me-debug-my-session-time-out-function>

### Title: Can you help debug my session time out function?

**Question:** Hi I am creating secure login functionality for my site. I have a function called sessionTimeOut() which i call at the top of each page of my site. As you can see within the function, if the user has been inactive for more than 30 mintues, I call a logOut() function and also a secure\_session\_start() function before redirecting the user back to the login page. I'm wondering will these functions execute fully before the redirect occurs? I'm not sure of the best way to debug the code. any help would be appreciated thanks.

**Answer:** A method I commonly use is to comment out the Header redirects and use Echo to output information at different steps in the code to catch where it ends. Additionally, output buffering can help in some circumstances.

979. <https://stackoverflow.com/questions/24714224/java-session-invalidate-and-timeout-does-not-work>

### Title: Java Session invalidate and timeout does not work

**Question:** The same issue if the session-timeout must be destroy the session. I can also get a valid session after this Duration if i enter the protected area /psg/admin/

**Answer:** In case of basic and digest authentication browser will resend user credentials, so effectively there is no logout, only session invalidation.

You need to use form-based authentication for logout to work.

980. <https://stackoverflow.com/questions/5195082/auto-logout-without-javascript-and-the-implications-of-such-a-solution>

### Title: Auto-logout without JavaScript? And the implications of such a solution?

**Question:** So I need to implement an auto-logout feature for WordPress. With JavaScript this seems straightforward;

- Prompt after X minutes *idle* (jQuery.nap), alternate <title> to gain attention
- If there is no confirmation after Y seconds, run logout

Seeing that the point of an auto-logout feature is security, would that deem it neccessary to have a no-JavaScript fallback?

And if so, the only solution I can see is to store & compare access times on successive requests, but the caveats I can already see are;

- It's no longer 'idle' time (time the user is effectively 'away'), merely time between each page load.

- If a user has walked away, whatever is currently on the page is vulnerable indefinitely, until the next request fires the logout.

I could say, for arguments sake, a server-side solution to log out after  $Z$  hours between requests, as opposed to a much shorter time for JavaScript?

What are your thoughts on the matter, and my proposed solution?

**Answer:** Using Javascript for this seems precarious at best to me. If the threat is the user walking away from the computer while logged in, and then an attacker walking up and doing bad things on his account, then the attacker could very well just disable javascript upon walking up to the machine. Unless of course the timer has already hit by the time the attacker gets there. But that would mean the timer would have to be pretty short.

I don't know about you, but I HATE websites that automatically log you off in a couple of minutes. It's a huge hassle for very little security benefit, IMO. It just doesn't seem like a realistic threat to me: Someone following one of your users, who happens to be in a public space, using an important account, then walks away leaving the computer unguarded?

A more realistic threat would be that the connection itself gets hijacked from someone quitting out of the browser without actually logging off or something. Having a server-side timeout of maybe an hour would be useful there

981. <https://stackoverflow.com/questions/3933024/what-are-the-issues-with-having-a-long-open-connection-to-a-web-server-from-a-device-connected-via-wifi>

**Title: What are the issues with having a long open connection to a web server from a device connected via wifi?**

**Question:** I am aware of timeout settings for certain executions over the internet.

My iphone application is downloading videos over the internet via a wifi router connection.

I've heard that a connection like this shouldn't be open for more than 240secs? Is this true?

What dangers/security threats/issues/etc will I encounter the more I increase the timeout?  
Why do internet connections have a timeout at all?

For instance, if I increase the timeout to 10 or 20 **minutes** then is this bad practice?  
Bearing in mind this isn't a secure connection or anything, its just a normal connect - download data style connection.

For anyone with iphone experience it is a NSURLConnection.

**Answer:** if the connection had some activity on it, it would be okay to leave it open for a long period of time.

If you are talking about long periods of *inactivity* - that is another issue.  
In such cases, I don't think it would be *productive* to increase the timeout - as the odds are, the *server* on the other end would wind-up timing out the connection.  
So as this is unavoidable (or uncontrollable by you, the client) - I would advise you to close the connection and re-open when need to communicate again.

982. <https://stackoverflow.com/questions/1360004/windows-service-running-on-windows-server-2003-cannot-call-an-xml-web-service-on>

**Title:** Windows service running on Windows Server 2003 cannot call an xml web service on the same machine.

**Question:** As you can see, it has some problem with writing to the eventlog (all that AUXSOURCE stuff), but the main problem is that it's getting a timeout error from the web service.

Here's the truly odd thing, though -- from my dev box (running XP), I can call the web service that's running on my Windows 2003 Server box. This is really perplexing -- obviously the web service is working fine, but for some reason, Windows Server 2003 will not let you call a web service from the same machine!

Can anybody please give me a hint as to what's going on?

**Answer:** This sounds like a networking issue related to your Win2K3 server. The network configuration is preventing it from accessing the service url at the given location.

Easiest way to troubleshoot this: RDP to the Win2K3 Server desktop and open up a web browser to connect to the web service. I expect you will get a timeout.

Easiest way to remedy this: if there is a URL to the service that works locally, i.e. localhost, try that from your service. Otherwise, be prepared to get your network administrator involved to understand the DNS settings necessary to support the URL path you want to use for your service.

983. <https://stackoverflow.com/questions/1352501/detecting-forms-authentication-timeout-in-login-page>

**Title:** Detecting forms authentication timeout in login page

**Question:** When you have forms authentication setup to redirect to login.aspx when accessing a protected page, what's a good way to detect in login.aspx whether the user was sent there because they haven't logged on yet, or because their forms auth ticket is expired? I'd like to display a "you've timed out" message.

(I do not mention the word session in this question, because ASP.NET treats them so distinctly, however, if there is a good solution that involves session, I'm all ears)

I've solved this in the past by having another cookie "hasloggedin" set when a user logs in and then checks to see if that exists to determine if it's a timeout and then display an appropriate message. But, this has to be a common problem?

**Answer:** Forms authentication will automatically append a URL parameter 'ReturnURL', indicating what page (if any) triggered the redirection to the login page. Most websites have a 'Default.aspx' or 'index.html' etc as the default page. You can check the ReturnURL to see if it contains the default page, or some other page in your application.

984. <https://stackoverflow.com/questions/56597788/how-to-do-timeout-and-then-clear-timeout-in-react-functional-component>

## Title: How to do timeout and then clear timeout in react functional component?

**Question:** I have functional component in reactjs, and I am trying to do timeout on mouse hover over menu, which is fine and work well, but I dont know how to clear this timeout in other function in this same functional component, is there some solution for this? I primary use hooks. I found some hooks timeout, but not work well. Thanks very much

**Answer:** What's happening here is that, we are saving the timer's reference in a react ref. This can then be used to check and clear the timer in another function.

985. <https://stackoverflow.com/questions/52508214/how-to-cancel-chained-scala-future-by-timeout>

## Title: How to cancel chained Scala future by timeout?

**Question:** The execution time of this future is 5 seconds ( $5 * 5 * 200\text{ms}$ ).

I am looking for a way to wrap this future in some sort of "timeout context" and stop the execution by timeout thus not all the transformations will be executed.

**Answer:** Here are a few of ways of doing this:

- 0) Don't chain the `Futures`. The execution is sequential so just use a loop inside a single `Future` and track the total elapsed time in your loop.
- 1) Record the start time in a `val` outside the `Future` and use this to modify the timeout value given to `appendCharWithTimeout` so that the total execution time is not exceeded.
- 2) Have `appendCharWithTimeout` take a total execution time and return the time remaining to the next iteration. Use this to stop execution when the timeout is exceeded.  
The choice depends on what the real code actually does, and whether you can change the code in `appendCharWithTimeout`.

986. <https://stackoverflow.com/questions/907914/selecting-and-displaying-ranked-items-and-a-users-votes-a-la-reddit-digg-et>

## Title: selecting and displaying ranked items and a user's votes, a la reddit, digg, et al

**Question:** when selecting ranked objects from a database (eg, articles users have voted on), what is the best way to show:

- the current page of items
  - the user's rating, per item (if they've voted)
- rough schema:

articles: id, title, content, ...

user: id, username, ...

votes: id, user\_id, article\_id, vote\_value

is it better/ideal to:

1. select the current page of items

2. select the user's vote, limiting them to the page of items with an 'IN' clause  
or

1. select the current page of items and just 'JOIN' vote data from the table of user votes  
or, something entirely different?

this is theoretically in a high-traffic environment, and using an rdbms like mysql. fwiw, i see this on the side of "thinking it out before doing" and not "premature optimization."

**Answer:** The JOIN would be faster; it would save a round trip to the database.

However, I wouldn't worry at all about this until you actually get some traffic. Many people have spoken out against [premature optimization](#), I'll quote a random one:

More computing sins are committed in the name of efficiency (without necessarily achieving it) than for any other single reason - including blind stupidity.

987. <https://stackoverflow.com/questions/57256283/is-there-way-to-ensemble-the-prediction-other-than-the-take-the-mean-average>

Title: Is there way to ensemble the prediction other than the take the mean average?

Question: right now I'm just taking the mean average of 3 models predictions

```
predictions_model = [y_pred_xceptionAug,y_pred_Dense121_Aug,y_pred_resnet50Aug]
predictions = np.mean(predictions_model, axis=0)
```

is there a better way to ensemble other than just take a mean average?

Answer: One neural network based approach is to use the 3 model predictions as input to a further neural network.

More advanced approaches include [bootstrap aggregating](#), where each model trains on a subset of the entire dataset before predictions are aggregated across models.

988. <https://stackoverflow.com/questions/56921106/checking-if-a-user-has-already-voted-returns-true-even-when-they-havent>

Title: Checking if a user has already voted, returns true even when they haven't

Question: The user enters their userid and then votes either 'yes' or 'no' but the code returns true and the if statement is executed even when the user hasn't voted.

For example - doing userid = 1 and voting, userid = 1 and voting. The second time userid tries to vote it does say you've already voted but if you then do userid = 2 for the third iteration it says you've already voted, which isn't true.

Answer: If you don't want repeated mention of the `votes` column, then phrase it as:

989. <https://stackoverflow.com/questions/56590206/how-to-limit-the-number-of-upvotes-in-php>

Title: How to limit the number of upvotes in php?

Question: I'm creating a video storing page where a user can upvote or downvote. To check if a user already liked a video, I created a table to check if a user liked more than once. However, the 'videosLikedBy' table, that limits the amount of likes, isn't updating. The 'video' table stores the total number of likes and is working fine though.

I'm thinking that the issue is with the `$_SESSION['id']` because of a syntax error I had before that showed `(id = "")` where it should equal the user's id. I'm still new when it comes to using sessions in php.

I tried adding `$_SESSION['id'] = $_POST['$id']` in the previous page where you click the video. Then in the page where the video is viewed, I'd have `$id = $_POST['$id']`. However that didn't do anything so I just kept `$id = $_SESSION['id']`; for the viewing page.

990. <https://stackoverflow.com/questions/55518900/seeking-pseudo-code-for-calculating-the-smith-and-schwartz-set>

**Title:** Seeking Pseudo-code for Calculating the Smith and Schwartz Set

Question: I've read Wikipedia on the [Smith Set](#), [Schwartz Set](#), [Kosaraju's Algorithm](#), [Tarjan's Algorithm](#), and the [path-based strongly component algorithms](#); however, my experience with such algorithms is...lacking. Wikipedia also says you can use a *version* of Kosaraju's algorithm to generate the Schwartz set—and that these algorithms can calculate the Smith set.

Wikipedia also has some pseudo-code for Tarjan's algorithm, but not the others; and it's not specific to this relatively-sensitive application. I'm also not 100% certain which is the simplest to implement—which has the feature of least likelihood of errors in implementation.

I'd like some more-direct pseudocode to cover computing the Smith and Schwartz set from one of these algorithms, given a set of ranked ballots. I find it easier to grasp concepts when I have a practical process I can walk. I'll turn it into actual code myself.

Whereby a GraphNode for Alex would have an element in `Defeats[]` pointing to a GraphNode for Sam, and vice versa.

Given these GraphNodes, what do I do with it to identify the Smith and Schwartz sets?

991. <https://stackoverflow.com/questions/55365798/is-there-a-way-i-could-doing-a-voting-function-on-my-model-predictions>

**Title:** Is there a way I could doing a voting function on my model predictions?

Question: I'm doing a voting function for my predictions and I arranged the multi-class reasons into a dataframe(similar to below). However, I can't do a majority Vote on it for every row, answer is NA.

**Answer:**

Your Mode function is bad. It can only be used on a named vector, and the way you apply it the input is unnamed. See the R-FAQ on [calculating the mode](#). Use one of those functions instead.

992. <https://stackoverflow.com/questions/47475055/how-is-upvote-functionality-done-while-staying-on-the-same-page-php-mysql>

Title: How is upvote functionality done while staying on the same page

Question: I have a relational database and a thread/comment system. I'm having trouble thinking of a way of tackling upvoting, as the page would have to be refreshed for the server to notice any changes.

I've created a new table, UPVOTESTTHREAD which consists of two foreign keys, user ID and thread ID, and a primary key which is the combination of the two. The only way I could actually insert into this though is if I submit some POST data. I'm afraid that this would feel clunky to the user, and it would also mean that the user would have to scroooollll down back to where they were just looking at. This can't be the correct solution, right? Is there a better way of doing this?

Answer: Yes there is a better solution. It's called [AJAX](#). It sends a post or get request to the server and receives the output without reloading the page.

The script on the server that receives the ajax request can (in your case) increment a vote counter in the db.

The (usually PHP-) script can also output something (usually json or a status code) that the success handler of the ajax function will receive. You can then modify your page with javascript accordingly. In your case you could receive the current vote count and update the count next to the upvote button if there is a count.

993. <https://stackoverflow.com/questions/45387019/handling-votes-through-forms>

Title: Handing votes through forms

Question: This doesn't execute the vote and doesn't redirect to the Car page. I'd like to implement the voting API in my template, without reloading the page if possible.

Any suggestion or feedback will be welcomed and greatly appreciated.

994. <https://stackoverflow.com/questions/39949260/how-to-implement-voting-system-closing-date-feature>

Title: How to implement voting system closing date feature?

Question:

I am implementing a node.js not real-time poll creating and voting system, where the admin can create a poll and set a closing date and then when this date is arrived the system closes the poll, send subscribed users an email and the users can't vote anymore. I have implemented every other feature, but I am struggling with closing the polls on that date. I thought about some persistent cron-like scheduler, where I set the job of closing the poll on the established date, but I don't know if this is the best approach. Do you have any ideas on how to solve this problem?

Answer: There are two basic approaches - in-process and out-of-process. In-process is simpler, but it requires your main program to be running. Out-of-process is more robust,

because you can use systems whose primary function is to reliably execute scheduled jobs (cron for example).

For the in-process approach in Javascript, I would suggest on startup, go read the poll records that show polls still open (a boolean flag, not a date), subtract the current date from the closing date, and use `setTimeout` to schedule a function call that far into the future (or immediately if the difference is negative). That function can do whatever you need (send emails, update records, etc.) The last thing it should do is update the original record to indicate "successfully closed". You want this function to be [re-entrant](#) so if your process dies halfway through, the next time it starts it will still see that record of a poll with a closing date in the past, but no "successfully closed" flag, and try again.

995. <https://stackoverflow.com/questions/38688536/software-to-optimise-peoples-preferences>

Title: Software to optimise people's preferences

Question: Say I have two colours of lollipops, and five lollipops of each colour (so ten in total), and I want to distribute these among my friends. We each submit some ranked preferences:

Ben: 1 - Orange, 2 - Green, 3 - Red

Joe: 1 - Green, 2 - Blue, 3 - Red

Tim: 1 - Orange, 2 - Red, 3 - Blue etc

Is there any software I can use that will "mimic" the total sacrifices we have to make? (e.g. giving everybody as close to their first preference as possible)

Answer: This question is lacking a good model. Different formulations of the objective/losses will lead to completely different behaviour/solutions.

Here is a mixed-integer programming approach (as your problem is already np-hard):

## Model A

- First preference gives satisfaction X, second: Y, ... (9, 4, 1, 0) = inverse squared
  - This is equivalent to a least-squares solution / l2-norm solution (= bigger misses are harder penalized than smaller ones)
  - We want to maximize the total satisfaction

## Effects of the model

- No try of giving each person the same amount of lollies

996. <https://stackoverflow.com/questions/38304942/ensembling-with-dynamic-weights>

Title: Ensembling with dynamic weights

Question: I was wondering if it is possible to use dynamic weights in sklearn's VotingClassifier. Overall i have 3 labels 0 = Other, 1 = Spam, 2 = Emotion. By dynamic weights I mean the following:

I have 2 classifiers. First one is a Random Forest which performs best on Spam detection. Other one is a CNN which is superior for topic detection (good distinction between Other and Emotion). What I would like is a VotingClassifier that gives a higher weight to RF when it assigns the label "Spam/1".

Is VotingClassifier the right way to go?

Answer: I think Voting Classifier only accepts different **static** weights for each estimator. However you may solve the problem by assigning class weights with the `class_weight` parameter of the random forest estimator by calculating the class weights on your train set.

997. <https://stackoverflow.com/questions/36118516/how-to-check-if-an-user-voted-but-to-be-impossible-to-see-for-whom>

Title: How to check if an user voted but to be impossible to see for whom?

## Question: Blockchain Voting System

### How current system works

- Users are allowed to vote after their identity is confirmed by an authority.
- Votes are collected and counted by an authority.
- The person who has the most votes, have the power for ~4 years, then we vote again.

### Problems

- The elected person can become irresponsible and corrupt within the ~4 year period and the citizens can't do much about this, they just have to wait until the ~4 years will expire.
- A lot of money are spent for election campaigns because everybody is trying to get power for ~4 years.

### How the new system works

- Users are allowed to vote after their identity is *registered in blockchain and confirmed by an authority*.
- Votes are stored anonymously on a blockchain.
- *It's possible to check if an user voted, but it's impossible to check for whom he gave his vote.*
- Votes are "realtime" (a new block is mined every XX minutes) and can be displayed on a billboard in the center of the town, so the elected person will watch it every day and work hard to maintain people's trust.
- Users are allowed to change their vote every week (Sunday).

- If the user didn't change or updated his vote for X weeks, the vote is expired and deleted. That way the citizens will be more active (also this fixes the problem with dead users)

## Problems

- How to implement: **It's possible to check if an user voted, but it's impossible to check for whom he gave his vote ?**
  - How to implement users?
    - Authentication: biometric or just a key given by an authority. It must be very simple and secure for non technical users.
    - New user creation - new people who reach 18 years
    - Anybody must be able to verify if the user who voted is a real person (prevent flood from corrupted central authority who has the ability to create new users)
1. Answer: A voter produces a statement of how they wish to vote.
  2. The voter blinds the vote, attaches the blinded vote to a proof of their identity, and signs it.
  3. The central authority receives the blinded vote and verifies the signature. If the signature is correct, the central authority signs the blinded vote.
  4. The voter unblinds the signed vote and uploads it to a repository or adds it to a blockchain anonymously.
  5. The central authority must be able to produce one signed, blinded vote for every unblinded vote produced. So if there are 50,000 votes signed by the central authority collected, the central authority must be able to produce 50,000 blinded votes signed by voters.

The signed, blinded votes show who voted. The unblinded votes show how many votes each candidate or proposal got. There is no way to map the blinded votes to the unblinded votes, so there is no way to tell who voted for what.

998. <https://stackoverflow.com/questions/34830567/plurality-voting-with-priorities-for-tie-breaking-algorithm-implementation>

Title: Plurality voting with priorities for tie-breaking algorithm implementation

Question: I am trying to implement a plurality voting algorithm where priorities are used to break ties. What I mean by priorities is the following. For example, we have three classes - A, B and C. But the priority goes A, C and B, starting with the highest - A to the lowest - B. So when A and C have equal votes and more than B, A will win the plurality vote because of its higher priority.

The only idea I have for the tie-breaking is to implement many if-statements. If I am not wrong, these are 10 for the case of 3 classes. But how can this be generalized so that I can implement an algorithm for K-classes? Can you please help with some code? It could be some imperative language like C, Java, JS, C#, Python, etc or pseudo-code.

Answer: You can sort based on number of votes first. Then iterate through the sorted list, and for those entries with equal number of votes, sort again, this time using priority.

999. <https://stackoverflow.com/questions/34372386/how-to-prevent-guest-users-from-voting-twice-for-a-post>

Title: How to prevent guest users from voting twice for a post?

Question: I have a site where users can post and vote for posts. It is very critical to allow guest users to vote for a post, it also very important to avoid multiple votes from the same guest.

Cookies, can be easily deleted, so this can't be the solution.

IP, very bad if you consider NAT situations.

So I think, I need more advanced way to go, maybe other type of cookies..?

If anyone have experience in similar context please help.

Answer: What you only can do about not logged in users - is to make as hard as possible for them to vote second time. For example you may:

On the client side:

- set cookie
- write information to browser storage
- use so called flash cookies

On the server side - store and check as much information about user as you can:

- store user ip (including proxy ip etc.)
- store browser fingerprint
- store user timezone
- block voting for this ip and browser fingerprint (permanently or for some time).  
etc.

But you still can not stop smart and really wanting to cheat anonymous users from voting.

So it may be more useful not to try to block voting but to detect and ignore "duplicate" votes instead (i.e. votes for the same option from the same ip and browser combination for certain time period may be considered "cheated").

1000. <https://stackoverflow.com/questions/5195082/auto-logout-without-javascript-and-the-implications-of-such-a-solution>

Title: Auto-logout without JavaScript? And the implications of such a solution?

Question: So I need to implement an auto-logout feature for WordPress. With JavaScript this seems straightforward;

- Prompt after X minutes *idle* (jQuery.nap), alternate <title> to gain attention
- If there is no confirmation after Y seconds, run logout

Seeing that the point of an auto-logout feature is security, would that deem it necessary to have a no-JavaScript fallback?

And if so, the only solution I can see is to store & compare access times on successive requests, but the caveats I can already see are;

- It's no longer 'idle' time (time the user is effectively 'away'), merely time between each page load.
- If a user has walked away, whatever is currently on the page is vulnerable indefinitely, until the next request fires the logout.

I could say, for arguments sake, a server-side solution to log out after  $Z$  hours between requests, as opposed to a much shorter time for JavaScript?

What are your thoughts on the matter, and my proposed solution?

Answer: Using Javascript for this seems precarious at best to me. If the threat is the user walking away from the computer while logged in, and then an attacker walking up and doing bad things on his account, then the attacker could very well just disable javascript upon walking up to the machine. Unless of course the timer has already hit by the time the attacker gets there. But that would mean the timer would have to be pretty short.

I don't know about you, but I HATE websites that automatically log you off in a couple of minutes. It's a huge hassle for very little security benefit, IMO. It just doesn't seem like a realistic threat to me: Someone following one of your users, who happens to be in a public space, using an important account, then walks away leaving the computer unguarded?

A more realistic threat would be that the connection itself gets hijacked from someone quitting out of the browser without actually logging off or something. Having a server-side timeout of maybe an hour would be useful there.

1001. <https://stackoverflow.com/questions/3933024/what-are-the-issues-with-having-a-long-open-connection-to-a-web-server-from-a-de>

Title: Detecting forms authentication timeout in login page

Question: When you have forms authentication setup to redirect to login.aspx when accessing a protected page, what's a good way to detect in login.aspx whether the user was sent there because they haven't logged on yet, or because their forms auth ticket is expired? I'd like to display a "you've timed out" message.

(I do not mention the word session in this question, because ASP.NET treats them so distinctly, however, if there is a good solution that involves session, I'm all ears)

I've solved this in the past by having another cookie "hasloggedin" set when a user logs in and then checks to see if that exists to determine if it's a timeout and then display an appropriate message. But, this has to be a common problem?

Answer: Forms authentication will automatically append a URL parameter 'ReturnURL', indicating what page (if any) triggered the redirection to the login page. Most websites have a 'Default.aspx' or 'index.html' etc as the default page. You can check the ReturnURL to see if it contains the default page, or some other page in your application.

1002. <https://stackoverflow.com/questions/tagged/heartbeat+reliability>

Title: Linux HA / cluster: what are the differences between Pacemaker, Heartbeat, Corosync, wackamole?

Question: Can you help me understand Linux HA?

Pacemaker, Heartbeat, Corosync seem to be part of a whole HA stack, but how do they fit together?

How does wackamole differ from Pacemaker/Heartbeat/Corosync? I've seen opinions that wackamole is better than Heartbeat because it's peer-based. Is that valid?

The last release of wackamole was 2.5 years ago. Is it still being maintained or active?

What would you recommend for HA setup for web/application/database servers?

Answer: Depends what kind of app is using the HA setup, MySQL? A cluster filesystem?

I'd recommend whichever HA setup redhat use in their cluster tools. They tend to know which package is best for the general case. Accord into [this](#) is heartbeat, however [Planet HA](#) has [interesting articles](#) depending on what kind of stack you are configuring.

- 1003. <https://stackoverflow.com/questions/2846440/linux-ha-cluster-what-are-the-differences-between-pacemaker-heartbeat-coros>

Title: Linux HA / cluster: what are the differences between Pacemaker, Heartbeat, Corosync, wackamole? [closed]

Question: Can you help me understand Linux HA?

- Pacemaker, Heartbeat, Corosync seem to be part of a whole HA stack, but how do they fit together?
- How does wackamole differ from Pacemaker/Heartbeat/Corosync? I've seen opinions that wackamole is better than Heartbeat because it's peer-based. Is that valid?
- The last release of wackamole was 2.5 years ago. Is it still being maintained or active?
- What would you recommend for HA setup for web/application/database servers?

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- 1004. <https://stackoverflow.com/questions/15015714/a-good-heartbeat-interval-for-pika-rabbitmq-in-amazon-ec2>

Title: A good heartbeat interval for pika-rabbitmq in Amazon ec2

Question: I am using the latest pika library(0.9.9+) for rabbitmq. My usage for rabbitmq and pika is as follows :

1. I have long running tasks (about 5 minutes) as workers. These tasks take their requests from rabbitmq. The requests come very infrequently i.e. there is a long idle time between requests.

2. The problem i was facing previously is related to idle connections(connection closures due to idle connections). So, I have enabled heartbeat in pika.
3. Now the selection of heartbeat is a problem. Pika seems to be a single threaded library where heartbeats reception and acknowledgement happens to be done in-between requests time frame.
4. So, if the heartbeat interval is set less than the time the callback function uses to do its long running computations, the server does not receive any heartbeat acknowledgements and closes the connection.
5. So, I assume the minimum heartbeat interval should be the maximum computation time of the callback function in a blocking connection.

What can be a good heartbeat value for amazon ec2 to prevent it closing idle connections ?

Also, some suggest to use rabbitmq keepalive (or libkeepalive) to maintain tcp connections. I think managing heartbeats at the tcp layer is much better because the application need not manage them.Is this true ? Is keepalive a good method when compared to RMQ heartbeats ?

I have seen that some suggest using multiple threads and queue for long running tasks. But is this the only option for long running tasks ? It is quite disappointing that another queue must be used for this scenario.

Thank you in advance. I think I have detailed the problem. Let me know if I can provide more details.

1005. <https://stackoverflow.com/questions/39404173/heartbeat-monitoring-system-for-iot-need-some-suggestion-with-architecture>

Title: Heartbeat monitoring system for IoT, need some suggestion with architecture

Question: First of sorry for such an open ended question, but i did not know any other platform for posting such questions.

So basically i am working on an IoT platform where in field close to 2 million devices are supposed to be connected with few gateways. Now i have a requirement where i need to monitor heartbeat (periodic) of each device and on the basis of some missed heartbeats i want to add/remove the device from the network console.

I am planning to put a kafka queue between the devices and the gateways so that the periodic data can be queued and stored some where, however my problem starts when at a gateway level i have to monitor every heartbeat and decide which device has missed beats for a given soak period. I can't maintain a large data structure to keep the mapping, DB is going to be costly for a NRT or RT system, any suggestion how the design should be made for this.

My platform is Java driven, so any suggestions if some other Open Source platform can fit the bill or any design approach.

Answer: Your use-case is a typical async ingestion + processing that happens all the time in big data systems.

Your choice of Kafka at the events ingestion is perfect (don't forget to look at ways of monitoring Kafka as well. Most people I know assume that Kafka is the magic pill and it will solve all their problems, only to find that the time they take their system to production, the lack of monitoring around the Kafka cluster has bitten them hard)

Now on the processing part at the gateway layer, you can look at systems like Spark (streaming)/Storm/Flink. I am quite familiar with Spark and your use-case looks more like spark streaming with windowing. It scales pretty well and also has an easy development cycle if you are already familiar with Scala (their Java APIs are also pretty straightforward).

You would not need a DB unless you want to maintain historical data of which device you have taken out and when. The output of Spark streaming job (after every window of soak time) can essentially communicate to your network console and take the device down. One thing to note is the soak time you have for your application - if it is big, then you might have to provision for more machines with RAM and disk. Spark is extremely fast as it maintains the entire window of data in memory (and flushing to disk if it can't hold in RAM)

1006. <https://stackoverflow.com/questions/48707616/c-sharp-socket-continuously-messaging>

Title: c# socket continuously messaging

Question: I am struggling for some days with this problem. I have a server machine and I need to implement a client . Firstly I am sending a logon message and I am receiving the response. After , I will need to send and receive different messages. From 10 to 10 seconds I need to send a "heartbeat message" , so the server needs to know that the connexion is still active. I have made it a simple asynchronous client. The SendHeart() is just as a normal Send , just is sending the keepalive message.

The problem that I am facing is the next: After the timer is firstly consumed and it triggers the Heartbeat() the application is only sending just the keepalive message, so it doesn t send the others messages . If it's sending just the keepalive message the connection is maintaining alive. Like the client can t access anymore the Send callback, and it remains just for the Heartbeat.

In another case I have made 3 timers , one for Send(),one for Receive(), and one for Heartbeat(). In this order and when one timer is expired it stops and starts the next one and so on. I send a message , I read a response and send a Heartbeat , after that any move I try to do BeginSend a message or BeginReceive a message , the connection is aborted by the host machine.

For the second case , another problem would be that if after sending a message, and starts the Receive, if the Heartbeat is sent the receive thread is lost so I can t read the message anymore.

Sorry if it's too tangled. I am waiting for questions if you didn't understand something

1007. <https://stackoverflow.com/questions/36972097/how-expensive-is-maintaining-a-tcp-socket-in-java>

Title: How expensive is maintaining a TCP socket in java

Question: I have currently implemented a heartbeat mechanism for my project and I am using TCP as my underlying connectivity. I was wondering how expensive is maintaining a tcp connection. Each slave sends a heartbeat every 5 seconds to the master(yes i know its way to often but i have a good reason to do so). So I was wondering should I constantly create a new connection or should I keep the connection open. Because if I keep the open connection then in that case I can just handle the exception. But since I need to know every 5 seconds wether or not a slave is down should I be re establishing the connection or just keep it open. Thanks in advance.

Answer: It's more expensive to re-open the connection regularly; there is a [three-way handshake](#) on open. Once the socket is open, that cost can be amortized (but only if you leave it open).

Answer2: As previously stated reopening the connection is more expensive, unless there are other factors involved like mobility. Not only do you have a [three-way](#) handshake, but you also have a [four-way](#) handshake terminating the connection. In addition to this, your TCP server application likely open up new threads for each new connection, which also needs to be allocated, deallocated etc. Most likely your connection will also pass through firewalls which are often NATed, which in turn opens up ports and states. This is why I personally rarely use UDP, because UDP may have problems passing through firewalls and ISP filters.

Finally the maintenance of the TCP connection itself from a protocol point of view is minimal. TCP do have the option of *keep-alive*, but these are rarely sent as often as every 5 seconds. There is a small overhead of context switching within your OS process, but that would happen regardless of you opening and closing the connection.

Answer: If you are doing a heartbeat, why not use UDP, TCP requires confirmation of receipt, UDP does not, then you can have a listener and just receive any packets that are broadcast to it and process. meaning one port open on the main system no matter how many children are sending to it.

TCP you would require one connection per child.

1008. <https://stackoverflow.com/questions/23358324/raft-consensus-protocol-should-entries-be-durable-before-commiting>

Title: RAFT consensus protocol - Should entries be durable before committing

Question: I have the following query about implementation RAFT:

Consider the following scenario\implementation:

1. RAFT leader receives a command entry, it appends the entry to an in-memory array It then sends the entries to followers (with the heartbeat)
2. The followers receive the entry and append it to their in-memory array and then send a response that it has received the entry
3. The leader then commits the entry by writing it to a durable store (file) The leader sends the latest commit index in the heartbeat

4. The followers then commit the entries based on leader's commit index by storing the entry to their durable store (file)

One of the implementations of RAFT (link: <https://github.com/peterbourgon/raft/>)

seems to implement it this way. I wanted to confirm if this fine.

Is it OK if entries are maintained "in memory" by the leader and the followers until it is committed? In what circumstances might this scenario fail?

Answer: I found the answer to the question by posting to raft-dev google group. I have added the answer for reference.

Please reference: <https://groups.google.com/forum/#msg/raft-dev/1QbUB52fkggI>

Quoting Diego's answer:

For safety even in the face of correlated power outages, a majority of servers needs to have persisted the log entry before its effects are externalized. Any less than a majority and those servers could permanently fail, resulting in data loss/corruption

Quoting from [Ben Johnson's](#) answer to my email regarding the same:

No, a server has to flush entries to disk before being considered part of the quorum.

For example, let's say you have a cluster of nodes called A, B, & C where A is the leader.

1. Node A replicates an entry to Node B.
2. Node B stores entry in memory and responds to Node A.
3. Node A now has a quorum and commits the entry.
4. Node A then gets partitioned away from Node B & C.
5. Node B then dies and loses the in-memory copy of the entry.
6. Node B comes back up.
7. When Node B & C then go to elect a leader, the "committed" entry will not be in their log.
8. When Node A rejoins the cluster, it will have an inconsistent log. The entry will have been committed and applied to the state machine so it can't be rolled back.

Answer2: I think entries should be durable before committing.

Let's take the Figure 8(e) of the Raft extended paper as an example. If entries are durable when committed, then:

1. S1 replicates 4 to S2 and S3 then commit 2 and 4.
2. All servers crash. Because S2 and S3 don't know S1 has committed 2 and 4, they won't commit 2 and 4. Therefore S1 has committed 1,2,4, S2, S3, S4, S5 has committed 1.
3. All servers restart except S1.
4. Because only committed entries are durable, S2, S3, S4, S5 have the same single entry: 1.
5. S2 is elected as the leader.
6. S2 replicates a new entry to all other servers except the crashed S1.
7. S1 restarts. Because S2's entries are newer than S1, so S1's 2 and 4 are replaced by the previous new entry.

As a result, the committed entries 2 and 4 are lost. So I think the un-committed entries should be also durable.

1009. <https://stackoverflow.com/questions/43400533/java-rmi-how-can-i-restrict-rmi-method-to-only-be-called-internally-by-the-client-object>

Title: Java RMI: How can I restrict RMI method to only be called internally by the client object

Question: I have an RMI model which uses a thread on each side (Client/Server Side) to maintain a client heartbeat. If the client crashes without unlocking the server, the lock will eventually timeout.

I don't want the user of my client API to be able to call the methods that deal with the heartbeat/lock. However from my understanding of Java RMI, the client and server must implement a common interface which defines all the methods that I want RMI access to, and these methods must be public. Since the interface defines these methods as public, the client methods must also be public, and can not be hidden from the user.

**Question:**

Is there a way to restrict certain methods that have been exported over RMI so that only the client object itself can call them? In other words, can I make the method act as though it is private on the client side?

Answer: You don't need this. Have a look at the Unreferenced interface

1010. <https://stackoverflow.com/questions/56870560/how-to-maintain-long-reuse-connection-in-python-socketio>

Title: How to maintain long/reuse connection in python-socketIO

Question: I have been trying to maintain connection btw client and server like heartbeat checkup. When I run the program for the first time the ping is working in the server with status \*\*\*\* connect but after the 1st iteration when the emit function is called but emit is not working.

1011. <https://stackoverflow.com/questions/26176521/session-level-and-application-lvl-seqnumber>

Title: Session level and application lvl seqNumber?

Question: Does quickfix/j maintain same sequence of seqNum for both type of messages(session and application lvl messages) or each level has separate sequence of seqNum.

Suppose I have a connection running, in the same time I'm getting orders msgType=D and quickfix session level message heartbeat msgType=0. current seqNum of msgType=10, and in the mean while order msgType come in, i want to know what will be the seq number of msgType=D. either seqNum will be 11 or 1?

Answer: It's the same sequence for all types of messages.

Note that incoming and outgoing, however, each have their own sequence.

1012. <https://stackoverflow.com/questions/20745043/udp-based-server-can-t-distinguish-different-users>

Title: UDP Based Server Can't Distinguish Different Users

Question: This is a C++ server application which communicates with all clients based on UDP protocol. When a user logs into the server from client, the client application registers a UDP channel to the server and this channel is in fixed format: IP+Port, which means if the IP keeps unchanged, then no matter what user logged in the client registers a same channel.

The server's socket layer maintains a heartbeat mechanism which will remove the channel if it doesn't receive any heartbeat packets from the channel in 3 minutes. Everything works fine until the client is down, e.g. the network wire is plugged off. Look at below scene:

Answer: I see no reason to presume that the origin port number for any two users will be identical unless the client application is explicitly binding the UDP socket. Clients which initiate the communication can often use ephemeral ports just as effectively. Ephemeral ports may or may not be sufficiently random for your particular use case, code below shows how to access client ports from inbound UDP data. If they are not sufficiently random, it may be wise to encode session cookies or user-cookies into the protocol.

1013. <https://stackoverflow.com/questions/23646910/how-to-keep-connection-alive-in-gos-websocket>

Title: How to keep connection alive in GO's websocket

Question: use `code.google.com/p/go.net/websocket` in server, so client can get notification from server.  
however, It seems after client connected to server, if there is no any data transfer between client and server, server will return EOF error at `websocket.JSON.Receive()`, it looks like a timeout mechanism.

And I have search in Google, it seems websocket protocol has a **ping-pong** heartbeat to maintain the connection, I want to ask

whether `code.google.com/p/go.net/websocket` support this ping protocol or not?

What should I do if I want keep connection between client and server alive?

Answer: As recently as 2013, the go.net websocket library [does not support \(automatic\) keep-alive messages](#). You have two options:

- Implement an "application level" keep-alive by periodically having your application send a message down the pipe (either direction should work), that is ignored by the other side.
- Move to a different websocket library that does support keep-alives ([like this one](#)) **Edit:** it looks like that library has been superseded by [Gorilla websockets](#).

1014. <https://stackoverflow.com/questions/9757124/handling-network-disconnection-on-mobile-im-app>

Title: Handling network disconnection on mobile IM app

Question: What's the best way to handle and avoid long reconnection time when the network connection is dropped (no signal or telco problem) in an instant messenger-like app? How does XMPP clients handle this or apps like WhatsApp/BBM/Gtalk?

My J2ME app currently opens a socket, keeps it open, and maintains a heartbeat (50secs) + keepalive (20 mins). I must be missing something as BBM and other XMPP clients are more reliable than my app's connection (using the same telco/network).

Wonder if there's also a difference in doing this on Android and iOS.

1015. <https://stackoverflow.com/questions/687059/risk-of-exploits-backwards-into-outbound-tcp-connections>

Title: Risk of exploits “backwards” into outbound tcp connections

Question: I am building a server application that will maintain connections to other applications by initiating TCP connections out through a firewall that is only open for outbound traffic to the relevant IP's ports that the application will connect to.

What is the risk of someone having taken over the machine(s) we connect to being able to exploit our application backwards through the outbound connection that we have established.

The protocol used on the connection is not difficult to figure out but it's based on a periodic heartbeat (interval 30 seconds). If two successive heartbeats are missed, the initiator (us) will terminate the connection and reconnect.

The sourcecode or binaries for our application will not be available to the organisation we connect to.

Answer: It is straightforward for an attacker to sniff the network traffic to your server if they have access to the machine or network you are connecting to. This could allow him to reverse engineer your protocol, and then either try and inject malicious data into the data going back to your server, or replace the client side application altogether.

Since it sounds like you can't trust the client side application, it doesn't matter who is initiating the connection, once it's up, you have a two-way communication channel. The best thing to do in this case is to validate all the data coming from the client.

If you can trust the client, but not the network, then adding some encryption to your network protocol will help.

Answer: They can't do anything to you other than speak your protocol to you. The risk is precisely that anything that can be done, from their end to your end, using your protocol, will be done.

N.B. I don't mean they have to speak a *well-formed* version of your protocol to you. If your system reads incoming messages into a static buffer using fgets(), then 'buffer overruns' are part of what can be done to you using your protocol.

Answer2: Your scenario is a fairly common one, it's really rare to have a network completely isolated from the internet. That said, consider the following factors involved:

- Third parties can send info-in based on what the protocol supports. Its pretty much a lost battle, as there isn't anything you can really rely on that would block them completely. See below.
- If you want to ensure the information is coming from the right third party, then you should need signed information. Some higher level protocols can do this for you. You are exposed to vulnerabilities in the implementation, but if the protocol supports it rolling your own will hardly be less vulnerable.
- If you want to ensure the information is private, you need encryption. Some higher level protocols can do this for you. The same comments as above apply.
- You are exposed to any vulnerability in the lower level protocols used (implicitly or explicitly). Its both impossible and impractical to roll your own of everything, and if you did you are likely to introduce vulnerabilities. Of course, make sure to have the latest patches.

1016. <https://stackoverflow.com/questions/2877292/selenium-grid-not-always-using-all-of-its-registered-rpcs-why>

Title: Selenium Grid not always using all of its registered RC's, why?

Question: My Selenium Grid setup is as follows (all VMs)

VM1 - ~~Windows 7 x64~~ Windows XP x32 - Grid Hub + 2 RCs registering the default \*firefox environment

VM2 - Windows XP x32 - 2 RCs registering the default \*firefox environment

VM3 - Windows XP x32 - 2 RCs registering the default \*firefox environment

I'm happily using Mbunit and Gallio to drive the Grid, but my problem is that sometimes the Grid hub will stop passing executions over to 1 or more of the RCs, despite their showing available on the hub console. They seem to be happily maintaining their heartbeat back to the hub, but they're never asked to do any more work. This is after they had been executing tests earlier in the test run.

Does anybody have any ideas why this should happen? In every case I've observed this behaviour, the last test an RC executed, before it then seemingly gets ignored by the hub, passed, and the session was successfully closed. Interestingly, whenever it happens to more than 1 of the RCs, its always (so far) been the pair that are running on the same VM. Yet they're managing to maintain their heartbeat, so it isn't a network connectivity problem.

Any help would be greatly appreciated!

**UPDATE:** After further attempts to troubleshoot, I've now discovered something else. To begin with I swapped out my Win7 VM for an XP based one, for the sake of consistency and to rule out any issues that the hub might have running on the newer OS. I've updated the above to reflect that change.

After that change, the hub is now consistently only ever using at most 5 of the 6 registered RCs. Which RC isn't used is consistently one of the two on the machine that is the last to register with the hub. So if I start the hub on VM1, start the RCs on VM2

and VM3, and then start the RCs on VM1, one of the two RCs on VM1 will never be used.

Answer: This is perhaps a foolish question, but all RCs are running on unique ports on that given machine, right? Can you telnet to the port of the RC that isn't doing anything an issue a GET /?

Also, what version of Selenium Grid are you using?

1017. <https://stackoverflow.com/questions/1442189/heartbeat-protocols-algorithms-or-best-practices/1442255#1442255>

Title: Heartbeat Protocols/Algorithms or best practices

Question: Recently I've added some load-balancing capabilities to a piece of software that I wrote. It is a networked application that does some data crunching based on input coming from a SQL database. Since the crunching can be pretty intensive I've added the capability to have multiple instances of this application running on different servers to split the load but as it is now the load balancing is a manual act. A user must specify which instances take which portion of the input domain.

I would like to take that to the next level and program the instances to automatically negotiate the division up of the input data and to recognize if one of them "disappears" (has crashed or has been powered down) so that the remaining instances can take on the failed instance's workload.

In order to implement this I'm considering using a simple heartbeat protocol between the instances to determine who's online and who isn't and while this is not terribly complicated I'd like to know if there are any established heartbeat network protocols (based on UDP, TCP or both).

Obviously this happens a lot in the networking world with clustering, fail-over and high-availability technologies so I guess in the end I'd like to know if maybe there are any established protocols or algorithms that I should be aware of or implement.

## EDIT

It seems, based on the answers, that either there are no well established heart-beat protocols or that nobody knows about them (which would imply that they aren't so well established after all) in which case I'm just going to roll my own.

While none of the answers offered what I was looking for specifically I'm going to vote for [Matt Davis's answer](#) since it was the closest and he pointed out a good idea to use multicast.

Thank you all for your time~

Answer: [Distributed Interactive Simulation](#) (DIS), which is defined under [IEEE Standard 1278](#), uses a default heartbeat of 5 seconds via UDP broadcast. A DIS heartbeat is essentially an Entity State PDU, which fully defines the state, including the position, of the given entity. Due to its application within the simulation community, DIS also uses a concept referred to as dead-reckoning to provide higher frequency heartbeats when the actual position, for example, is outside a given threshold of its predicted position.

In your case, a DIS Entity State PDU would be overkill. I only mention it to make note of the fact that heartbeats can vary in frequency depending on the circumstances. I don't

know that you'd need something like this for the application you described, but you never know.

For heartbeats, use UDP, not TCP. A heartbeat is, by nature, a connectionless contrivance, so it goes that UDP (connectionless) is more relevant here than TCP (connection-oriented).

The thing to keep in mind about UDP broadcasts is that a broadcast message is confined to the [broadcast domain](#). In short, if you have computers that are separated by a layer 3 device, e.g., a router, then broadcasts are not going to work because the router will not transmit broadcast messages from one broadcast domain to another. In this case, I would recommend using multicast since it will span the broadcast domains, providing the time-to-live (TTL) value is set high enough. It's also a more automated approach than directed unicast, which would require the sender to know the IP address of the receiver in order to send the message.

Answer: Broadcast a heartbeat every  $t$  using UDP; if you haven't heard from a machine in more than  $k*t$ , then it's assumed down. Be careful that the aggregate bandwidth used isn't a drain on resources. You can use IP broadcast addresses, or keep a list of specific IPs you're doing work for.

Make sure the heartbeat includes a "reboot count" as well as "machine ID" so that you know previous server state isn't around.

I'd recommend using [MapReduce](#) if it fits. It would save a lot of work.

Answer: Cisco content switches are a hardware solution for this problem. They implement a virtual IP address as a front end to multiple real servers, whose real IP addresses are known to the switch. The switch periodically sends HTTP HEAD requests to the web servers, to verify they are still running (which the switch software calls a "keepalive", although this doesn't keep the server itself alive). The Cisco switch accepts traffic on the virtual IP and forwards it to the actual web servers, using configurable load balancing such as round-robin, or user-defined load balancing.

These switches retail in the \$3-10K range, although my business partner picked one up on eBay for about \$300 a year ago. If you can afford one, they do represent a proven hardware solution to the question of how to have a service spread transparently across multiple servers. Redhat includes a built-in port configuration so that you could implement your own Cisco switch using a cheap RedHat box. Google for "virtual ip address" and "cisco content router" for more information.

1018. <https://stackoverflow.com/questions/15874764/camel-need-non-blocking-queue-analogous-to-not-processing-events-on-graphics-thread>

Title: Camel need Non-blocking Queue - Analogous to not processing events on graphics thread

Question: Sorry I answered my own question - it actually IS just SEDA, I assumed when I saw 'BlockingQueue' that SEDA would block until the queue had been read ... which of course is nonsense. SEDA is completely all I need. Question answered

---

I've got a problem that's completely screwing me, I've been provided a custom Endpoint by company we connect to, but the endpoint maintains a heart-beat to a feed, and when it sends messages above a certain size they take so long to process on the route that its blocking and the heartbeat gets lost and the connection goes down

Obviously this is analogous to processing events on a non-graphics thread to keep a smooth operation going. But I'm unsure how I'd achieve this in camel. Essentially I want to queue the results and have them on a separate thread.

Answer: as suggested [camel-seda](#) is a simple way to perform async/mult-threaded processing, beware that the blocking queues are in-memory only (lost if VM is stopped, etc). if you need guaranteed messaging support, use [camel-jms](#)

1019. <https://stackoverflow.com/questions/20380557/c-sharp-sockets-missing-some-data-unless-i-set-a-breakpoint>

Title: C# sockets missing some data unless I set a breakpoint

Question: I am troubleshooting an issue on a relatively simple socket application which is listening for status updates from a third party machine. I have set up a TcpListener object to wait for a connection request and then establish the socket to read the data coming in. I get the periodic heartbeat as expected without issue, but whenever there is a sudden change in status the server machine sends out an immediate update which I don't get. The bizarre thing here is that I get the update no problem if I set a breakpoint in the code.

The server itself handles these connections a little strangely and doesn't maintain an open socket connection. when it tries to send data, it opens the connection, sends data, and then closes the connection, which is why I've built this to similarly wait for a connection and close it when the data transfer is done before beginning to listen for another connection request.

Answer: Ok, I've resolved this. Turns out I was closing the socket too soon which led to some weird behavior that, honestly, I don't fully understand, but I do know how I fixed it.

After opening the socket I needed to continue listening for data until receiving a 0 length message which signaled that the server had closed the connection. At that point I could start listening for a new socket connection request. I'm still not sure why I would get the heartbeats only, but everything has been working perfectly since I made the change.

1020. <https://stackoverflow.com/questions/43309707/session-timeout-security-concerns>

Title: Session timeout security concerns

Question: I've read about the security risks of the long session timeout. On the other hand I can return to great websites after a month and I see that I'm still logged in.

It is the case with the stacoverflow.com itself, but the gog.com or g2a.com works in the same way. So what is the golden rule about this?

I will create an e-commerce site and the long session timeout would be really convenient to the customers. I guess that is not easy answer, because on an e-commerce site people can spend money. Despite it a short timeout (e.g. 1 hour) would be extremely

inconvenient. I think the shortest acceptable timeout (from the aspect of customers) is a week.

Some site use a short session timeout, but automatically(!) put a "remember me" or token cookie which result are the same. Are there any difference?

Answer: If you by default allow long session timeouts, then the risk is on shared computers - future user accesses the session of the current user. If you try to blame the user for not logging out, then you will find your user base dwindle and you will have to deal with a lot of end user complaints.

Best practice is to have short timeout by default, but allow an option 'remember me on this device' so that people can opt to long sessions if they are in a trusted environment. The golden rule is "secure by default".

1021. <https://stackoverflow.com/questions/21769481/spring-security-custom-session-timeout>

Title: spring security custom session timeout

Question: I am using spring security with my spring mvc webapp and I am trying to implement a custom session expiry. My requirement is when the session expired I need to retrieve the user for which the session expired and then grab something from their security context and write it to the redirect url.

The problem I am facing is that on session timeout the security context is not the user for which the session has timed out. Instead the security context comes out as anonymous user.

How can I get org.springframework.security.web.session.SessionManagementFilter to pass the user for which the session has timed out into  
onInvalidSessionDetected(request, response);

Here is the method in SessionManagementFilter where I need to somehow get the user for which the session timeout is happening and pass it to invalidSessionStrategy. Or alternatively can I just grab that inside invalidSessionStrategy.

Answer: You can either set the session timeout (say 60 minutes) for all sessions in web.xml:

```
<session-config>
 <session-timeout>60</session-timeout>
</session-config>
```

or on a per-session basis using

```
session.setMaxInactiveInterval(60*60);
the latter you might want to do in a authorizationSuccessHandler.
```

```
<form-login authentication-success-handler-ref="authenticationSuccessHandler"/>
```

1022. <https://stackoverflow.com/questions/14282979/grails-spring-security-redirect-after-session-timeout>

Title: Grails Spring Security Redirect after Session-Timeout

Question: I have an issue with the Session Timeout. In my grails application an user logs in after a session timeout, but then gets to the last edited page. I want to prevent that and send them to a specific URL. How can I achieve this, I cant find something in the spring security documentation.

Answer: The two properties sound like they should do the same, but in my case it only works when I have them both. Perhaps you can remove one of them and get it to work...

This will alter the behavior any time you log in, not just after a timeout. If you need a more dynamic solution, I guess you have to dig into the spring security source code...

1023. <https://stackoverflow.com/questions/23901950/spring-security-ajax-session-timeout-issue>

Title: Spring Security + Ajax session timeout issue

Question: I have an app build with Spring MVC and secured with Spring security, a bunch of the controllers are JSON rest services that are all protected. I'm using `LoginUrlAuthenticationEntryPoint` to detect AJAX requests and send 403 ERROR CODE if session timeout occurs - all other requests just get redirected back to login page.

Below is the Spring Security XML snippet and the authenticationEntryPoint java class.

The issue is that the first AJAX Request after session timeout, Spring redirects to login page and the returns login page HTML, if I attempt to do AJAX request again (after redirect happens) the authenticationEntryPoint executes and HTTP Error Code 403 is returned. I have attempted the same thing using this mechanism <http://distigme.wordpress.com/2012/11/01/ajax-and-spring-security-form-based-login/> and the same exact thing happens (on first AJAX request a redirect occurs, all subsequent AJAX requests HTTP 403 is returned). I do not want to get Redirect to login page for AJAX requests where session is timed out.

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1024. <https://stackoverflow.com/questions/24367050/how-do-i-create-a-security-timeout-in-coldfusion>

Title: How do I create a security timeout in ColdFusion?

Question: I am creating an application that needs more advanced security measures, besides logging in with an account.

I want the whole website to track how long a user has been idle, and then automatically log them out after 30 seconds. So that their session expires, thus having them to log in again.

Is there an easy way to do this?

1025. <https://stackoverflow.com/questions/30059012/spring-security-csrf-token-after-session-timeout>

Title: Spring Security Csrf token after session timeout

Question: There is a form with POST method and `csrf_token = '1'` (for brevity). After the session timeout, I submit the form and get redirected to login page. After logging in, I can see the old token (in the request) and the new generated token ('2') in `CsrfFilter` (in the debugger). Since these don't match, I get an `InvalidCsrfTokenException` and then a 403 error.

How should Spring normally behave in this case?

I checked these posts:

- [Getting 403 with CSRF token in spring security](#)
- [Session timeout leads to Access Denied in Spring MVC when CSRF integration with Spring Security](#)

but they both look like workarounds. Is there no better option? Why wouldn't the Spring team include one of them as a default?

Answer: The point of a CSRF token is to prevent CSRF attacks. This basically entails storing a token in the user session, which by the premise of your question, has expired, and thus, is gone. Both the "workarounds" in the questions you linked to are viable options.

1026. <https://stackoverflow.com/questions/25522139/how-to-turn-off-http-session-timeout-in-spring-security>

Title: How to turn off HTTP session timeout in Spring Security?

Question: Is it possible to turn off HTTP session timeout in Spring Security?

From this [answer](#) I see that the HTTP session timeout can be modified in web.xml like this:

```
<session-config>
 <session-timeout>10</session-timeout>
</session-config>
```

But I did not find from the Spring Security manuals how to disable the timeout.

From this [answer](#) I see that the Spring Security uses a javax.servlet.http.HttpSession internally, which according to this [manual page](#) can be set to never expire by calling method setMaxInactiveInterval(0).

Therefore it should be possible to change the session timeout by obtaining the HttpSession (as shown [here](#) in an answer) and changing the maxInactiveInterval to 0. My question is, if I will do this the first time after the user has logged in, will the change persist in the HttpSession (i.e., in a next request, will the change in HttpSession will be still there?)

And is it possible to disable the session timeout in web.xml like this or not?

```
<session-config>
 <session-timeout>0</session-timeout>
</session-config>
```

And another question, what is the default HTTP session timeout in Spring Security?

Answer: Yes. The snippet below will keep the HttpSession alive unless the session is invalidated explicitly

1027. <https://stackoverflow.com/questions/6232633/entity-framework-timeouts>

Title:

Question: I am getting timeouts using the Entity Framework (EF) when using a function import that takes over 30 seconds to complete. I tried the following and have not been able to resolve this issue:

I added `Default Command Timeout=300000` to the connection string in the *App.Config* file in the project that has the EDMX file as suggested [here](#).

This is what my connection string looks like:

What else can I do to get the EF from timing out? This only happens for very large datasets. Everything works fine with small datasets.

Here is one of the errors I'm getting:

```
System.Data.EntityCommandExecutionException: An error occurred while executing the
command definition. See the inner exception for details. --->
System.Data.SqlClient.SqlException: Timeout expired. The timeout period elapsed prior to
completion of the operation or the server is not responding.
```

---

OK - I got this working and it's silly what happened. I had both the connection string with `Default Command Timeout=300000` and the `CommandTimeout` set to 180. When I removed the `Default Command Timeout` from the connection string, it worked. So the answer is to manually set the `CommandTimeout` in your repository on your context object like so:

Answer: There is a known bug with specifying default command timeout within the EF connection string.

<http://bugs.mysql.com/bug.php?id=56806>

Remove the value from the connection string and set it on the data context object itself. This will work if you remove the conflicting value from the connection string.

## Entity Framework Core 1.0:

```
this.context.Database.SetCommandTimeout(180);
```

## Entity Framework 6:

```
this.context.Database.CommandTimeout = 180;
```

## Entity Framework 5:

```
((IObjectContextAdapter)this.context).ObjectContext.CommandTimeout = 180;
```

## Entity Framework 4 and below:

1028. <https://stackoverflow.com/questions/21190190/spring-security-get-authentication-on-session-timeout-authentication-object-is>

Title: Spring Security Get Authentication on Session TimeOut : Authentication object is returning NULL on session timeout

Question: I'm using spring/spring-security 3.1 and want to take some action depends on the authorities in AUTHENTICATION object whenever session is timed out. AUTHENTICATION object is null on session timeout.

Here are the files for reference:

security config:

```
<logout invalidate-session="true" logout-url="/j_spring_security_logout"
success-handler-ref="logoutSuccessHandler"/>

<!-- Custom filter to deny unwanted users even though registered -->
<custom-filter ref="blacklistFilter" before="FILTER_SECURITY_INTERCEPTOR" />

<!-- Custom filter for username, password and domain. The real customization
is done in the customAuthenticationManager -->
<custom-filter ref="authenticationFilter" position="FORM_LOGIN_FILTER" />

</http>
```

Note: tried with "invalidate-session="false"" as well.

and my custom LogoutSuccessHandler:

```
public class EnterpriseLogoutSuccessHandler extends
SimpleUrlLogoutSuccessHandler{

@Override
public void onLogoutSuccess(HttpServletRequest request, HttpServletResponse
response, Authentication authentication) throws IOException, ServletException {
for(GrantedAuthority authority: authentication.getAuthorities()){
 if(authority.getAuthority()!=null)
 logger.debug("THE CURRENT AUTHORITY FOR THE SESSION IS : {}"
",authority.getAuthority().toString());
 else
 logger.debug("THE CURRENT AUTHORITY FOR THE SESSION IS : {}"
",authority.getAuthority().toString());
}
}
```

```

 logger.debug("THE CURRENT AUTHORITY FOR THE SESSION IS
authority.getAuthority(): NULL ");

 if(authority.getAuthority()!=null &&
authority.getAuthority().equalsIgnoreCase(Operational.SPRING_SECURITY.LOGIN_SOURCE
_BEACON)){
 loginSource = authority.getAuthority().toString();
 break;
 }
 }
}
}

```

So, there is the question how I can obtain Authentication object on the session timeout.

Can some help me to find out the solution for the above problem.

1029. <https://stackoverflow.com/questions/9385759/jsf-spring-security-session-timeout-viewexpiredexception>

Title: jsf spring security session timeout viewExpiredException

Question: This solution works, but it has just one problem:

If I leave the browser staying idle at a page until the session timeout expires, and then I request the same page, then I get a "viewExpiredException". This is because the filter worked well, it bypassed the redirection to the invalidSessionUrl, but as the session expired anyway, then I get that exception trying to re-render the same page.

If I request any other unsecured page when the session timeout has expired, it works well, it redirects correctly to the page and I don't get the viewExpiredException.

Anyone knows how to solve this?

Answer: I essentially use `intercept-url` tags to claim that pages within certain relative contexts can only be accessed by the following roles. You can see that all pages at the web application default context are available to anonymous users. If the user is unauthorized to view the page then they will be redirected to `access-denied-page`. The only catch is that your User bean has to implement the `UserDetails` interface and have a property that returns a role bean which implements the `GrantedAuthority` interface. Spring will look for a `UserDetails` to have a `GrantedAuthority` property to determine what the role is. If this user does not exist, is unauthenticated, or unknown then it will default to anonymous role.

1030. <https://stackoverflow.com/questions/9385759/jsf-spring-security-session-timeout-viewexpiredexception>

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1031. <https://stackoverflow.com/questions/43065889/spring-security-session-is-not-invalidating-properly-on-timeout>

**Title:** I'm using spring-security-core 2.0 in my grails 2.4.4 application. I limited my concurrent session access of a user to 1. So the problem is after session timeout of 30 minutes I couldn't login with that username and password, it will throw the concurrent session maximum exceeded exception. I'm doubtful that, on the session timeout my logout is not working properly so that session can still be active.

I'm a newbi to spring-security so can anyone tell me what to do?

Here I'm giving What are changes I have made in my code to limit the concurrent access.

1032. <https://stackoverflow.com/questions/40214042/customized-session-timeout-in-spring-security>

**Title: customized session timeout in spring/security**

**Question:** How to customize session timeout in spring.. session timeout parameter/input is set in web.xml for 15 minutes.. and it is working fine.. I want to execute few lines before this session timeout happens and should be able to decide whether to proceed with session timeout or not.. This means.. I want to check some parameter in session and then want to selectively proceed with session timeout(i.e after 15 minutes of inactivity) for some users, and other users this timeout should never occur.

1033. <https://stackoverflow.com/questions/21752443/spring-security-custom-session-timeout-stuck-in-infinite-loop>

Title: spring security custom session timeout stuck in infinite loop

Question: And the code is executed properly but even after the redirect the code just keeps falling into the `onInvalidSessionDetected` method instead of actually redirecting to what I've configured in the `invalidSessionUrl` property.

I don't really get it.

1034. <https://stackoverflow.com/questions/38720167/how-to-handle-session-timeout-in-spring-security-3-2>

Title: How to handle session timeout in Spring-security 3.2

Question: I am new to spring security. I am trying to redirect the URL to login page on clicking any tab/link after session time out

I have below configuration in my security context

1035. <https://stackoverflow.com/questions/17835696/is-there-a-session-timeout-exception-in-spring-security>

Title: Is there a Session Timeout Exception in Spring Security?

Question: That would be useful, so that I don't have to check if session is valid before interacting with the currently login user. Even nicer if I could tell Spring to automatically redirect user to the login page if session is already timed out.

There's a similar question here:[Logout/Session timeout catching with spring security](#) but what I really need is something more intuitive and elegant. Is that possible?

Answer: Actually

```
<form-login login-page='/login.jsp'>
```

will already do this. If the user requests a secured page and is not logged in (that also happens when the session isn't available due to a timeout), spring security sends a redirect to the specified `login-page`.

<http://static.springsource.org/spring-security/site/docs/3.1.x/reference/ns-config.html#ns-form-and-basic>

Answer: How do you deploy your web application? Which server? Are you specifying some session timeout apart from the one you've got configured in KC?

1036. <https://stackoverflow.com/questions/37030912/spring-session-spring-security-session-timeout-handling-not-working>

Title: Spring Session & Spring Security - session timeout handling not working

Question: When attempting to add spring-session to an existing Spring MVC project with spring-security, I get the following behavior (EDIT: with tomcat's session-timeout set to 1 minute for testing):

- With the `springSessionRepositoryFilter` filter in `web.xml` *commented-out*, I am correctly booted to the login screen after a minute of inactivity
- With the `springSessionRepositoryFilter` filter in `web.xml` active, I can continue to use the app at least 5 minutes after the last activity

Besides that, everything seems to work as expected - the session is persisted in redis & across webapp restarts, and logging out manually correctly invalidates the session.

Some snippets of my configuration - here is the invalid session handler configuration for spring-security, that will cause expired sessions to be redirected to a login page:

1037. <https://stackoverflow.com/questions/37030912/spring-session-spring-security-session-timeout-handling-not-working>

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Some snippets of my configuration - here is the invalid session handler configuration for spring-security, that will cause expired sessions to be redirected to a login page:

Answer: When using Redis session timeout is configured like this:

1038. <https://stackoverflow.com/questions/32434276/configure-session-timeout-in-grails-spring-security-core-plugin-without-modify>

Title: Configure session timeout in Grails Spring Security Core plugin, without modifying 'War'

Question: I would like to configure session timeout in Grails 2.3.11 with Spring Security Core plugin. But I don't want to touch it's war(output) file.

Answer: I'd recommend installing the runtime ':webxml:1.4.1' plugin, then you can create a file called YOUR-APP/grails-app/conf/WebXmlConfig.groovy:

```
webxml {
 sessionConfig.sessionTimeout = System.getProperty('SESSION_TIMEOUT') ?:
 System.getenv('SESSION_TIMEOUT') ?: 30
}
```

When the .war is deployed, you can set the system variable to the desired value

1039. <https://stackoverflow.com/questions/9425925/how-to-handle-session-timeout-when-using-servlet-3-0-programmatic-security>

**Title:** How to handle session timeout when using Servlet 3.0 programmatic security

Question: Regarding Servlet 3.0 programmatic security, when a session times out there is no way to invoke `HttpServletRequest#logout()`.

Does the user remain logged into JAAS?

If so, what is best practice to handle logging out of JAAS after session times out?

How does the container handle the user's subsequent request to login again and create a new session after session timeout?

As an aside, what are the pros and cons of using the following three approaches to handle session timeout when using Servlet 3.0 programmatic security:

1. HttpSessionListener#sessionDestroyed()
2. Make the @ManagedBean @SessionScoped  
LoginManager implement HttpSessionBindingListener and do something in valueUnbound.
3. Annotate a method in LoginManager with @PreDestroy.

Any other suggested approaches/ best practices advice would surely be appreciated.

Answer: There is a statement somewhere in the Servlet specification to the effect that session invalidity corresponds precisely to the state where there is no Principal in it. This is the key. logout() and timeout both invalidate the session, and invalidating the session removes the Principal from it, and all its value bindings.

All that JAAS really does is allow LoginModules to accumulate Principals in a Subject, both for the user and his roles. All that the JAAS logout() method really needs to do is clear the Subject of the Principals that were added by the same module's login(), or more probably commit(), method, and this is really just for total security if you have added things like private credentials to the Subject. As logout() won't be executed by the same instance as login()/commit(), that removal has to be based on principal class rather than on an internal collection of principals.

The JAAS logout() isn't called when the session expires, but as the Principal is removed from the session that shouldn't really matter to anybody.

If you want to track session termination for some other reason, e.g. logging, make your user bean a session binding listener and log the termination as a logout in the valueUnbound() method: this is 100% reliable in my experience.

To answer your other questions, there isn't such a state as 'logged in to JAAS': JAAS provides a login/logout service *to the container*, not to itself; and a new login is a new login, into a new session, whether or not the previous one expired.

Answer: Session management is not directly linked to JAAS.. and session management really depends on your container.

In Jetty 8, session management is handled by the SessionManager (at the context level) and SessionIdManager (at the server level).

The browser sends the session id to the server. The class implementing the SessionManager validates the session Id. If the session is expired, the session is invalidated and removed, and session listeners are notified.

I am not sure why you then need to 'logout' the user then but you should be able to hook your logout on the listeners.

'Staying logged in JAAS' may not mean much on your container. Jetty does not have a user/principals/subjects cache, so you do not 'stay logged in' unless you implement a cache yourself, as we did.

The JAAS module simply provides authentication and authorization; nothing else.

ADD

When the session is expired, the server sends a 302 back and redirects to the login page. The form submit on the page calls the Login module (which may be a JAAS Module) and upon successful authentication creates a new session and session id which is sent back to the browser usually via the mean of a cookie ( or URL rewriting).

Unless your app handles a single context id for all your contexts, I do not think you should perform any type of programmatic logout when a session expires; you may 'invalidate' an user which still has a valid session in another context.

Answer: I don't know what's inside the guts of JAAS. I don't know how the web container interfaces with JAAS e.g. where the Subjects, Principals and Groups are stored, what actually happens when HttpServletRequest#logout() is invoked vs. when the session times out. Does the housekeeping performed when HttpServletRequest#logout() is invoked also get performed by the container if the session times out? If not, why is it not necessary in such circumstance?

1040. <https://stackoverflow.com/questions/33269391/spring-security-auto-logout-for-particular-user-after-timeout-using-thread-from>

Title: Spring Security auto logout for particular user after timeout using thread from Java class

Question: I have a problem. I can't implement user's Spring Security auto logout for particular user after timeout using thread. I've already tried to implement the kill of the particular user's session. Also I've already tried to call Spring Security logout from my thread. Here is my implementing of user's session kill.

1041. <https://stackoverflow.com/questions/14574251/spring-security-session-timeout-issue-when-accessing-root>

Title: Spring Security session timeout issue when accessing root “/”

Question: I am trying to implement session timeouts with spring security. I have web.xml and the security context setup, but I am having a problem when a user tries to access the root "/". Spring thinks that it is an invalid session (because technically it is) and redirects to /sessiontimeout.

Is there anyway to ignore this initial invalid session because the user has not logged in yet? Or differentiate between an expired session and one that is invalid?

Answer: An "invalid session" isn't one where the user hasn't authenticated. It's when the browser submits a JSESSIONID cookie for an old session, for example when it has timed out but also potentially when the user has logged out but the cookie is still present.

Most likely this is what you are seeing. You can configure Spring Security to try to delete the session cookie when a user logs out, as explained in [the reference manual](#).

1042. <https://stackoverflow.com/questions/25674582/spring-security-session-timeout-without-extending-renewing>

Title: Spring Security – Session Timeout without extending/renewing

Question: Is there a way in Spring Security to set sessions to expire after a time, regardless of activity?

i.e. when someone logs in, they have exactly 30 minutes to work and then the session is dead, regardless of whether they have been navigating, making REST calls, etc.

Answer: I don't think so. But you can use Quartz scheduler for job scheduling and execute a job when you need, for example 30 minutes after the user logged in.

1043. <https://stackoverflow.com/questions/14574251/spring-security-session-timeout-issue-when-accessing-root>

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1044. <https://stackoverflow.com/questions/10531512/redirect-after-session-timeout-grails-spring-security-core-tomcat>

Title: Redirect after Session timeout (Grails, Spring Security Core, Tomcat)

Question: I have an application developed in **Grails** (v1.3.7) and we used **Spring Security Core** (v1.2.6) plugin for authentication. After building .war file, I have *deployed the application in a standard tomcat server* (v7.0.22). The application runs fine.

I know that I can configure Session timeout period in web.xml either before building the application or in the tomcat server itself. But, I want (additionally) to redirect any page to the log-in page automatically whenever the Session is timed out. Because, if the Session times out and users click on any links or simply refresh the current page, they get a tomcat error.

Can anyone suggest a way to resolve it easily? Is there any configuration (like expired-session-url) in **Tomcat** or **Spring Security Core** that does the job?

I have search in the plugin doc site, plugin blog site but nothing found. [This site](#) suggest that I would require to add a listener in code and I would hate to do that and would like to use a simple configuration like [this](#). Can anyone guide anything?

Answer: Http is stateless protocol, and session is just a marker stored on client cookies (+ local db), and you can't handle this as an event. 'new client' and 'session expired' is the exactly same, it just means that you can't identify browser for current request. For most cases it means also that user is not authenticated (for raw Spring Security Core, at least)

For your case, you already have session expired handler, it's when you're getting this tomcat error. Just handle this error, and redirect user to login page.

Btw, if you have proper Spring Security configuration, it must redirect all non-authorized users to login page. And seems that you have made something wrong with your app architecture, if you have authenticated user, but still having some user details in standard tomcat session. There at least two ways: avoid your own user session, or make some kind of session-based Spring Security authentication config.

1045. <https://stackoverflow.com/questions/27654206/session-timeout-leads-to-access-denied-in-spring-mvc-when-csrf-integration-with>

Title : Session timeout leads to Access Denied in Spring MVC when CSRF integration with Spring Security

Question: I have Integrated CSRF token with Spring Security in my Spring MVC Project. Everything works properly with CSRF token, token will be sent from client side to server side.

I have changed my logout process to make it POST method to send CSRF token and it works fine.

I have faced problem when session timeout occurs, it needs to be redirected to spring default logout URL but it gives me Access Denied on that URL.

How to override this behavior.

I have included below line in Security config file

Answer : The question is a bit old, but answers are always useful.

First, this is a known issue with session-backed CSRF tokens, as described in the docs: [CSRF Caveats - Timeouts](#).

To solve it, use some Javascript to detect imminent timeouts, use a session-independent CSRF token repository or create a custom `AccessDeniedHandler` route. I chose the latter:

1046. <https://stackoverflow.com/questions/27654206/session-timeout-leads-to-access-denied-in-spring-mvc-when-csrf-integration-with>

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How to override this behavior.

I have include below line in Security config file

```
<http>
 //Other config parameters
 <csrf/>
</http>
```

Please let me know if anyone needs more information.

1047. <https://stackoverflow.com/questions/26660131/vbscript-sql-integrated-security-db-connection-timeout>

Title: VBScript, SQL Integrated security, DB Connection Timeout

Question: I have a VBScript that connects to a *SQL Server*. I am using integrated security in the connection string:

```
Provider=SQLOLEDB;Data Source=servename;Initial Catalog=databasename;
Integrated Security='SSPI';
```

Everything works perfectly when I execute the script by double clicking the .vbs file, but when I schedule the .vbs file to run through task scheduler, the connection to the database times out.

I have task scheduler set up to run using the credentials that work when executing manually.

I hope this is enough information and someone can help me with what the problem is. Please be kind to this virgin who has gotten lots of answers here before, but has never asked a question before.

Answer: Nice. If you would be a doctor and a patient comes with pain you would tell him to get painkillers and shut up? THere is NO reason in which the standard timeout for a connection is not good enough.

1048. <https://stackoverflow.com/questions/39546080/timeout-of-continue-button-in-java-security-panel-in-a-jws-application>

Title: Timeout of Continue button in Java security panel in a JWS application

Question: I am working on a Java webstart application and am getting the below security alert when launching the application.

JWS plug-in verifies the certificate while launching the application and gives a java security warning.

My doubt is that if I click on the "continue" button after a minute, application crashes with socket timeout exception when I launch it using Java 8 update 66. When I do the same with Java 7 update 76 after even half an hour, application launches successfully.

So, does the timeout of "continue" button feature available in the java security panel is infinite in Java 7 and one minute in Java 8 (OR) does this have anything related to hosting OS - apache modules of SLES11 or SLES12 (in case of my project).

1049. <https://stackoverflow.com/questions/44775120/spring-security-custom-session-timeout-url>

Title: Spring security custom session timeout url

Question: Currently I'm working on spring security app, where I need user to be redirected to a custom lock page when session is expired which only contains a password field. (username might be placed in a hidden field inside the login form.) I need to pass username extracted from UserDetails instance and redirect to this custom URL once login session timed out.

I tried to use `concurrency-control -> expired-url` but it did not give me successful result. I will be very helpful if you could give some guidance to achieve this.

Is this possible to achieve since I will need to have customized behavior on `authentication-failure-url` too? (when a given password is incorrect). I'm expecting something like this:

user Login screen: <https://i.stack.imgur.com/vTPkF.png>

Lock screen after logged in user being inactive for while: <https://i.stack.imgur.com/DY9kG.png>

1050. <https://stackoverflow.com/questions/13516033/how-to-detect-session-timeout-expired-using-spring-security>

**Title:** How to detect session timeOut expired using spring security?

Question: how to detect and redirect page when the timeout expires in a JSF application without navigation. My application contains one xhtml page only. and how to adjust the timeout?

Answer: I don't do Spring. But in theory, it is in any way irrelevant here if you're using Spring or not. This is a pure client side solution with help of an extremely simple servlet which should run as good in a Spring flavored webapp

1051. <https://stackoverflow.com/questions/36795678/how-to-enable-session-and-set-session-timeout-in-spring-security>

Title: How to enable session and set session timeout in Spring Security

Question: I need clarification on whether I am doing it right, if it looks good, then where I need to setup the session timeout. I am doing it fully based on annotation.

Answer: If you are using `JavaConfig` and do not want to use XML you can create a `HttpSessionListener` and use `getSession().setMaxInactiveInterval()`, then in the `Initializer` add the listener in `onStartup()`:

1052. <https://stackoverflow.com/questions/54669701/security-issue-javascript-access-to-cookies-containing-custom-timeout-and-last>

Title: Security issue– javascript access to cookies containing custom timeout and last accessed datetime values.

Question: Originally, we were passing a custom timeout value and another date time value which indicates the last time a server request was made in a state cookie and reading it in the front end (javascript in some parts of the application/typescript in other parts of the application) to trigger a client side session timeout and redirect to a timeout page.

We use a javascript utility in some parts of the old legacy code which checks the last accessed date time value from the tstate cookie and also the timeout value and works out when to time out the application. With our Angular apps, we use a http response interceptor and `setInterval()` to timeout the application (again by reading the timeout value from the state cookie)

We now need to recreate this functionality without relying on the values coming back from the cookie due to security concerns.

We have decided to go down the route of setting the `HttpOnly` flag on the session cookie but the key question is where to get the timeout value and the last activity value from and where would be the best place to store it so that it can be accessed by both the angular apps and the legacy code.

Any ideas on this would be greatly appreciated.

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Any ideas on this would be greatly appreciated.

1054. <https://stackoverflow.com/questions/14564953/is-there-a-security-risk-when-changing-the-timeout-of-the-session-cookie>

Title: Is there a security risk when changing the timeout of the session cookie?

Question: Suppose I have a pyramid application where I use UnencryptedCookieSessionFactoryConfig for csrf tokens and authentication with SessionAuthenticationPolicy. The default timeout for the session cookie is 1200, which means that my user is disconnect after 20 minutes, which is quite annoying. I was tempted to raise the timeout or even remove it, and to set a max\_age to make it survive the browser, but I guess the timeout is there for a good reason.

Is there a security risk with having an long-lived session cookie ? Is it considered bad practice ?

My guess is that the csrf token should be short-lived. In that case, I should use AuthTktAuthenticationPolicy for the authentication. Same question : is an authentication cookie with a max\_age far in the future a bad practice ?

Answer: Note that the timeout only applies to users that do not contact the server in that time. A visit to your site within 20 minutes refreshes the cookie.

Yes, there is a security risk in allowing longer time-outs on cookies; it creates a longer window in which to compromise the client computer or try to exploit a XSS flaw in your application. I'd still set a limit on the cookie.

I'd use the AuthTktAuthenticationPolicy to manage user authentication sessions anyway; it offers more fine-grained control over session lifetime (see this [older answer of mine](#)).

You could even write a small piece of javascript that pokes the server periodically when the user is active (keyboard and mouse input, poking, say, once every minute) to refresh that cookie; close the browser, session gone automatically within 20 minutes.

1055. <https://stackoverflow.com/questions/14320988/grails-spring-security-reload-session-variables-on-relogin-after-session-timeout>

Title: Grails Spring Security - reload session variables on relogin after session timeout

Question: I'm using spring security core in my grails application. My app has lots of ajax calls which call controllers. Controllers in turn, depend on some session variables to fulfil the request. I'm currently able to correctly display the ajax login form on session timeout. However, it creates a new session with only the newly created user object. All other objects stored in session are lost.

Is there a way to reload session variables after a user logs back in after session time out?

Answer: the purpose of the session scope is that it's wiped when the session ends. if you need to share data between sessions, you should rethink your architecture and persist the data in a database (server side), or a cookie (client side)

(moved from comments into an answer)

1056. <https://stackoverflow.com/questions/56167098/savedrequestawareauthenticationsuccesshandler-does-not-work-as-intended-when-session-timeout>

Title: SavedRequestAwareAuthenticationSuccessHandler does not work as intended when session timeout in spring security

Question: I'm using Spring Security 4.2.2.RELEASE in my application. Once the session timeout happens and then if the user click any URL, it gets redirected to logout page and once the authentication is successful, it redirects to the default Home page, not the previously requested page.

So I tried to workaround this behavior by adding following configurations to the servlet.xml file.

Answer: The initial request is stored in the session, there is no session hence nothing to store and thus after login nothing to re-execute. Only using the referrer header won't be enough as there could be a request body involved etc.

1057. <https://stackoverflow.com/questions/38020218/angularjs-and-spring-security-redirecting-to-login-on-session-timeout>

Title: angularjs and spring security redirecting to login on session timeout

Question: I am using spring security with angularjs, when my session times out i return an endpoint with JSON saying the session is invalid and using angularjs I try to redirect to my login page. The problem when I redirect to the login page is that the session is no longer timed out, and thus redirects to the index page.

Answer: need to understand few things : 1. is invalidateSession() getting called 2.if 1 is happening then is \$location.path("/login"); getting called

1058. <https://stackoverflow.com/questions/22658527/session-timeout-at-idp-with-spring-security-saml>

Title: session timeout at IDP with spring security saml

Question: Can someone please explain what happens at the SP sessions, when a timeout occurs at the IDP ?

How does the SP know to redirect user to IDP to login again ?

Does the SP ping the IDP every time a request comes to it ?

Answer: Once the user is transferred to the IdP, the session length is up to the SP. There isn't a mechanism really "built-in" to SAML, beyond the SP deciding that it needs to get a more recent authentication.

1059. <https://stackoverflow.com/questions/32721190/how-to-bypass-session-timeout-for-anonymous-user-with-spring-security>

Title: How to bypass session timeout for anonymous user with Spring Security?

Question: I've been working with Spring Security for two weeks now and it's working well except for anonymous users and session timeouts.

### Use Case #1

1. An anonymous user can visit the site and view public pages (/home, /about, /signup, etc.) for as long as they want (**no session timeouts**).
2. If the user selects a protected page the login screen appears.

### Use Case #2

1. A registered user logs in and can view protected pages.
2. If their session times out, the invalidSessionUrl page is displayed and the user is directed to log in.

I've read a ton of SO and blog posts but I can't seem to find the solution to Use Case #1. I'm using Spring 4.1.6.RELEASE, Spring Security 4.0.2 RELEASE and Tomcat8.

Any action by an anonymous user after the session expires results in an invalid session exception. The problem is in the security filter chain (see log below) the `AnonymousAuthenticationFilter` (#11) creates a new session, but the `SessionManagementFilter` (#12) retrieves the prior expired session, compares it to the new one and throws the `invalidsession` exception. I want this to happen for logged in users, but not for anonymous users. However, at the time the exception is thrown the security context has been destroyed so I can't know whether the prior session was from an anonymous or logged in user.

Solutions I've considered are:

1. Set the global session timeout to 24 hours or more then adjust the timeout for registered users in a `LoginSuccessHandler` and `RememberMeSuccessHandler`.
2. Turn off security for the public pages.
3. Create a separate cookie to indicate the type of user (anon vs. logged in), and query that in the `InvalidSessionStrategy` to redirect anon users to the /home page.
4. Create a custom filter that is executed first to identify an anon user (possible?) and simply extend the current session.
5. Write some javascript or jquery to periodically check the session timeout and reset it for anon users.

Solution #1 may result in issues with expired sessions on the server (not sure if this is a big deal). #2 doesn't feel right to me, especially if a public page may include any info about a logged in user. #3 might work except that the anon user could click on a public link other than the home page but get redirected to the home page because I don't think there's a way to tell in the `InvalidSessionStrategy` which link they were trying to access? I'm not sure if #4 will work or not - haven't tried it yet. #5 might also work but it increases network traffic?

I'm hoping that someone can point me to a practical solution. This has to be something that many sites deal with but I'm going around in circles trying to solve. Thanks in advance for any advice or tips.

Here's a portion of a log to illustrate what happens. I've set the session timeout to 60 seconds for testing purposes.

Answer: I posted a similar question a few days after this one: [Why does anonymous user get redirected to expiredsessionurl by Spring Security](#), for which I've posted an answer. Solution #2 above works, but I don't like turning off all security even for public pages. What I ended up implementing was a combination of #3 and #4. See the linked question for the full answer.

1060. <https://stackoverflow.com/questions/3719691/detect-session-timeout-in-spring-3-spring-security-2-0-5>

Title: Detect session timeout in Spring 3/Spring Security 2.0.5

Question: I have a web application running under Spring 3 with SpringSecurity 2.0.5. To present the user the changes to the site since his last visit, I try to register the time when his session is destroyed. Therefore I

registered `org.springframework.context.ApplicationListener<HttpSessionDestroyedEvent>` and also a `javax.servlet.http.HttpSessionListener`. The implemented methods work when the user uses the logout link. But when the session times out it's as if the events aren't generated.

Am I forgetting to listen to the right events? Or is there nothing fired for the session timeout? Is there any other way to achieve this? Does it depend on a server setting (which is tomcat 6.0.24 btw)?

Answer: Keep in mind that you're testing the session timeout the right way. Closing a webbrowser window for example won't *immediately* destroy the session on the server side. The session will live as long as the client hasn't sent any HTTP request for 30 minutes. Those 30 minutes are the default session timeout which is configurable by `<session-timeout>` entry in `web.xml`.

Also, the servletcontainer won't *immediately* destroy sessions after exactly the timeout value. It's a background job which runs at certain intervals (e.g. 5~15 minutes depending on load and the servletcontainer make/type). So don't be surprised when you don't see the `sessionDestroyed()` method being called after *exactly* 30 minutes of inactivity.

However, when you fire a HTTP request on a timed-out-but-not-destroyed-yet session, it will be destroyed immediately.

1061. <https://stackoverflow.com/questions/3858861/windows-identity-foundation-security-token-service-setting-cookie-timeouts>

**Title: Windows Identity Foundation Security Token Service setting cookie timeouts**

Question: I want to configure the timeout duration that is applied to the cookies that are created on relying party after a user logs in through the passive Security Token Service (STS). I believe I read somewhere this is defaulted to 14 minutes however I can't find where I read this any longer.

I would like to up this to a more reasonable 35 minutes or so.

Answer: The description about `persistentSessionLifetime` in [MSDN](#) is not true. For example, if you set it to `1.6:13:45.0`, the cookie will expire after 30 hours (1 day + 6

hours) 13 minutes and 45 seconds +/- the maximumClockSkew from <identityConfiguration>. So the description from MSDN should be like the one from TimeSpan: [-]d.hh:mm:ss.ffff. I hope Microsoft changes the wrong description.

1062. <https://stackoverflow.com/questions/8955513/wcf-duplex-client-is-unable-to-finish-the-security-negotiation-within-the-conf>

**Title: WCF Duplex - Client is unable to finish the security negotiation within the configured timeout**

**Question:** I have a duplex WCF, it work perfect in local host (connect my application to this WCF when it run locally).

Now I tried to hosted it in my IIS (Server 2008 R2 standard), I create a windows account "GOD", and an application poll in IIS using the "GOD" identity.

I can access this WCF from my pc (other than the server) from web browser and see the XML of the contract, (click on the link inside the page displayed)

When try to access from my application I get the exception:

Client is unable to finish the security negotiation within the configured timeout (00:00:00).  
The current negotiation leg is 1 (00:00:00).

Again when the WCF run locally my app work OK.

I tried to use the trace but all I successful to see is the exception about the time out.

**Answer:** wsDualHttpBinding tries to open a connection from server to client which will be blocked by firewalls

My advice would be to switch to netTcpBinding - its much simpler for duplex messaging as I blogged [here](#)

1063. <https://stackoverflow.com/questions/19122533/how-do-i-change-session-timeout-for-a-single-page-under-tomcat-running-a-spring>

**Title: How do I change session timeout for a single page under Tomcat running a Spring security controlled application?**

**Question:** Part of my application has a single page view for an overhead status board. Access to the server that runs the overhead display is in an access controlled location that only a few key people have access to. The problem I am encountering is that the session expires after a set amount of time, necessitating someone physically going to the server and reloading the page. Needless to say this creates some problems when the key people aren't around.

This application runs under Tomcat, and security is controlled via Spring security. How would I go about changing the session timeout **for this page only?**

[\[edit\]](#)

I've taken the approach that @sotirios-delimanolis suggested. Although I still need to find an elegant way to reverse the extended session timeout if the user navigates to this page then navigates away, this appears to work for me.

**Answer:** I don't know how your page is accessed, by controller, resource provider, etc. but you would have to add a `Servlet`, `Filter`, `HandlerInterceptor` or handler method somewhere in the processing of that request that basically did the following

```
int seconds = ...; // timeout
request.getSession(true).setMaxInactiveInterval(seconds);
```

That session now has the specified timeout before the container invalidates it.

Note that if the user goes to some other page somehow, the timeout for their session will remain what you set above unless you change it.

1064. <https://stackoverflow.com/questions/48289763/spring-security-infinite-loop-after-initial-login-and-timeout>

#### **Title: Spring Security infinite loop after initial login and timeout**

**Question:** I found out that when my `WebSSOProfileConsumerImpl` authentication expires (set through `setMaxAuthenticationAge`) and my `HttpSession` expires (set through `setMaxInactiveInterval`) it just keeps looping like indicated above. If I set the `HttpSession` to expire indefinitely, then I won't have this issue, but then the user will never get logged out. What is supposed to happen when they both expire like that? Shouldn't Spring Security be handling this so that it doesn't infinite loop like this? I have scoured the internet for solutions/answers and can't find anything. Any help is appreciated. Thank you very much.

1065. <https://stackoverflow.com/questions/6003325/client-is-unable-to-finish-the-security-negotiation-within-the-configured-timeou>

#### **Title: Client is unable to finish the security negotiation within the configured timeout**

**Question:** I am making a WCF service and its WPF client. When I run the service from Visual Studio 2010 it publish the service to asp.net development server. My WPF client works fine with asp.net development server, but when I publish the service to IIS 7.0 it publish correctly .When I add service reference to my WPF client, the client successfully add new service reference with address of IIS. But when I call the WCF service methods from my WPF client, it give the following error.

"Client is unable to finish the security negotiation within the configured timeout (00:00:59.9239957). The current negotiation leg is 1 (00:00:59.8789931). "

How I can remove this error, there is no help available on net.

1066. <https://stackoverflow.com/questions/37436792/how-to-exclude-some-page-from-session-management-timeout-concurrency-check-in>

#### **Title: How to exclude some page from session management (timeout/concurrency check) in Spring Security?**

**Question:** but the question is,

1. I need to exclude some page like `login` `change_password` from session check (timeout and concurrency).
2. If I have a page that accessible for both logged user or un-logged user. But I need to do session timeout and concurrency check only when the user logged in.

How should I implement this?

**Answer:** Session is created regardless of spring, security, etc. Mechanism behind session is fully automatic, you do not need to change or do anything. Instead of digging into Spring details, you can use plain javax.servlet API and accomplish what you need.

And what you need to do is simple: differentiate between anonymous session and authenticated user sessions with the help of session-bound custom object.

Session can hold objects, and server maintains objects bound to specific session (normally via session cookie jsessionid). Example of such a object is following code:

1067. <https://stackoverflow.com/questions/31824945/spring-session-redirect-after-timeout>

**Title:** spring session redirect after timeout

**Question:** I have configured spring security for login form. Everything works fine except session timeout. When session timeouts I want to redirect to login page. Instead I am redirected to homepage. Below is part of my security xml .Can anyone suggest anything via xml configuration

**Answer:** Can you change your session-management tag as : `<session-management><concurrency-control error-if-maximum-exceeded="true" expired-url="/login.jsp" max-sessions="1">/concurrency-control></session-management>`

1068. <https://stackoverflow.com/questions/24687931/how-to-apply-regular-filters-to-page-after-spring-security-re-authentication-on>

**Title:** How to apply regular filters to page after Spring security re-authentication on session timeout

**Question:** So I am working on an application that uses Spring security for authentication. Here is the scenario that I am having problems with. User is on a page, and session expires. Either by refreshing or attempting something on that page, the user is redirected to the login page to login again. We do have a security-default-target, which is the default home page, but per the functionality of spring authentication if you don't specify otherwise, it will go back to the previous location if there is one (and we want this functionality). However, there are other factors that affect whether a person can see a page, and those get reset on login, so we want to go through the same filters as when they load the page via the browser, so since it isn't, they are in a state that they can't get to via navigating on the website (i.e. the menus are different since in their regular login, they shouldn't see the page that refreshed - to see that, they had to change to a different type of user, which is not remembered across sessions). So if they had gone through the regular filters, that page wouldn't have been allowed since the permissions for that were lost when the session expired. I hope this makes sense. The easy solution is to force everyone back to the home page after re-authenticating, but people like the refresh/reauthenticate/return to page functionality.

Here is the configuration for Spring security. I was wondering if there was a mechanism to force the page to go through the same reload process as if they clicked on a link to get there, i.e. the filters that verify what a particular user can see at that time. This reauthentication process seems to skip over that. Any suggestions?

What I want is the opposite of this question, as they wanted to force the return to the default page, which is one simple setting: [spring security redirects to last requested page after login session timeout](#)

Sorry for the wall of text and thanks in advance for any insight.

Answer: I don't really understand the details of your question ("they had to change to a different type of user" etc), but if you log in again after trying to refresh a page, when you are redirected to the originally requested page, there isn't any difference in the access-control checks that are applied, which seems to be what you're asking for. (BTW, "filters" is a poor choice here, since I thought you were referring to the servlet filters which Spring Security applies, but I guess you aren't since you only have one filter chain).

1069. <https://stackoverflow.com/questions/24687931/how-to-apply-regular-filters-to-page-after-spring-security-re-authentication-on>

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What I want is the opposite of this question, as they wanted to force the return to the default page, which is one simple setting: [spring security redirects to last requested page after login session timeout](#).

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were referring to the servlet filters which Spring Security applies, but I guess you aren't since you only have one filter chain).

1070. <https://stackoverflow.com/questions/27449611/spring-security-session-is-created-without-logging-in-after-session-timeout>

Title: Authentication works fine as expected, but recently i added session-timeout to the application. My application polls server for every 5 seconds, hence the default time out does not work. I googled and found below solution with filter and implemented it.

Answer: You figured out correctly.

Let me explain it.

#### Session is created by default

Yes It is called as ROLE\_ANONYMOUS.

By default if there is No session(No cookie with JSESSIONID) it will create a session with Role = ROLE\_ANONYMOUS, If already authenticated it will not create new session.

And hence ROLE\_ANONYMOUS is a Un-authenticated user.

permitAll includes ANONYMOUS user also. ANONYMOUS user will be permitted to access that resource.

Just try this. authorize admin resources to ANONYMOUS user like this

```
.antMatchers("/app/admin/*").hasRole("ANONYMOUS")
```

Then admin resources can only be accessed without login. If logged in with admin credential and tried to access you will get 403 error(FORBIDDEN).

UNAUTHENTICATED user is a ANONYMOUS user, he will also get a session to identify him, hence his session also gets invalidated after timeout hence it redirects to a page configured in session managements expiredUrl.

He is the only one user who can not reach AuthenticationSuccessHandler

1071. <https://stackoverflow.com/questions/39754419/can-we-specify-the-csrf-token-expiry-timeout>

#### Title: Can we specify the CSRF token expiry timeout?

Question: I am using spring security and Java configurations in my project.

The Java configurations for spring security by default have csrf enabled.

Is it possible to set the timeout after which the csrf token expires? This was a requirement to specify the timeout for the token based application.

After going through some blogs and articles, I noticed that the behavior of csrf token is unpredictable to make it more secured.

Here is a sample code for configuring spring security.

Answer: See [Spring Security Reference](#):

One issue is that the expected CSRF token is stored in the HttpSession, so as soon as the HttpSession expires your configured AccessDeniedHandler will receive a InvalidCsrfTokenException.

That means, you could change the session timeout in your `web.xml` to expire the CSRF token, see for example [WebLogic](#):

`<session-timeout>` | optional | The number of minutes after which sessions in this Web application expire

Another way is to write your own [CsrfTokenRepository](#):

An API to allow changing the method in which the expected CsrfToken is associated to the HttpServletRequest. For example, it may be stored in HttpSession.

1072. <https://stackoverflow.com/questions/27818572/error-when-implementing-global-timeout>

### Title: Error when implementing Global Timeout

Question: Is there any architectural difference in how test runs in Junit when [timeout is set for test method](#) and when its not set?

I am getting security errors(Data Security system requires an ApplSession to be created and valid )(related to session) when I implement timeout,even when the test is not timing out. What is the way to solve the issue? This isn't the complete stack trace but this is what I can share:

1073. <https://stackoverflow.com/questions/16858017/redirect-handling-primefaces-ajax-requests-on-session-timeout-in-spring-security>

### Title: Redirect handling PrimeFaces Ajax requests on session timeout in Spring Security

Question: I am trying to get the JSF web front-end to redirect to back to the login page (in Spring Security) when the session times-out.

I have tried using a meta-refresh approach, however this causes an undesired side-effect that the meta-refresh time will not be updated when only AJAX controls are used on the page. This means that the page may refresh while you are still using it, because you haven't transitioned to another page and only made AJAX calls to the server. I have not found a way to change this behavior easily using Primefaces.

The Spring Security sends a 302 HTTP error message back to Primefaces when the session has expired, however Primefaces just ignores redirect request. You can tell when the session has expired as the Primefaces controls stop responding as their AJAX calls are not succeeding.

I have am using Primefaces 3.4.2, and Spring Security 3.1.4 running on Glassfish 3.1.2.2.

Answer: This is a problem with the default way that Spring Security sends redirects back to the client. The default method of sending a redirect to the client is the HTML approach of sending a 302 Temporarily Moved response, however this does not work for AJAX clients. The AJAX client will interpret this as a redirect to a new location to post/get its

data and not as a page redirect. The correct way to get the AJAX client to redirect the browser to a new page in the same way as a normal HTML request is

1074. <https://stackoverflow.com/questions/5711698/spring-security-extjs-redirecting-to-login-page-on-session-timeout>

**Title: Spring Security & ExtJS - redirecting to login page on session timeout**

Question: I am using ExtJS with Spring MVC/Security. I want the user to be redirected to the login page when the session has expired, and I gave this in the Spring security application context -

```
<session-management invalid-session-url="/login.jsp"></session-management>
```

But since the calls to the server are all AJAX based, the redirection does not happen. Please suggest the best way to implement this. I have a custom `UserNamePasswordAuthenticationFilter` implemented for AJAX login:

Answer: You might be able to mold the following to override all ajax requests to test for a timed out session response and handle it accordingly:

1075. <https://stackoverflow.com/questions/8489107/why-does-entity-framework-over-sql-express-ignore-timeout>

**Title: Why does Entity Framework over SQL Express ignore timeout?**

Question: I have following connection string:

```
metadata=res://Database.csdl|res://Database.ssdl|res://*/Database.msl;provider=System.Data.SqlClient;provider connection string="Data Source=.\\SQLEXPRESS;AttachDbFilename='Database.mdf';Integrated Security=True;User Instance=True;Connection Timeout=300;"
```

I expect that this connection string can never get timeout (because it is 5 mins). However, on a very easy database.table.Count() call to Entity Framework it fails in 10 seconds with "Timeout" exception. Why does Entity Framework ignores SQL timeout? How to set timeout for Entity Framework?

Answer: Connection timeout specifies the amount of time to spend waiting for a connection. It doesn't affect the amount of time that a *query* can spend before timing out. For that, you need to search for a `CommandTimeout` property on whatever database context class you're using.

1076. <https://stackoverflow.com/questions/8489107/why-does-entity-framework-over-sql-express-ignore-timeout>

**Title: Why does Entity Framework over SQL Express ignore timeout?**

Question: I have following connection string:

```
metadata=res://Database.csdl|res://Database.ssdl|res://*/Database.msl;provider=System.Data.SqlClient;provider connection string="Data
```

Source=\SQLEXPRESS;AttachDbFilename='Database.mdf';Integrated Security=True;User Instance=True;Connection Timeout=300;"

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1077. <https://stackoverflow.com/questions/53484030/too-many-h13-timeout-after-security-update-heroku-18-update-and-ruby-2-5-3-upda>

Title: Too many H13 timeout after security update, Heroku-18 update and Ruby 2.5.3 update

Question: Since we made an update to **heroku-16** and Ruby (from 2.4.4 to **Ruby 2.5.3**) and some gems listed below, we have a lot of H13 timeout. They happen randomly in many endpoints (I don't know if all are impacted but it's not only POST requests). On my localhost, I have a timeout too with a POST endpoint but it's probably not only one. I'm not sure it's the same problem but it's arrived since the same date. The timeout says:

Answer: Too much has changed at once. Go back to a previous release and change one thing at a time.

1078. <https://stackoverflow.com/questions/53484030/too-many-h13-timeout-after-security-update-heroku-18-update-and-ruby-2-5-3-upda>

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ERROR Rack::Timeout::RequestExpiryError: Request older than 90000ms.  
but it arrives always at less than 500ms...

**Do you have already seen a similar problem and do you have an idea from where it can come ?**

It's really similar to [this question](#) but it's not only about POST endpoints.

Answer: Too much has changed at once. Go back to a previous release and change one thing at a time.

1079. <https://stackoverflow.com/questions/26135959/spring-security-with-cassandra-timedoutexception>

Title: Spring Security With Cassandra – TimedOutException

Question: I'm Trying to authenticate user using spring security with Cassandra database. I'm getting following exception:

Authentication request failed: org.springframework.security.authentication.AuthenticationServiceException: PreparedStatementCallback; SQL [select email, lastlogin, password, usertype from login where email=?]; TimedOutException(); nested exception is java.sql.SQLTransientConnectionException: TimedOutException()  
I tried with increasing Cassandra timeout and all consistency levels. I don't get what is causing this error, same query works well in Cassandra DevCenter.

Here is configuration details.

Answer: I don't know if you already found the solution, but anyway, you are going the wrong way. Instead you have to implement your own UserDetailsService according to <http://docs.spring.io/autorepo/docs/spring-security/3.2.2.RELEASE/apidocs/org/springframework/security/core/userdetails/UserDetailsService.html>.

1080. <https://stackoverflow.com/questions/44831234/c-sharp-wcf-client-is-unable-to-finish-the-security-negotiation-within-the-confi>

Title: C# wcf Client is unable to finish the security negotiation within the configured timeout in clickOnce Deployed Applications

Question: I have an network deployed forms desktop application (clickonce) which connects to an WCF service.

On most machines it works well but there are a few machines on which I get this error:

Client is unable to finish the security negotiation within the configured timeout (00:00:09.9377020). The current negotiation leg is 1 (00:00:09.9065530).

When I reset InternetExplorer (Settings->InternetSettings->Advanced->Reset), then this error doesn't appear any more and the application works well, so it's no timeout problem at all. (Applications are started over the InternetExplorer via link)

I think, that there is something stuck on AssemblyCache and that's why Windows can't provide credentials for the service.

I don't use certificates for the connection, and remember this phenomenon only appears on 10 out of 150 machines but the reset workaround is not acceptable over the time.

In some cases the clickonce application didn't even start.

What happens in Windows when starting an ClickOnce app?

Do you know why a reset helps, that the Client can provide credentials?

1081. <https://stackoverflow.com/questions/42230631/spring-boot-security-jquery-ajax>

Title: spring boot + security + jquery ajax

Question: **Hi,I build a project with spring boot & spring security. Now, I want to provider the login restfull service for Jquery.ajax({...}); And I want to:**

1. process the login request from HTML page (like the `<form>` submit).
2. automatic to check session timeout when HTML page request, redirect timeout to login page.
3. process the login request from Ajax.
4. automatic to check the login state when Ajax request.
5. **When I test in page(thymeleaf), All of worked. but.. when I use Jquery Ajax. The issue:**
6. When I used `Jquery.ajax({})` API to send the request, the request can not be get to server. How to write ajax request with jquery, I tried a lot of Jquery methods, page has no response code in console. Is the spring security not support ajax ?

Answer: But I do not think so is good job like this. It's very troublesome, In the client, I need to check every response code is it right or not for every request. Is any better ways to solve this ensure??

by the way, the Client(Browser + Ajax) and Server(Spring mvc) are separate.

1082. <https://stackoverflow.com/questions/16575799/invalid-or-expired-security-context-token-when-running-after-a-debugging-restart>

Title: “Invalid or expired security context token” when running after a debugging restart

Question: I have a WCF App that I am coding. I start and stop it several times as I change things and then run the service call again.

Since I need session info I am using `wsHttpBinding`.

Before I moved to `wsHttpBinding` I was using `basicHttpBinding` and I could stop the service, make changes and re-start it. Then I could run my WCF test client (WCF Storm) against the endpoint and it would still run fine.

Now it tells me:

The message could not be processed. This is most likely because the action '<http://tempuri.org/IMyService/MyOperation>' is incorrect or because the message contains an invalid or expired **security context token** or because there is a mismatch between bindings. The security context token would be invalid if the service aborted the channel due to inactivity. To prevent the service from aborting idle sessions prematurely increase the Receive timeout on the service endpoint's binding.

This means I have to refresh my connection and re-setup my service call (which gets annoying after several hundred times.).

I read that the security timeout is 10 minutes. I am re-running in less than 2 minutes, so I don't think it is a time out issue.

My guess is that the token expires for the obvious reason that I have killed and restarted the service.

The thing is that I don't need the security stuff at all (I only need the session stuff or I would be using BasicHttpBinding)

**Is there anyway to make my WCF Service not care about Security Context Tokens?**

**Note:** My test client defaults to wsHttpBinding and has security set. But I assume that it is setting this because my service is publishing that it needs security.

Answer: At first, you're true : basicHttpBinding does not support this due to the connectionless /stateless nature of the HTTP protocol.

But I think there is something wrong in your WCF understanding.

Session is a generic concept in WCF. It can be *security-based session*, in which both ends of communication have agreed upon a specific secure conversation or a *reliable session* in which messages can be configured to be delivered in order and exactly once, ensuring messages are received even when messages travel across multiple nodes during the conversation.

Both modes allow you to select InstanceContextMode.PerSession. Is this really what do you want ?

WCF security relies on mutual authentication ; If both parties trust the other's credentials (based upon claims), then a secure context can be established in which all messages are exchanged in confidentiality, and all messages are signed to protect their integrity. The security session is *unique* and you can't reuse it in another conversation.

Here is the problem with your context: the problem is not on *Server Side* but on **Client Side**. Because something have to be kept on client and on service, rebuilding the service will flush the whole WCF context on the service (all instances & sessions will be disposed). There is no general data store associated with WCF sessions (one difference with asp.net session), so a restart will drop everything. However, the client still believe to be authenticated because of its "invalid" context.

To solve this, there is a checkbox for this scenario on the default Wcf Test Client: "Start a new proxy". On WCf Storm, there is a general config in Under the hood/Miscellaneous "always create new proxy".

Note : On production, you will never have this scenario because your service will always be up.

If you follow me you may want to try reliable Session. You can test but I'm not sure this will work.

1083. <https://stackoverflow.com/questions/3761044/security-processor-was-unable-to-find-a-security-header-in-the-message>

Title: Security processor was unable to find a security header in the message

Question: Recently on one of my machines, my client (WCF client) is having problem talking to WCF server. Both server and client are running on the same machine. The machine is Windows7 64 bit machine. It used to work fine until recently. The same software is working fine on all other machines with exactly same configuration. I am really confused here. Could someone please let me know what could be the problem?

1084. <https://stackoverflow.com/questions/53055345/graphql-java-query-timeout>

Title: GraphQL–java query timeout

Question: Is there a way to set a timeout on query execution with the GraphQL–java implementation? That seems like a fairly basic security thing that's recommended by the GraphQL [docs](#), but I can't find anything for it.

Answer: You can use GraphQL Java [instrumentation](#) for that.

The example below sets a timeout of 3 seconds for every data fetcher. You can use the instance of `InstrumentationFieldFetchParameters` passed in to apply the timeout to specific data fetchers (maybe one up on the query structure if you want a timeout for the whole query).

```
public class TimeoutInstrumentation extends SimpleInstrumentation {
 @Override
 public DataFetcher<?> instrumentDataFetcher(
 DataFetcher<?> dataFetcher, InstrumentationFieldFetchParameters
parameters
) {
 return environment ->
 Observable.fromCallable(() -> dataFetcher.get(environment))
 .subscribeOn(Schedulers.computation())
 .timeout(3, TimeUnit.SECONDS)
 .blockingFirst();
 }
}
```

You can also use 2 existing instrumentations to achieve other checks mentioned in the page you've posted:

- [MaxQueryComplexityInstrumentation](#)
- [MaxQueryDepthInstrumentation](#)

There's also the option of setting up a timeout at the request level. This is out of GraphQL Java's jurisdiction though. If you're using Spring as the http server you can setup a global request timeout using the `spring.mvc.async.request-timeout` application property. I'm pretty sure any other web server would have a similar property as well.

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1086. <https://stackoverflow.com/questions/11109919/sitecore-analytics-robots-sessiontimeout-causing-premature-session-timeout>

Title: Sitecore Analytics Robots SessionTimeout causing premature session timeout

Question: On one of our project we been experiencing random session timeout issues. With recent discovery I've notice that Sitecore Analytics.Robots.SessionTimeout maybe the thing that's causing it.

We notice that at random session timeout, the timeout value was set to 1min instead of our 120min.

After searching through all the config files we notice only one configuration has timeout set to 1min.

We think by increasing the analytics robots session timeout to 120min will fix our random timeout issue, but my question is, will this have any negative performance impact or security issue by allowing robot sessions to live for 120min instead of 1min?

Thanks you for your suggestions.

Answer: This seems like a different problem to me... I don't think it's an issue that robots are set for 1 minute session. You say the problem is "random", but is it possible what is really going on is that some site visitors are being mis-identified as robots?

I don't think you'll see any performance impact by changing the robot timeout, but that would be treating the symptom rather than finding the real cause.

1087. <https://stackoverflow.com/questions/28557619/getting-timeout-expire-error-using-data-reader>

Title: Getting Timeout expire error using data reader

Question: Throwing error as "Timeout expired. The timeout period elapsed prior to completion of the operation or the server is not responding" Error on this line Dim myReader As SqlDataReader = myCommand.ExecuteReader()  
And I cannot change the database pool size due to security reason, Please any one advise.

Answer: Try Setting CommandTimeout

```
myConnection = New SqlConnection(Connection)
myConnection.Open()
Dim myCommand As SqlCommand = New SqlCommand("proc_g_report", myConnection)
myCommand.CommandTimeout=0
Dim myReader As SqlDataReader = myCommand.ExecuteReader()

DTResults.Load(myReader)
```

1088. <https://stackoverflow.com/questions/20513824/spi-timeout-in-linux-and-c>

Title: SPI timeout in Linux and C

Question: It sends a byte sized command and receives a response of certain size (in half duplex mode). How can I implement a timeout in the response? Can it be implemented using `select`? Should I separate both transactions and use `select` or better use an alarm?

Then, I have the same question for a full duplex mode, which is implemented too using `ioctl`. Can you give me any hints?

Answer: In hardware the SPI master does not 'wait' for a response. By definition, the SPI master provides the clock cycles and the slave must reply. The concept of waiting for a response doesn't apply to the SPI bus. (I'm assuming you're operating the SPI master)

(deeper in the protocol, the SPI might poll the hardware to see if it's done/ready; but the SPI bus itself is getting an immediate answer every time).

To clarify: the SPI clocks in whatever is on the SPI MISO pin. Whatever level is on the MISO pin is the reply, even if the slave is not explicitly driving a level. The only way to detect a non responsive slave is to pullup/pulldown the MISO in a way that can not be interpreted as a valid message

1089. <https://stackoverflow.com/questions/43216921/timeout-accessing-amazon-ec2-machine-from-outside-even-with-security-group-allow>

Title: Timeout accessing Amazon EC2 machine from outside even with security group allowing everything

Question: Everything works normally when I test this (both client and server) outside my EC2 machine, but when I deploy the server.js to the cloud and run it, I can't reach it from outside.

When I bind a nginx web service on port 80 or 81 and proxy every request to the application, everything starts working fine from outside the cloud, but still does not work on other ports.

My security group is fully open (for testing purposes) (inbound and outbound allowing all traffic from and to anywhere (0.0.0.0/0, ::/0) on all ports) (screenshot attached).

Things that may be useful for troubleshooting:

- When I try a NodeJS http server (without nginx) using node on the same port, it does not work either (works only on 80 and 81)
- I am sure my machine is on the 'fully-open-insecure' security group with all traffic allowed.
- My application is binding to all addresses because I can connect to it using the public address or localhost from inside the cloud machine.
- It only works on port 80 and 81 when I proxy\_pass connections from a nginx web server that is on the same machine as the NodeJS application  
any help or troubleshooting suggestion will be very appreciated.

thank you very much for your time

Answer: My problem was solved and this is embarrassing. My local network was not allowing outbound connections on the ports I mentioned.

If you have the same problem, I recommend to test your local network. Also, check your iptables rules

1090. <https://stackoverflow.com/questions/1696807/reportins-services-timeout-expired>

Title: Reportins services Timeout expired

Question: I'm developing a Report Service and while executing the query getting :

An error has occurred during report processing. Exception has been thrown by the target of an invocation. Timeout expired. The timeout period elapsed prior to completion of the operation or the server is not responding.

I know that on the SQL server the query running for a minute or two.

I setted the Connection string in the web.config like that:

```
"Data Source=servA;Initial Catalog=myPortal;Integrated Security=True;connection timeout=1000"
```

It didn't work for me.

Answer: You can specify the connection timeout in the connection string, but that only says how long it should wait for a connection to succeed,  
What you're looking for is the command timeout. That specifies how long SSRS will wait on a particular query to succeed. If I remember right, you can change this in each report in the command timeout setting? Or maybe it was called execution timeout?

Answer2: How I got this to work in using BIDS 2008:

1. In the "Report Data" pane, right click on the Dataset and select "Dataset Properties".

- At the bottom of the "Query" tab inside the "Dataset Properties" modal window, set the value of the "Timeout (in seconds)

1091. <https://stackoverflow.com/questions/14842064/how-do-i-decrease-the-connect-timeout-with-entity-framework>

Title: How do I decrease the connect timeout with Entity Framework?

Question: I want to make a database connection to my SQL Server fail fast. How can I decrease the timeout? I've tried adding `Connection Timeout=1` in my connection string, however this doesn't seem to make a difference.

With `Connection Timeout=500`, it takes about 8 min 30 seconds to timeout. This is expected. With `Connection Timeout=1`, it takes around 40 seconds to timeout which is way longer than expected.

I found the `EntityConnection.ConnectionTimeout` property but it is read only. Is there anything else I can do to decrease this timeout? Is this an issue with Entity?

**UPDATE:** Here is my connect string. It still takes ~40 seconds to timeout.

```
<add name="KofaxAdminToolsEntities"
connectionString="metadata=res://*/DB.Model.KofaxAdminTools.csdl|res://*/DB.Model.KofaxAdminTools.ssdl|res://*/DB.Model.KofaxAdminTools.msl;provider=System.Data.SqlClient;provider connection string="data source=MY_DATASOURCE;initial catalog=MY_CATALOG;persist security info=True;user id=MY_USER;password=MY_PASSWORD;MultipleActiveResultSets=True;App=EntityFramework;Connection Timeout=1"; providerName="System.Data.EntityClient" />
```

**UPDATE 2:** So I discovered that the timeout was a **tcp timeout**, not a **sql connect timeout**. If my machine were able to reach the host, @marc\_s solution would have worked, however, since I cannot reach that host, the tcp timeout comes into play. Does anyone know how to decrease the tcp timeout for a `SqlConnection`?

Answer: Where and how did you specify that connection timeout?

I just tried and added this to my EF connection string (using EF database-first) - and it works as expected: with SQL Server service stopped, the connection attempts time out almost immediately....

```
<add name="myEntities"
connectionString="metadata=res://*/People.csdl|res://*/People.ssdl|res://*/People.msl;provider=System.Data.SqlClient;
provider connection string="data source=.;initial catalog=mydb;
integrated security=True;connect timeout=1;multipleactiveresultsets=True;

App=EntityFramework";
providerName="System.Data.EntityClient" />
```

(EF connection string broken up and wrapped for clarity - this will be just one long line in your `web.config`)

You need to add `connect timeout=x` (where `x` is in seconds, any value bigger than 0 is ok) **inside** the `provider connection string=` value of your EF connection string.

1092. <https://stackoverflow.com/questions/56933926/provisioner-file-failed-due-to-i-o-timeout>

Title: Provisioner file failed due to i/o timeout

Question: However since I am using OSX I find it hard to test the WinRM ports.

Can you help me to spot any issue with my tf code?

Answer: Not sure but after a while it seems to work.

It might take up to 10 minutes for the security group change to take effect.

1093. <https://stackoverflow.com/questions/43322493/sql-set-connection-timeout-in-the-connection-string>

**Title:** sql: set connection timeout in the connection string

Question: In a console app I have a connection string like this:

Data Source=localhost;Initial Catalog=database\_name;Integrated Security=True;**Connect Timeout=100**  
I've read [here](#) that I need to add **Connect Timeout** to the connection string to set the  
timeout, but if I run a query that contains  
**WAITFOR DELAY '00:00:40';**

I'll get a timeout exception, so it seems that the timeout from the connection string is  
ignored. so how to set the timeout in the connection string (and not on the connection or  
command objects)?

Answer: There are two timeouts relating to SQL connections/commands - there is  
a *connection* timeout, that affects how long a connection is willing to wait when you try to  
open it, and a *command* timeout that affects how long an individual command being  
executed will wait.

You need to adjust the second of these - by e.g. setting the `CommandTimeout` property on  
the `SqlCommand` object.

Answer: It's not ignored, that's the behavior...if it times out, it throws an exception. If it  
didn't timeout, it would just run until the query returned.

Just use a try-catch block and do what you want when the exception is thrown.

1094. <https://stackoverflow.com/questions/16810023/configuring-spring-security-to-redirect-user-to-previous-location-after-session>

**Title:** Configuring spring security to redirect user to previous location after  
session timeout

Question: **edit 1:** Let me better specify my requirements:

- When a user session times out, I want the user to be redirected to the saved request  
(the url they requested before being redirected to the signin page).
- However, when they initially signin with the app, I want them to be redirected to the  
home page of the personal area.

Are my requirements possible to implement using solution suggested by Carsten (see below)?

Answer: You could set the `always-use-default-target="true"` in the `form-login` tag. This redirects the user to the url they were trying to access before being intercepted to login. But this will be the standard behaviour and not only in the case of a session timeout. Depending on the application this might not be what you want.

**Edit:** To do what you want you need to find a way to save the information on which page the user was when the session timedout. I don't know of any out of the box solution for this problem, since there is no state that indicates whether or not the user timed out or logged out manually.

What needs to be done ist to:

1. set a flag or save the page-url on session timeout

2. check in a custom AuthenticationSuccessHandler and redirect accordingly

If I would implement something like that I would most likely store the page-url. Also there are a few tricky things with this from an UX perspective. What happens if the saved page relies on a state achieved earlier? (I assume that's the reason you want the User to go to the default-url on normal login?) What happens if the user just does not log out shuts down sleeps for the night and logs in navigating to the login page (does the flag/page-url time out)? etc.

In general I think it would be better use the `always-use-default-target="true"` since this adds the comfort of bookmarking any page and not having to navigate there at each login.

1095. <https://stackoverflow.com/questions/34119758/spring-security-save-user-login-logout-date-in-database-and-handling-session-tim>

Title: Spring security save user login/logout date in database and handling session timeouts need to monitoring users login/logout.

SimpleUrlLogoutSuccessHandler works only if the user use the logout button, but I need to store session timeout logouts too. But SimpleUrlLogoutSuccessHandler does not work in this case. From HttpSessionEventPublisher I can catch session timeouts, but I can't get username to store logout date to database. Any elegant solution to handle simple and session timeout logouts?

Answer: I would suggest you to use auto logout if no activity for some specified time. And store the time when session expires for the user if user is not terminating session manually by logout.

The session timeout in a web application can be configurable in two ways

- 1) Timeout in the deployment descriptor (web.xml) – Specified the timeout value in "minute", enclose with "session-config" element.

```
<web-app ...>
 <session-config>
 <session-timeout>20</session-timeout>
```

```
</session-config>
</web-app>
```

The above setting is apply for the entire web application, and session will be kill by container if client doesn't make any request after 20 minutes.

2) Timeout with setMaxInactiveInterval() – You can manually specified the timeout value in “second” for a particular session.

```
HttpSession session = request.getSession();
session.setMaxInactiveInterval(20*60);
```

The above setting is only apply on session which call the “setMaxInactiveInterval()” method, and session will be kill by container if client doesn't make any request after 20 minutes.

1096. <https://stackoverflow.com/questions/42457997/aws-lambda-node-js-timeout-when-trying-to-access-dynamodb>

Title: AWS Lambda node.js timeout when trying to access DynamoDB

Question: I'm facing one of these AWS Lambda node.js timeout when trying to access DynamoDB issues but the symptoms appear different and the solutions I found don't solve this issue.

Timeout is set to 5min, memory is set to 128MB but doesn't exceed 30MB usage.  
IAM policies for the role are:

- AWSLambdaFullAccess
- AmazonDynamoDBFullAccess
- AWSLambdaVPCAccessExecutionRole

The default VPC has 7 security groups and include the default security group with:

- **Inbound:** All Traffic, All protocol, All port range,
- **Outbound:** All Traffic, All protocol, All port range, 0.0.0.0/0

Answer: I guess your Lambda is in a private subnet. In this case by default your Lambda will not have outbound internet access. You need to create a NAT Gateway or NAT Instance to let VPC protected resources to access outside Internet. DynamoDB API is outside Internet from VPC point of view.

Answer2: You no longer need to create a NAT gateway/instance

You can create a VPC Endpoint for Dynamo DB which will open Lambda in the private subnet to access Dynamo. Create an endpoint in your VPC that aligns to the VPC/subnet setup you have for lambda and you will have no issues with access.

You can limit access to specific services or resources.

<https://aws.amazon.com/blogs/aws/new-vpc-endpoints-for-dynamodb/>

This can be done for any global AWS service, S3 etc

1097. <https://stackoverflow.com/questions/48704084/warn-to-user-with-message-in-session-timeout-in-spring-boot-app-2-0>

Title: Warn to user with message in session timeout in spring boot app 2.0

Question: I want to display message to user as "Singed out because of inactive" in login page .

I tried the below code in spring security but its not effected .

sessionManagement().maximumSessions(1).expiredUrl("/login?expired") in httpsecurity .

After session timeout , simple its redirect to the /login only , did't get the expired value .

Answer: That not enough. You have also to add a session listener.

1098. <https://stackoverflow.com/questions/13394499/ado-net-connection-timedout-before-the-connection-timeout-value>

Title: ADO. net connection timedout before the connection timeout value

Question: We have a WCF Data Service connecting to a SQL Server 2008 R2 database. When the service is trying to access data from the database the connection is getting timed out before the Connection Timeout value and the timeout exception is thrown.

This is the connection string:

```
Data Source=XXXX;Initial Catalog=XXXX;MultipleActiveResultSets=False;
Connection Timeout=80;Integrated Security=false;User ID=XXX;Password=XXX
```

In this connection string, even though we gave 80sec as the Connection Timeout, the connection gets timed out at around 700ms and throws below exception

*System.Data.SqlClient.SqlException (0x80131904): Timeout expired.*

*The timeout period elapsed prior to completion of the operation or the server is not responding.*

This is happening on some queries only.

Answer: This type of timeout can have three causes;

1. There's a deadlock somewhere
2. The database's statistics and/or query plan cache are incorrect
3. The query is too complex and needs to be tuned

Taken from the following links

[Timeout expired. The timeout period elapsed prior to completion of the operation or the server is not responding. The statement has been terminated](#)  
try to optimise the query as mentioned here

Answer: I had the same problem and google brought me here.

[Timeout expired. The timeout period elapsed prior to completion of the operation or the server is not responding.](#)

In my case, the mssql firewall port (default = 1433 TCP) was not yet open on the db server.

1099. <https://stackoverflow.com/questions/3839966/can-anyone-explain-what-jsonp-is-in-layman-terms/3840118#3840118>

Title: Can anyone explain what JSONP is, in layman terms?

Question: This question already has an answer here:

- [What is JSONP, and why was it created?](#) 9 answers

I know JSONP is JSON with padding.

I understand what JSON is, and how to use it with `jQuery.getJSON()`. However, I do not understand the concept of the `callback` when introducing JSONP.

Can anyone explain to me how this works?

**Answer:** Preface:

This answer is over six years old. While the concepts and application of JSONP haven't changed (i.e. the details of the answer are still valid), you should [look to use CORS where possible](#) (i.e. your `server` or `API` supports it, and the `browser support` is adequate), as JSONP [has inherent security risks](#).

---

JSONP (*JSON with Padding*) is a method commonly used to bypass the cross-domain policies in web browsers. (You are not allowed to make AJAX requests to a web page perceived to be on a different server by the browser.)

JSON and JSONP behave differently on the client and the server. JSONP requests are not dispatched using the `XMLHttpRequest` and the associated browser methods. Instead a `<script>` tag is created, whose source is set to the target URL. This script tag is then added to the DOM (normally inside the `<head>` element).

Answer: Say you had some URL that gave you JSON data like:

```
{'field': 'value'}
```

...and you had a similar URL except it used JSONP, to which you passed the callback function name 'myCallback' (usually done by giving it a query parameter called 'callback', e.g. `http://example.com/dataSource?callback=myCallback`). Then it would return:

```
myCallback({'field':'value'})
```

...which is not just an object, but is actually code that can be executed. So if you define a function elsewhere in your page called `myFunction` and execute this script, it will be called with the data from the URL.

The cool thing about this is: you can create a script tag and use your URL (complete with `callback` parameter) as the `src` attribute, and the browser will run it. That means you can get around the 'same-origin' security policy (because browsers allow you to run script tags from sources other than the domain of the page).

This is what jQuery does when you make an ajax request (using `.ajax` with 'jsonp' as the value for the `dataType` property). E.g.

1100. <https://stackoverflow.com/questions/2930916/how-to-turn-off-https-security-risk-related-messages-on-asp-net-mvc-page>

Title: How to turn off https security risk related messages on ASP.NET MVC page?

Question: We have a secured website using ASP.NET MVC Framework. The User session timeout is implemented using **JQuery IDLETIMEOUT** plugin.

So that If the session timeout is set for 30 min, it displays a message "**You are about to be Signedout due to inactivity**" with "**Stay Logged on**". This popup Message displays for last 30 sec and if the user clicks on this message, the session continues, else this message disappears and User is Logged out.

Now I noticed once security warning message that is displaying from the Internet Explorer "**This page is accessing the information that is not under its control. This poses a security Risk. Do you want to continue?**"

I am wondering how to get rid of this secury warning message. This warning message is coming along with the About to session timeout message

Answer: This warning comes when your page is accessing URL that are non-secure. That is a https page while loading is giving hit to http urls debug along these lines to find out a solution.

1101. <https://stackoverflow.com/questions/38132984/security-group-allowing-traffic-from-itself>

Title: Security group allowing traffic from itself

Question: I have a **Webserver** in a **VPC** that will occasionally use curl to get or post a resource from itself, using one of the *domains* associated to that *server*. I have a restrictive security group assigned to this *server*, as I only want to allow traffic from specific **IP ranges**. Additionally, I added the security group itself as a source of inbound traffic, in order to deal with the curl calls.

Unfortunately this isn't working. The *connections timeout*. Using `wget` from *command-line* on the *server's IP* or one of the domains goes timeout too. The only way to fix it is to allow traffic from '`0.0.0.0/0`' on the security group, which I don't want to do.

As a workaround I've added '`127.0.0.1`' entries for every *domain* to the *hosts* file, but this isn't a long term solution for me.

Is any help to fixe?

Answer: The traffic is basically going out to the internet and back, which means it is leaving the VPC, so it is no longer identified as coming from within the Security Group. To allow traffic from a Security Group, that traffic has to be addressed to the Private IP address, not the public IP or domain name.

One way to do this is add *hosts* file entries like you have done. You could also create a private hosted zone in Route53 and assign it to the VPC, then override certain DNS records within your VPC to route to the private IP address.

1102. <https://stackoverflow.com/questions/36396532/change-login-timeout-when-loggin-in-to-ubuntu>

Title: Change login timeout when loggin in to Ubuntu

Question: I've tried searching for how to change the timer that controls when an login attempt is reset. I'm having a hard time finding the solution, maybe because I'm not searching correctly. I've found this: <https://unix.stackexchange.com/questions/144303/change-tty-login-timeout-archlinux> ...which describes what I'm searching for, but can't find it for Ubuntu. I'm running Ubuntu 14.04.3 LTS. Sorry if this is a total noob question. It's only the timeout for the login screen I'm interested in changing, not the session timeout after a successful login. Hope I'm explaining it okay. I'm loggin in via console through VMware vSphere. SSH is closed down due to security concerns. Copy/paste option is removed due to security concerns. I have to input a 32 character insane password, and the timer expires before I'm done entering password.

Answer: in my ubuntu, I can edit the file /etc/login.defs and change the line

LOGIN\_TIMEOUT 60

To another value

1103.

T: Performance vs Quality of Code

Q: Do you think it's worth trading off some performance for code-quality and maintainability? I remember a post by Jeff Atwood that stated that hardware is cheap, developers are not. I think I'd like to change that to "Hardware is cheap, time is not." I've noticed with an MVC project I've been working on lately that sometimes I lose DAYS just trying to squeeze out a little extra performance out of my app and I'm starting to think it's just not worth it. I've just found myself having trouble with designing an ASP.NET MVC application. I love IQueryable to death in the fact that it allows me to append to the query so I can get some fluent code for using it. But being able to do something like that seems to add more responsibility on the controller/BLL.

So what do you think? In the case of web applications would you be ok with trading off some performance for maintainable/cleaner code? Do you think it's worth to prematurely try to optimize everything you can? Because as we've seen you cannot predict all requirements.

A1:

8. Make it work
9. If performance is questionable, profile and identify the problem
10. Fix the problem.
11. Repeat steps 1-4 if necessary
12. ???
13. Profit. Sir Tony Hoare famously said, "We should forget about small efficiencies, say about 97% of the time: premature optimization is the root of all evil."
- 14.

A2: The first part of the quote has been all but forgotten (it doesn't roll off the tongue as easily), and thus many inexperienced engineers don't take performance into consideration during the design phase of a software project. This is almost always a fatal mistake, as later on a badly designed application is very difficult to optimise due to fundamental design flaws. At the same time, there is no point trying to save CPU cycles by using clever tricks when the performance bottlenecks aren't known yet. As to your question, I think a properly designed application that is designed to cope with its particular performance requirements won't need to be coded in an unmaintainable or "unclean" way. It's only when those performance bottlenecks are discovered (e.g. you discover your application spends 90% of its time in 10% of the code) that you might want to consider sparingly using optimisation tricks in

small amounts of your code, so that it remains maintainable and easy to understand. The great thing about many Web applications is that performance can be drastically improved using various caching techniques. As you control the server environment (and, like you say, hardware is cheap) you can make sure you cache the hell out of those commonly-used parts of your Web app. This doesn't really make for unmaintainable code if you use an abstraction layer. Facebook is a good example of a Web application that famously exploits caching (memcached) to its advantage. Sir Tony Hoare famously said, "We should forget about small efficiencies, say about 97% of the time: premature optimization is the root of all evil."

A3: I really do not believe this is an either/or. If you write clean, simple code that does all processing only exactly the number of times it should, you will have some of the best performing code you can. It's really that simple.

A4: The obvious answer is it depends. If your app is slow enough that it affects usability significantly, and you have measurements to prove that your optimizations actually help, then sacrificing maintainability can be a reasonable tradeoff. On the other hand, if you haven't measured or the app isn't slow enough to hurt usability, always go for readability, maintainability and flexibility. This just boils down to premature optimization being the root of all evil. Note: Design time algorithmic and architectural optimizations aren't necessarily bad if you know performance is going to matter for your app, but in the case of your question, you clearly appear to be talking about micro-optimization, to which the above applies. Also, in your specific case, if you can't tell whether your app is slow enough to hurt usability then it's premature. If you can then it's not.

A5: Before talking about performance you should really learn about big O notation, you can look that up in any books about algorithms or on wikipedia. Big O notation says something about how much time a function takes. For instance. A list running from 0 to 100 you have  $O(N)$ . No matter how high number you count to the O notation stays the same. This function has a linear runtime and cannot be improved in any ways. Now if you have a list running from 0 to 100 and for each item in that list you do another list running from 0 to 100 you get  $O(N^2)$  which is twice the work and has a much worse runtime than  $O(N)$ . When writing applications that has to have good performance we talk about getting a good runtime written in O notation. Whether a window uses <0.1 seconds or >1 second doesn't really matter if they use the same algorithms. That means, the shaving of seconds you do probably doesn't have a different O notation so you're not really optimizing your code in any way - So for you, writing MVC in asp.net I would recommend you focus on writing clean and readable code instead :). When you have learned about O notation you will be able to know what algorithms to pick (how to sort lists, populate them, retrieve data) in a way that uses the least run time in O notation and this knowledge will probably make your code much faster than shaving seconds off your code writing tight loops ever will do.

A6: All good answers. The choice between speed and clean code is a false dichotomy. I haven't seen you work, but I've watched others, and it's always the same story: "It's not fast enough. I think the problem is in the XXX code. I think I'll tweak that and see if it helps." You don't know the problem is there. You're guessing. Never do anything based on a guess.

(Of course you would never do that, would you? But most people do.) You could profile the code. My favorite method is to just halt it a few times while it's being slow, and ask it what the heck it's doing. It's usually a surprise that one couldn't have guessed.

A7: Neither quality (meaning easy to read) nor performance is the most important - CORRECTNESS is!

A8: Agree with this to an extent. Developer time is costly, and profiling and optimizing code is a very expensive way to get probably not very much performance gain. Having said that it depends on the type of application and the environment you're working in.

If you're working on a web application, then you can make massive improvements by fixing a few simple issues (mainly on the client-side). Things like reducing HTTP requests by concatenating CSS/JS files, building image sprites, etc... will give you huge gains compared to actually profiling code, and are a very good use of developer time.

I don't know that I agree with the 'hardware is cheaper than developers' quote though. Of course hardware can help you scale your application and give it more performance oomph, but the last thing you want to do is rely on beefy hardware. If your software is too tightly coupled to your hardware you lose a lot of flexibility in terms of moving to new data centers, upgrading servers, etc... and not having that flexibility can be very costly in the longer term. Say you decide that the way to scale your application efficiently is to move to Amazon's EC2 infrastructure. If your application requires 32GB of RAM on each server you're going to find a move like this might require a re-write.

A9; This is one of the classic trade offs performance versus supportability. I first came across this trade off when writing COBOL structured code (in the early 1980's). It became clear that by separating everything out into reusable modules created extra branching and stack pointer management and on the early computers this degraded performance. The answer was to group functions together (and duplicate certain functions) in order to reduce the code swapping and stack pointer manipulations that were used to call modules. This caused a supportability issue. Moving on, more recently, I had to de-normalize a data base to create large objects that could be cached. The issue here was reading access rights for roles and responsibilities during navigation around a CRM system. Long story short the normalized version took too long to process and load each screen so 30 years on I am still involved with this classic trade off.

A10: I definitely do value my own time over application performance on the server side. If I notice that my site is not performing well enough on database requests etc, upgrading the server hardware is an alternative solution that could (at least short-term) solve my problem without looking at the code. However, if the app is extremely network-inefficient, I would spend quite some time trying to improve that part. Sending large chunks of data affects my users, no matter what I do with my own server and uplink - and if they don't like the performance, they won't come back. But as several others have said, it is not a matter of either/or - it depends a lot on situation, how heavy the performance issue is, where in the application etc.

A11: Good design often sacrifices some performance for improvement of the overall program. For example, writing you code in layers has a cost, but we do it anyway because it makes changing the code easier over the long term. We use app servers remotely, not because it is the most efficient way, but because it scales. I recall from Code Complete 2, McConnell does give an example where making the code horribly difficult to read was necessary as an optimization. That particular example was an encryption algorithm. The program was made into one method to eliminate the overhead of calling a function. So, there is indeed a time and place for this, but I believe it to be rare. As for solving performance problems, in most cases, I have found performance issues to be either database/IO related or a bug(memory leak). As others have suggested, profiling is the way to go, though it can still be tricky to track down many bugs. As for the hardware issue, hardware relaxes but does not eliminate the need for optimized code. The faster hardware really just allows us to use less than optimal languages and do really nice GUI stuff.

A12: A standard definition of Quality is "Conformance to client expectations (requirement)". If you have done good requirements gathering, then you have agreed to certain performance criteria. If your application meets this criteria, then you are wasting your, or the client's, time and money trying to do better. Writing loosely coupled, cohesive, and easy to read code just reduces the risk and cost associated with bugs and changes to the requirements. If you are prepared to accept the risk of 'ball of mud' coding, then go ahead. Me, I like to make a profit.

Q: Reusability, testability, code complexity reduction and showing-off-ability programming importance? There are lots of programming **and architecture patterns**. Patterns allow to make code cleaner, reusable, maintainable, more testable & at last (but not at least) to feel the follower a real cool developer. How do you rank these considerations? What does appeal you most when you decide to apply pattern? I wonder how many times code reusability (especially for MVP, MVC patterns) was important? For example DAL library often shared between projects (it's reusable) but how often controllers/views (abstracted via interfaces) are reused?

A1: Code complexity reduction ranks high, if I keep things simple, I can maintain the project better and work on it faster to add/change features. Reusability is a tool, one that has its uses, but not in every place. I usually refactor for reusability those components that show a clear history of identical use in more than three places. Otherwise, I risk running into the need of specialized behavior in a place or two, and end up splitting a component in a couple of more specialized ones that share a similar structure, but would be hard to understand if kept together. Testability is not something I personally put a lot of energy in. However it derives in many cases from the reduced code complexity: if there are not a lot of dependencies and intricate code paths, there will be less dangers to break tests or make them more difficult to perform. As for showing-off-ability... well... the customer is interested in how well the app performs in terms of what he wants from it, not in terms of how "cool" my code is. 'nuff said

A2: I think you missed the single most important one from your list - more maintainable. Code that is well and consistently structured (as you get with easily reusable code) is much more easily maintained. And as for reusability, then yes, on a number of occasions, usually something like : create a web page to save/update some record. Some months later - we need to expose this as a service for a third party to consume - if your code is structured well, this should be easy and low risk, as you're only adding a new front end.

A3: "Code reusability" as defined in many books is more or less a myth. Try to focus more on easy to read - easy to maintain. Don't start with "reusability" in mind, will be better if you will start to think first on testability and then to reuse something. Is important to deliver, to test, to have clean code, to refactor, to not repeat yourself and less important to build from the start components that can be reused between projects. Whatever is to be reused must be a natural process, more like a discovery: you see a repetition so you build something that can be reused in that specific situation.

A4: I hope most people use patterns to learn how to solve design problems in certain context. All those non-functional requirements you mention can be really important depending on stakeholder needs for a project. As for MVC etc. it is not meant only to be reused between projects, that is often not possible or a good idea. The benefits you get from MVC should be important in the project you use that architecture. You can change independently details in view and models, you can reuse views with controllers for different models, you should be able to change persistence details without affecting your controllers and views. All this is imho very important during development of a single project.

1105. <https://stackoverflow.com/questions/18691138/is-mvc-a-design-pattern-only-or-programming-technology/18691287#18691287>

Q: Is MVC a design pattern only or Programming Technology? If I violate the MVC pattern like ASP.Net Form Application then any performance issue arise or not?

A1: MVC is neither a design pattern or a technology. It's a software architecture pattern. See:

<http://en.wikipedia.org/wiki/Model%E2%80%93view%E2%80%93controller>

The difference between a design pattern and a software architecture pattern is that design patterns tend to be simpler and apply to specific components of an application, while architecture patterns are broader and apply to the application as a whole.

In any event, there is also various pieces of technology called MVC, which are based on the MVC pattern. For instance, ASP.NET MVC is the official name for the flavor of MVC created by Microsoft for use in web applications. This is a specific implementation of MVC.

Violation of the MVC pattern has nothing to do with performance, and is largely an issue dealing with maintainability. The MVC pattern stresses separation of concerns to make designing and maintaining your application easier, and making your application less fragile to change.

A2: MVC is just a architecture pattern not a technology, and its goal is separating concerns, you should know something that you can use MVC pattern and Webforms together, and if MVC does not separate Model View and Controller then you are doing something else not MVC.

A3: The background and requirements of your project is VERY important, but you don't mention

1106. <https://stackoverflow.com/questions/2267041/what-are-the-performance-implications-of-using-design-patterns-in-php/2267053#2267053>

**T: What are the performance implications of using design patterns in PHP?**

Q: I know that design-patterns are very useful in creating of big projects. Does anyone have experience in both creating project with normal (OO, procedural ) and using design patterns in respect to performance(speed of execution)? I want to create some big project and I am afraid that using design patterns my scripts would run slower. So What is pefrmance of code with desing paterns compare to normal OO programming?

A1: Personally,

I'd program it, and then figure out if there are speed problems/bottlenecks.

Only worry about performance when it becomes a problem.

A2: The objective of design patterns is to solve common problems. These problems may include maintainability (which is what it sounds like you're mostly interested in), as well as performance. Personally, I would favour applying architectural patterns first to make the operations of your application easy to understand. It should then be easier to refactor the existing code to introduce some performance-related patterns, should the performance of your code warrant it.

A3: An old adage about database design can be applied here: "Design for normalization first, denormalize for performance later". In this case, design it right the first time, if you find performance bottlenecks, optimize and break elements of your design on a one off basis then. Another issue, get someone using your application before you start optimizing, otherwise, who really cares?

A4: Some of the reasons design patterns are used is to eliminate code duplication and placing the code in the right spot. Both of these factors adds up to a fast application. Individual techniques such as caching and loading-code-only-when-needed could be easier/faster to apply with design patterns.

That said, maintainability will be much more prominent with some kind of thinking behind the coding applied, which will let you as a programmer focus on the real performance issues.

A5: Rarely code complexity is a factor in total execution speed of a PHP application, usually database interaction and network transfer times are much better candidates for slowness. In any case, develop first and optimize later. You might found out that that kind of optimization is not even necessary.

A6: This depends entirely on what your application is doing and on the details of how you implement the patterns. Design patterns themselves are not really related to performance, but are intended to help you structure your system to aid maintainability.

Besides, performance should not be a concern at this stage; focus on getting the design pinned down first, and if it turns out to be running too slowly, only then should you worry about optimization.

A7: Well I don't have experience with programming using design patterns (only MVC). It is useful for maintainability, but amount of classes/code is greater compare to OO programming. (that is conclusion from my research ,but not from experience). By desing patterns I mean Factory,Decorator, Singleton etc.

1107. <https://stackoverflow.com/questions/1866821/is-mvc-a-design-pattern-or-architectural-pattern/9571399#9571399>

T: Is MVC a Design Pattern or Architectural pattern

Q: According to Sun and Msdn it is a design pattern.

According to Wikipedia it is an architectural pattern

In comparison to design patterns, architectural patterns are larger in scale. (Wikipedia - Architectural pattern)

Or it is an architectural pattern that also has a design pattern ?

Which one is true ?

A1: MVC is more of an architectural pattern, but not for complete application. MVC mostly relates to the UI / interaction layer of an application. You're still going to need business logic layer, maybe some service layer and data access layer. That is, if you're into n-tier approach.

A2: Why does one of them have to be true?

Both can be true, depending on point of view.

MVC can be an architecual pattern, if it forms the basis of the application architecture.

It can also be seen as simply a design pattern, an abstract notion that is applicable to any application.

A3: Design patterns say how to write code effectively (considering Code Metrics).

A few benefits:

Easily Maintainable

High Re-usability

Readable because of abstractions

Architectural patterns say how to utilize resources effectively.

Parallel tasks execution like programmers and graphic designers can work parallel.  
Multiple technologies can be utilized to build a software.

A4: I know that it's been answered awhile ago, but no one has yet mentioned the book that made MVC famous: Pattern-Oriented Software Architecture (POSA), by Buschmann, et al published in 1996. Though not as widely read as the Design Patterns book, by Gamma, et al, POSA is one of the foundational books used by the patterns community.

Oh, and POSA very clearly identifies MVC as an architectural pattern. My hunch is that MS and Sun are just being sloppy and calling every pattern a "design pattern".

A5: I think both are true. If you're looking at a particular instantiation of MVC in a framework like Ruby on Rails, that instantiation is more of a design pattern. If you look at MVC as a general concept, it's more of an architectural pattern.

A6: If you put ten software architects into a room and have them discuss what the Model-View-Controller pattern is, you will end up with twelve different opinions. ... Some of the purists out there will inevitably have qualms with what I refer to as "MVC". Feel free to leave a flaming comment on the message board at the bottom of this Web page. I will gladly entertain different perspectives on what MVC means, but keep in mind that I do not care.

A7: MVC always mentioned and introduced as/in presentation layer in software architecture books.

Read these books:

Architecting Microsoft.NET Solutions for the Enterprise (Microsoft press)  
Professional ASP.NET design patterns (Wrox)  
Enterprise Solutions Patterns Using Microsoft.NET (Microsoft press)  
Patterns of Enterprise Application Architecture (Addison Wesley)  
A Practical Guide to Enterprise Architecture (Prentice Hall)

1108. <https://stackoverflow.com/questions/3226531/avoiding-bad-php-coding/3226557#3226557>

Q: There is a lot of books and tutorials about php that are completely different from each other. How can I choose the right way? Is the only way is test with xdebug or phpUnit or benchmark?

A1: It's also worth mentioning the use of a well defined pattern like MVC and build your project with some Framework like Zend, as this will encourage you to put each piece of code where it belongs.

A2: As code quality/readability/maintainability cannot be "benchmarked", I suggest reading books about proper code structuring and best practices. Maybe Code Complete book from Steve McConnell?

1109. <https://stackoverflow.com/questions/31742485/what-is-the-standard-i-should-use-in-mvc-coding/31742915#31742915>

T: What is the standard I should use in MVC coding

Q: Based on the answers mentioned here, I understood that I should put the business logic inside the model itself, while in my program I am using EF directly inside the actions of the controller for example to get the list of cars from the database directly I am doing the following.

what is the impact on my website performance if I will use the mentioned above code inside controller or inside Model?

which method I should use? for example if I want to work with a team, is there a standard I should follow to separate the code, kindly advise

for using the repository pattern: I read that we should not use if as mentioned for example here , i will copy some of what mentioned:

A: The answer to your question is, it does not really affect performance but it will definitely become an issue in terms of maintainability as the application grows bigger. You can adopt the SOLID architecture principles: SOLID architecture principles using simple C# examples. This enables you to develop high quality software.

You can create a multi-layered application:

Interface Layer - MVC application

Business Layer - Class Library with classes with logic

Data Access Layer - Database Contexts and Repositories, unit of work with CRUD operations

Shared layer - Logging, AppSettings, validations, utilities, extensions, constants, enums

Having your application in this structure would require you to consider things like inversion of control, dependency injection and many more to ensure loosely coupled classes, easy unit testing and most of all a solid application.

You can also read this: Implementing the Repository and Unit of Work Patterns in an ASP.NET MVC Application

1110. <https://stackoverflow.com/questions/3335578/asp-net-or-php-soft-for-real-estate-agencies/3335832#3335832>

Q: Soon I begin create CRM for Real Estate Agencies sphere. In my background 2 years of PHP-programming & then 5 years of ASP.NET (intranet applications). & I think maybe ASP.NET (I write code on C#) have good IDE (VS 2010), but this is monster :) My application will be multiplayer web application for different real estate agencies (it is now fashionable to talk SAAS). Interaction over SSL via web browser. What situation with developing of web applications now? What language prefer for start new project? Pluses & Minuses of each? Or maybe choose another language?

Maybe now exist standards of data structure & exchange in real estate at this moment?

A1: Work in the language you are most comfortable with. All modern programming languages have pros and cons. It's more important that you build a good product than the language used to build it.

A2: Well... if you're getting paid heavily for this, play it safe and go the ASP.NET way. Otherwise, go the PHP way. Why? Because if you can play with it, learning a little bit more of PHP will turn out to be useful, especially because it's not OS-dependant.

A3: I would also heartily recommend C# and .NET over PHP.

My own personal bias is that C# is a vastly better language than PHP but I am sure you have enough experience in each to have your own opinion.

ASP.NET MVC is more maintainable than plain ASP.NET WebForms and it is a lot easier to implement TDD (Test Driven Development) in MVC which (again my opinion) leads to more maintainable and higher quality software. Depending on your experience however, it could be a lot faster to get something up and running in WebForms. You can mix and match to some extent though. It seems common these days to design the main parts of an ASP.NET site in MVC and to build the administration screens in WebForms.

You could also use System.Web.Routing in WebForms at first and migrate over to MVC over time although again this might be difficult depending on your experience.

One thing, you do not have to deploy on Microsoft Windows. The Mono project supports ASP.NET projects on Linux very well. If someone tells you otherwise, I doubt they have tried it. If you go this route, you could also consider an Open Source database like MySQL.

MySQL can handle very large web loads with high reliability. Again, I doubt the naysayers have much direct experience with it. There are other DB options on Linux of course.

Deploy on Windows if you want. I just wanted to say that the .NET/PHP decision does not limit your OS platform decision as some suggest.

A4: I'd suggest creating it in ASP.NET MVC. Why? Well, you've been developing ASP.NET and C# for longer than PHP and are familiar with the tools. I'd suggest MVC over web-forms as it makes it easier to separate concerns in the 'layers' of your app, making it easier to maintain and develop (especially with a "monster" application!).

A5: In this situation, I would suggest building the site in ASP.NET (MVC or WebForms would work) simply because the tools are better suited to larger projects and it's where you have the most experience.

Depending on the technologies used, this may limit your platform choices. If you build a basic .NET site and build your data access layer yourself, you can get away with running your .NET site on Linux/Apache/Mono/DB of your choice.

If you decide to go with technologies like LINQ to SQL (or LINQ to Entities) for Data Access or WCF Services to provide a backend for your site, you'll probably want to stick to Windows Server/MS SQL Server for Enterprise Level performance/reliability.

A6: That being said, it seems most real estate scripts are written in php, especially for non-enterprise products.

1111. <https://stackoverflow.com/questions/20854041/refactoring-re-engineering-a-large-system/20857399#20857399>

Q: I am currently in the process of re-engineering a system which is written in struts 1.3 / PostgreSQL and Hibernate. The system is architecture'd as an MVC system with presentation logic in JSP's / Actions having View Logic and EJB's having Business logic. They have used Hibernate as a mapping layer, but some areas still use JDBC functions which have large number of business logic written inside them Or is to start from the DB, refactor the DB then come up the stack? Is start at the enterprise business logic layer and refactor the business logic? Where should I start and what should my approach be. I am now going through Martin Fowler's books and lot of articles on refactoring and re-engineering. But I would really appreciate some guidance.

A: First question would be "what is the purpose of refactoring?". Have you reached the point where the maintainability of the application is unmanageable, and fixing one bug simply exposes 3 others? Do you want to extend the application, and have you found it too expensive? Is application performance suffering?

I ask this because with such a large project, it's important to make sure your approach solves the actual problem you face. For instance, if you decide to start writing unit tests for the entire application, it may not help you with performance issues until much later. If you move the business logic out of the view layer, it may not help much with adding new features.

Next question is "is there a logical structure to the application, either in the technology solution or the business domain?". You've got a horizontal partitioning from the MVC architecture - is there a vertical partitioning? Again, as Namal Dinesh Ubhayawa suggests, picking a manageable, self-contained subset of the application, and working through that module top to bottom will quickly show whether you're on the right track.

Once you've agreed the module you're going to work on, create a release plan. Set yourself a target, and use whatever development process you've got to work towards that target. Make the target as specific as you can:

The team will release a new version of the product information module by 15 February. The release will meet our quality criteria of 0 P1 defects, < 5 P2 defects, and < 15 lower priority defects. Unit test coverage will be x, code review coverage will be y. No methods will have a cyclomatic complexity > z. There will be no business logic in the view layer, and the data model will be normalized to 3rd normal form".

1112. <https://stackoverflow.com/questions/2025206/asp-net-application-webcam-capture>

T: ASP.NET Application Webcam Capture

Q: Ok, so I have seen a ton of stuff on capturing an image from a web cam but I want to capture video. I want to be able to control quality, length and size of file that will be transferred. It is part of an ASP.NET MVC C# web application and would appreciate any guidance in finding info on this topic, as well as any comments on efficiency , security, etc.

A: For security reasons, linking to external hardware devices is not a capability that is permitted by most browsers. You will need to use a technology like Flash or ActiveX that has a binary presence on the client's computer and can bypass the browser security model; ASP.NET MVC all by itself won't cut it.

1113. <https://stackoverflow.com/questions/11689156/how-to-take-userid-or-email-input-and-validate-in-servlet>

T: How to take use rid or email input and validate in servlet

Q: My question is simple. In some websites it is seen one can enter the site providing his/her email-id or userid and password(i.e already registered with the site). Now in MVC structure we use servlet as DECISION CONTROLLER. So after taking the input in servlet, we can compare them with userid or email-id column of user table. So to take input we can write in servlet: String input=request.getParameter("inputfield"); After taking the input what should be the way to check ,if the given input is email-id or userid? Should we compare the String input with each value of both the userid and emailid column of user table? If that is the only way the program quality will be very low and security can be exploited.

1114. <https://stackoverflow.com/questions/5580123/asp-net-and-mvc-security>

T: asp.net and mvc, security?

Q: The company has a website that is driven with asp.net webforms. They would like to move over to MVC. So we have decided to create a new sub domain for the MVC page and then piece by piece convert the asp.net to mvc. How can i setup the security (selfmade authentication) to overlap from the webforms page to the mvc page. What i want to do is to move the user from asp.net webforms over to mvc when they are accessing some code that has been rewritten. Then when they are using some other tools on the website they should be ported back to the webforms site. I dont want to validate the user between the move from the asp.net webforms to mvc and back. That should all happen automatically. Can i configure the sessions to stay intact when moving over to the new mvc subdomain? So the mvc should be able to access the same sessions that was created on the webforms site.

A: Try this page <http://www.packtpub.com/article/mixing-asp.net-webforms-and-asp.net-mvc> It shows how to use webforms inside of an ASP.NET MVC site. You want it the other way round, but I think you can get the results you want by putting the existing webforms application into a new ASP.NET MVC application. The article shows how you can access the same session variables from both parts, which I think enables your security implementation.

1115. <https://stackoverflow.com/questions/27180161/mvc-security-and-access-control>

T: mvc security and access control

Q: I am new to MVC and I want to know how security and access control is handled within MVC. My case is, let's say I am managing an website where user can post a note that is not accessible by other user unless permission is given to do so. My database is currently structured as below.

Let's then say I have below URL and which will only be accessible by users with UserID 3 and 1 according to the owns note table.

/Note/Edit/1

What is the best practice to implement this kind of restriction ?

I can simply look up the table in the Edit Action and redirect to other page if user doesn't have access. But my problem is then when I implement new Delete action, or whatever actions in the future, I need to place the same code at the start of each action. Is this only way to implement this ?

Thanks in advance...

1116. <https://stackoverflow.com/questions/12980904/good-java-mvc-security-framework>

T: Good Java MVC security framework [closed]

Q: Can anyone recommend me a good authentication security framework that allows the user to be authenticated by an email address as the user name, and allows the user to have a separate screen name?

A: MVC design pattern is completely unrelated to application security.

1117. <https://stackoverflow.com/questions/13544238/why-do-my-azure-sites-keep-going-down>

T: Why do my Azure sites keep going down?

Q: I am testing Microsoft's Azure cloud platform and am hosting two very low-requirement websites. One is a simple single form MVC website that simply accepts some input from the user, performs some calculations, and spits out an output. The second is similar, but it performs a simple query against an Azure SQL Server instance. Both websites go down constantly. What appears to be happening is that if I don't hit the website for awhile (maybe an hour or so) the GET request simply fails. Nothing is ever returned from the server. If I wait a minute or two and try again, the website works perfectly. Anyone know what's happening or how I can fix it? I obviously cannot host websites on this platform if the reliability is this low.

1118. <https://stackoverflow.com/questions/13109263/what-was-mvc-invented-for/13109595#13109595>

T: What was MVC invented for?

Q: I am new in web development, and read some wiki and discussions about MVC. However, the more I read, the more confusion I have about its design purpose. I just want to know why is this design pattern invented? And what problem is it used to solve?

A1: The goal of the MVC paradigm is in essence to ensure a form of separation of code. The problem that often arise when developing code is that the code is written in a succession, where each part follows another and where each part is directly dependent upon what the other parts are doing. When working with a large project, maintaining and further developing the code can quickly become an issue. You could therefore argue, in a simplified manner, that what the MVC paradigm tries to do is to ensure that you separate business logic (e.g. the code that performs) from the presentation logic (the code that shows the results). But those two parts need to communicate with each other, which is what the controller is responsible for. This allows for a clear structure of code where the different parts are

more decoupled, meaning less dependent upon each other. The separation also means that you work in a much more modular way, where each part interacts with the others through an interface (some defined functions and variables that are used to call upon other parts) so that you can change the underlying functionality without having to change other parts of your code, as long as your interface remains the same. So the problem it tries to solve is to avoid having a code base that is so entangled that you can't change or add anything without breaking the code, meaning you have to modify the code in all sorts of places beyond where you made your original changes.

A2: To some degree it's a solution in search of a problem.

As a rather ancient programmer I'm well aware of the benefits of "separation of concerns", but (in my not-so-humble opinion) MVC doesn't do this very well, especially when implemented "cook-book" fashion. Very often it just leads to a proliferation of modules, with three separate modules for every function, and no common code or common theme to tie things together and accomplish the real goal: minimize complexity and maximize reliability/maintainability.

"Classical" MVC is especially inappropriate in your typical phone GUI app, where, eg, management of a database table may be intimately connected to management of a corresponding table view. Spreading the logic out among three different modules only makes things more complicated and harder to maintain.

What does often work well is to think about your data and understand what sorts of updates and queries will be required, then build a "wrapper" for the database (or whatever data storage you use), to "abstract" it and minimize the interactions between the DB and the rest of the system. But planning this is hard, and a significant amount of trial and error is often required -- definitely not cook-book.

Similarly you can sometimes abstract other areas, but abstracting, say, a GUI interface is often too difficult to be worthwhile -- don't just write "wrappers" to say you did it.

Keep in mind that the authors of databases, GUI systems, app flow control mechanisms, etc, have already put considerable effort (sometimes too much) into abstracting those interfaces, so your further "abstraction" is often little more than an extra layer of calls (especially if you take the cook-book approach).

A3: Model view controller was created to separate concerns in code instead of creating a hodge podge all in a single blob. (Spaghetti code) the view code is merely presentation logic, the model is your objects representing your domain and the controller handle negotiating business logic and integrations to services on the backend.

1119. <https://stackoverflow.com/questions/25779199/when-is-the-mono-implementation-of-mvc-5-expected-to-come-out>

T: When is the mono implementation of mvc 5 expected to come out?

Q: Currently I am trying to figure out the architecture for a product revamp. The current project is in Asp.Net Webforms 4.0 but I am leaning heavily towards MVC 5 now. Problem is that a few customers (around 10%) do not want to get stuck with Windows Server licensing but our dev team/environment is .Net/Windows based. I was wondering if I could build it in MVC 5 leveraging the latest features like scaffolding, filtering, etc and also be able to port it to Linux based platform through Mono.

Does it sound realistic ? I wanted to know about the timelines for a stable implementation of MVC 5 in Mono so that I can know whether I can depend on Mono when my team would be working on portability 2-4 months down the line. Otherwise MVC 5 may be a dealbreaker for us. I went through the Mono site and it links to StackOverflow for any questions ... so here I am

A1: MVC 5 will likely never be 100% stable/supported on Mono, as it builds upon System.Web which Microsoft never open-sourced and is difficult to recreate in Mono. edit this may change now that the sources for System.Web have been made open source.

MVC 6 (and all the other stuff from ASP.NET "vNext") is a complete rewrite to get rid of System.Web and will support Mono out of the box, as Microsoft actively tests on it.

See <http://www.asp.net/vnext>, <https://github.com/aspnet/Home> and <https://github.com/aspnet/Mvc>.

My advice would be to keep an eye on ASP.NET "vNext" (it is in development stage right now, but will be the future of ASP.NET for the next decade) if you want to have proper Mono support. You can also start with MVC 5 now, but be aware that there will be breaking changes by the time you upgrade to MVC6.

A2: You could also try Nancyfx, which is a MVC framework that has been built from the start to work with .net and mono.

I currently use it on a project. I develop on windows and .net and then publish(copy files) to Ubuntu and mono. Its very seamless.

Nancy's hosting support is very broad also.

Hosting Nancy with ASP.NET

Hosting Nancy with WCF

Hosting Nancy with Azure

Hosting Nancy with OWIN

Hosting Nancy with Umbraco

Hosting Nancy with Nginx on Ubuntu

Hosting Nancy with FastCgi

Self Hosting Nancy

1120. <https://stackoverflow.com/questions/41526029/net-mvc-application-into-an-n-tier-application>

T: NET MVC application into an N Tier application

Q: In either .NET MVC 5 or a .NET Core MVC application, is it possible to split your Models into a Data Transport Layer, your business logic into a Business Logic Layer and your Db Contexts into a Data Access Layer? I essentially would want the main project to really only have controllers that call to the BLL, and display the results in the view. That way there is portability with my application if I wanted to exchange the main project, which is essentially just a presentation layer. I know I am going to be needing this kind of architecture as I am building an application that will share a lot of the same business logic between the two applications. What ways can I still get access to helpful features like scaffolding a model into views/controller, and still maintain that portability? Is there a way to do such a thing?

Please note, that this project may be on a short budget, so it is pretty essential to be able to maintain the scaffolding tooling.

1121. <https://stackoverflow.com/questions/10518507/php-mvc-framework-maximum-6-includes-per-action>

T: PHP - MVC Framework - Maximum 6 includes per action

Q: I'm developing a small PHP-MVC framework which's main principle is simplicity of use and debug and also portability, performance (above all) and ultra-easy learning curve. In my framework, the router and the controller are in the same file, because I don't really use a router, I simply parse actions from the \_GET and \_POST So my idea is to try to, no matter what action is being called, never (or almost never) do more than 6 includes (include()). The idea of this is to sustain readability and performance at their best. What you guys think? Do you think it's a good idea or not?

In my framework, the router and the controller are in the same file, because I don't really use a router, I simply parse actions from the \_GET and \_POST So my idea is to try to, no matter what action is being called, never (or almost never) do more than 6 includes (include()). The idea of this is to sustain readability and performance at their best.

What you guys think? Do you think it's a good idea or not?

A1: many includes are no problem, at least not with opcode caching extensions like xcache or apc. they cache the classes in memory and hold them for later usage (nearly instant).

you should plan the class interaction with something like uml and prefer single responsibility of classes and methods over using less of them.

if you like mvc you might want to look at h-mvc as it enables hierarchical controller calls using mvc. also you should try to decouple the view from the template engine.

A2: The point of using includes in the first place is to narrow down what you need so you don't wind up running code or defining functions you won't be using at all. Many lightweight frameworks out there build on this idea: "use only as needed". Of course if your framework only requires 6 files, sure it cleans up the code a bit but then you run into other problems such as loading time, functionality, usefulness, reusability, memory, readability, debugging, maintainable... It's just not practical in my opinion to force yourself down to 6 files only.

1122. <https://stackoverflow.com/questions/498536/is-mvc-good-for-mobile-device/537733#537733>

T: Is MVC good for mobile device?

Q: Is it good for develop MVC Framework by using J2ME (Resource,Speed,Performance,...)?

A: Yes, MVC eases the design process and promotes portability. Check out PureMVC . The J2ME version is in alpha. Nokia is using it.

1123. <https://stackoverflow.com/questions/30991580/mvc-plugging-a-c-model-into-a-web-based-view>

T: MVC: Plugging a C++ Model into a Web-based View

Q: I am writing a tool using MVC where the model is written in C++, controller in JavaScript/jQuery and the view in HTML/CSS. The reason the model is in C++ is for eventual portability to a thick client from the "speed build" on web.

Issue

My major roadblock at this point is connecting my C++ model to the HTML form that is currently collecting input data from the user.

I have looked into Emscripten for compiling the C++ directly into JavaScript, but I don't like the idea of having my underlying model be visible to the end user in any form. This is due to the model being

hooked up to a MySQL server handling a lot of sensitive data. I want to minimize risk of the end user accidentally (or purposely) messing with the function call invoking the model.

I have done quite a bit of research on PHP/C++ linking, but all the resources I could find have been severely outdated and/or convoluted.

I'd ideally like to have the data pushed to the server using a POST method before invoking the model so I can have maximum control over input validation both on the end user and server side.

I've also thought about using PHP to push to the MySQL server then having the C++ pull down from the server, but this seems a little obfuscated and raises the issue of when/how to wake the C++ up.

#### Question

Is there a good way to maintain security of my model (have it run entirely server-side behind a POST method) as well as the understandability of how this was implemented? I am a temp employee and my project will pass to other hands for the port to a thick client from web.

Speed is also a concern, but I'm assuming (or hoping) that the only bottleneck will be the pipe/script between the POST to the server and the C++ since most of the heavy-lifting will be occurring in the model.

A1: What about not putting any business logic in your model and instead break the model up into an Entity and Service?

You could then use emscripten on the Entity while your Service holds all of your MySql connection logic.

1124. <https://stackoverflow.com/questions/32709169/htaccess-configuration-adding-two-forward-slashes>

T: htaccess Configuration adding two forward slashes

Q: I am running a custom PHP MVC system and I am handling some of the normal .htaccess functions inside my PHP to ensure portability of the site but I have run into problems with, guess what? Portability!

Everything works fine except the home page, somewhere two forward slashes are being added to the domain name, but I don't believe that it can be attributed to my .htaccess Apache directives.

I'm adding the base to the url like

To see what's happening exactly, the reference site is Entourage Media.

Can anybody please help me understand this problem?

1125. <https://stackoverflow.com/questions/315782/develop-app-to-run-natively-or-go-cross-platform/315801#315801>

T: Develop app to run natively or go cross platform?

Q: What's your opinion on whether one should write an application for a specific platform or use a cross platform approach and reach more potential clients?

It would be a GUI based application and I'm thinking of using Java.

Most of the applications that I've used built on Java don't run as smooth as the native applications on the respective platforms.

The two platforms I'm thinking of are windows and macs.

If I was creating the app just for my own use, and I had to choose one system, I would choose to focus on the mac. I would like to hear your thoughts.

A: I would use Qt and yes, definitely target Cross Platform...

The major reason isn't in fact what you think it is (being cross platform by itself) but actually that by targeting multiple platforms your code by some freaking weird magical reasons tends to end up with far better code quality. I've seen this happen countless times in my own projects. Every time I add a new platform the quality of the code increases and the code becomes more clean...

Also every serious app should have as few "dependencies" as possible, being cross platform means you have less dependencies... ;)

Then as a "bonus" you get to your app to run on multiple platforms...

A2: Cross platform development, in general, is a bit overrated as an artform. Java is the leading technology here, but even in this case, most Java programmers don't really go cross platform. There are a few spectacular examples of tools like Vuze and LimeWire and JRipper which work pretty well just about anywhere, but these are exceptions, statistically speaking. Most Java apps, especially of the corporate variety, are coded with one platform in mind, and they never really move around.

If you want to go Mac and Windows, consider spending time in the Limewire and Vuze codebase. Both of these apps work extremely well on both platforms.

You will definetly need two builds. One build probably won't do.

A3: Requirements, requirements, requirements.

In all seriousness, "it depends" is the right answer.

Truly cross platform is hard work; Working where you/your users are familiar is worth something. Solving the problem in an effective manner is really the highest priority.

A4: I suggest to develop it first for the platform you feel comfortable with, and where you can make use of all platform gimmicks; in this case, this would be OS X.

Later, if your app is successful for the Mac, look at porting options. It's IMO not worth to put effort into porting until it is certain that there would be significant interest in the app in the first place.

A5: In this day and age, is there really a good reason to write native code?

Yes. The languages and libraries available do not allow excellent programming to be done well. At best they allow one to write code that works ok across platforms, but never excel.

Pick one and focus on it. Focus on that audience (you'll find the audiences are different in their tastes and desires anyway).

Once you've got an app people are clamoring for on the other side, and just before someone makes a competitor, evaluate the cost/benefit to porting your finely tuned and well designed product over.

If you try to 'serve two masters' you'll make design decisions based on what's easiest for both platforms, and that's not a good design process.

A6: If your app uses an MVC design, you can write portable model classes using C++, and native controller and view classes for each platform you want to support. That gives you the best of both worlds - portability where that's practical, and a native interface for which your users will thank you.

A7: IMHO, this discussion should be answer by the customer needs.

Most of the time IT provide solution, the way the solution is build is only a detail for the customer.

However making the code reusable could be useful in case your first choice of development environment was wrong.

many other criteria may come into the thinking. for instance if your software is for health care you may want to support for 10 years, then you have to select an OS supported for more than 10 years (forget windows and mac). etc.

A8: I agree with your observation about Java applications versus native applications, although I'm sure that an experienced Java programmer could probably make it work.

The bottom line is that the programming APIs for both Mac and Windows are the best tools to use for building interfaces on their respective systems. If you want your app to run smoothly on a particular system, you should use that system's API.

If it is absolutely essential to have a cross-platform implementation, consider writing all of the core functionality (non user-interface portion) for your program in a library that can be compiled for both systems (c++ is an obvious choice), and then build a nice user interface for each target system that can makes calls to the common library.

A9: Depends on how much time you wish to spend on the application. Fastest way is Java, otherwise you can build your model with C++ and do separate GUI code using MFC and Cocoa.

A10: Make it a web app ? Otherwise Java i guess. It depends of many things, type of your app, target etc.

A11: It really depends on who your users will be. Don't go cross-platform just because you can. There needs to be a real need regardless of the tool. And testing is going to eat up quite a bit of time. You'll still need to thoroughly test on both platforms.

I use REALbasic to create a wide variety of cross-platform desktop applications from a single code base and it has worked well for me and my clients.

A12: I have had good luck with cross platform Java using SWT. This will give you a nice native-look on any OS, and there aren't a whole lot of problems out there that require any JNI code. With any luck, you should be able to distribute the exact same codebase to both targets, and it should just work.

Having said that, you should evaluate whether or not you really need the cross platform functionality. At the very least, it will require you to test the GUI layer of your app on each OS (testing layouts, presentation, etc). With a large app, this becomes cumbersome very quickly.

In either case, choosing a cross-platform language from the start will give you flexibility in the future. If you were to write native code from the start, it would be non-trivial to port the code to another platform. It would likely be accompanied by several bugs, and would also require a port of all the test code to the new platform. You would run into synchronization issues with any new features, bug fixes, etc. With Java, you can write JUnit tests which will run in both OS's, and any bugs or new features will be propagated to both versions automatically.

It really does depend on your specific application. If you are anticipating a user base on both OS's, then that should dictate your language choice.

A13: It is possible to get a nice looking Java app to run on Windows, Linux and Java - look at SBCommander for example - and note that you can run it and look at the UI even if you don't have the hardware that it's supposed to control.

On the other hand, one thing I've found very hard to do is to write a cross-platform app that looks and behaves like a native app on each platform; there are just too many different assumptions about how an application should behave.

A14: Why don't you consider Web Application.

You can build rich UI Web site running in browser which runs everywhere and all platforms, If you are familiar with Java, you can try GWT for the 'Weblication' Check out the demo page of GWT.

A15: Quite often I find PC developers attempt to capitalize on the Mac market (some do successfully). In turn, they development the application in the described above "cross-platform" architecture (Java, or some Qt framework, etc...) The result is usually, a hideous looking application with poor OS integration support and the community backlash commences in the reviews.

My advice, port it. Do a good job, understand your market before dumping your cross-platform product in your carpet bomb marketing approach.

1126. <https://stackoverflow.com/questions/27111298/how-to-use-asp-net-identity-on-wcf-service-in-asp-net-mvc-project>

T: How to use ASP.Net Identity on WCF Service in ASP.Net MVC project.

Q: I'm having all kinds of trouble understanding this. Every article I read seems to have some unmentioned prerequisite amount of knowledge. I have written a WCF service that was initially designed to be an intranet service. Now we are moving this service to a cloud hosting solution and it needs to only let authorized users call its methods. I've since created an ASP.Net MVC 5 website for support purposes. The idea for this is that support staff will login to the mvc site with seeded credentials and add users as they sign up for the service. At the moment, users should not need to enter username or password anywhere. The service client will have username and password knowledge via local settings or configuration file or something and the authorization will be invisible to users. The MVC project seems to be working fine after some changes to the out-of-the-box flow. The database (remote) is created and being populated with new registered user information. Because the WCF service is in a different project, and to keep a level of portability I have referenced that project in the MVC project. I then added a "wrapper" wcf service to the MVC project that I intend to be the forward facing door to the existing WCF project. In this wrapper wcf service is where the authentication should happen. I don't understand how to tie the ASP.Net Identity authorization used in the new MVC project into the wrapper wcf service. How can I make the wrapping service authorize user credentials against the identity database created and populated using the MVC site?

1127. <https://stackoverflow.com/questions/10722169/sip-api-as-webservice>

T: SIP API as webservice

Q: I'm currently in an early stage of my internship at a company which offer VoIP solutions. I'm basically here to create a custom SIP-client App for iPhone. I told them however, if I were to set up the MVC pattern correctly and more efficient in terms of portability, there would be minimal code to write when porting to different platforms.

I've chose to go with MonoTouch C#.NET, for high portability and productivity (learning Objective-C is too steep for my timeframe + memory management too time consuming). To create even more portability I've been thinking of exposing a C# SIP library as webservice, so when porting to Android there's even less hooking up to different APIs. Also, MonoTouch for compile reasons does not allow usage of Dynamic Libraries.

My app would communicate to the SIP webservice and the webservice in turn to the SIP server.

SIP is very familer to HTTP, but could this solution work? As I'll be facing Realtime Transport Protocol aswell.

Kind regards

A: As far as I know, it won't work because, as you mentionned, you will face RTP. You'll probably get a lot of lag in your conversations. Also, you'll have to figure out how you are going to stream the data between the clients and the server.

However, to really know if this can be done would be to do a few prototypes to test these kind of issues.

1128. <https://stackoverflow.com/questions/3319378/getting-started-with-repository-pattern>

### T: Getting Started with Repository Pattern

Q: I'm trying to get started with the repository pattern and ASP.NET MVC, and I can't help but believe I'm missing something. Forgive me if this is a stupid question, but it seems to me like an implementation violates DRY exponentially. For example, in my (admittedly novice) understanding in order to implement this, I would have to:

Create my database model (Currently using Linq to Sql)

Create a IRepository for each concept (table or group of related tables)

Create an implementation for each IRepository Do we return L2S objects or some sort of DTO?

Create viewmodels which either are containers or copies of the data

Use some method of DI (Windsor or Unity?) on the controllers

While I realize scalability and portability come at an expense, it just feels like I'm missing something?

A1: I tried to implement the Repository Pattern in LINQ 2 SQL and it doesn't work very well, mainly because L2S doesn't use POCOs and you have to map to DTOs all the time as you mention. Although you could use something like AutoMapper, L2S just isn't a very good fit for the Repository Pattern.

If you're going to use the Repository Pattern (and I would recommend it), try a different data access technology such as NHibernate or Entity Framework 4.0's POCO support.

Also you wouldn't create a Repository for each and every table, you create a Repository per Domain Aggregate, and use the Repository to access the Aggregate's Root entity only. For instance, if you have an e-commerce app, with Order and OrderItem entities, an Order has one-or-many OrderItems. These 2 entities are part of a single Aggregate, and the Order entity is the Aggregate Root. You'd only create an OrderRepository in this case, NOT an OrderItemRepository as well. If you want to add new OrderItems you'd do so by getting a reference to the Order entity, then adding the new OrderItem to the Order's Items collection, then saving the Order using your OrderRepository. This technique is called Domain Driven Design, and it's a very powerful paradigm to use if you have a complex Domain Model and business rules in your application. But it can be over kill in simple applications, so you have to ask yourself does the complexity of your Domain Model warrant using this approach.

In terms is adhering to DRY, normally I create a base Repository class that has common methods for Save, Delete, FetchById, that sort of thing. As long as my Repository classes implement this base class (OrderRepository, ProductRepository etc.) then they get these methods for free and the code is DRY. This was easy to do in NHibernate because of POCO support, but impossible to do in LINQ 2 SQL.

Don't worry too much about sending your Domain Models directly to the view, most dedicated ViewModels look almost identical to the Domain Model anyway, so what's the point. Although I tend to avoid using the DM for posting data back to the server because of under/overposting security concerns.

If you follow this POCO approach (and ditch LINQ 2 SQL, honestly!!), you end up with only one class (your POCO entity) instead of 3 (L2S class, DTO and ViewModel).

It is possible to implement the Repository Pattern badly, so tread carefully, read a few tutorials, blog posts books etc. (I recommend Steven Sanderson's book, especially look at the Pre-Requisites chapter) But once mastered, it becomes a very powerful way to organise the complexity of hydrating Model objects to and from a data-store. And if you use Repository interfaces (IOrderRepository etc.) and have them injected via an IOC Container, you also gain the benefits of maintainability and unit testability.

A2: This has been brought up before, at first glance certain aspects of properly separating concerns does seem to violate DRY.

As you've mentioned MVC have you read Steve Sanderson's Pro ASP.NET MVC 2 Framework book? It spends a great deal of time explaining why using the repository pattern is a good idea.

You might find that, for the projects you're working on, it isn't appropriate, that's okay. Don't use it and see if you come across problems that this could have addressed. You don't need to be a developer for long to realise how crucial it is to keep different parts of your application as loosely coupled as possible.

1129. <https://stackoverflow.com/questions/43646189/spring-form-tag-doesnt-allow-context-relative-actions>

T: Spring form tag doesn't allow context relative actions

Q: I recently had to port a smallish Spring MVC webapp from a legacy box it was running on, and I had to fix a small number of portability issues with it.

1130. <https://stackoverflow.com/questions/862003/mvc-in-a-google-app-engine-java-world/5780606#5780606>

T: MVC in a Google App Engine Java world

A: Play Framework would fit the bill. It's a modern MVC framework for Java and has a Google App Engine module to provide compatibility. See <http://www.playframework.org/modules/gae>.

Another benefit to using Play would be portability. You can deploy Play using its built-in webserver (optionally behind apache for caching, load-balancing, etc) or you can bundle as a .war file for deployment to the many Java application servers (Glassfish, Tomcat, ...).

1131. <https://stackoverflow.com/questions/32045431/controller-in-mvc-design-pattern/32045910#32045910>

T: Controller in MVC design pattern

Q: I want to ask that in MVC why do we need controller.why don't we just directly connect model and view.what would be the problem if we don't have controller ?

A: MVC is a Software Architectural Design Pattern and by dividing your code it makes it more readable, maintainable and portable.

1132. <https://stackoverflow.com/questions/252514/create-a-cross-platform-windows-mac-os-x-application/252558#252558>

T: Create a cross platform Windows, Mac OS X application.

A: It's good that you're thinking of portability early on - it's vastly more difficult to "bolt it on" after the fact. There are various cross-platform kits available, but IMHO all of them fall a bit short of providing a "native" look and feel on all the supported platforms. On the Mac (what I use), proponents of such kits always want to mention that they're using native controls. That's a good start, but it's not the whole journey. Other issues addressed by Apple's Human Interface Guidelines include how the controls should be arranged, how button labels should be phrased, what standard shortcut keys should be used, etc.

Even Microsoft had to learn the hard way about the dangers of trying to write a cross-platform GUI, with the ill-fated Word 6.0 for Mac. IMHO, a better approach is to use an MVC design, with the model layer written in standard, portable C++, and the view and controller layers using the native toolkit for each platform. For the Mac version, Carbon and C++ throughout used to be an interesting option that is now not supported anymore, so you would want to use Cocoa, using Objective-C in the view and Objective-C++ in your controllers to bridge the language gap. Your Windows version could likewise compile your model as "managed C++", and use any .NET language for controllers and views.

1133. <https://stackoverflow.com/questions/5109471/suggestions-on-portlet-development-approach-on-liferay/5111163#5111163>

Q: We are in the phase of evaluating some of the frameworks for portlet development. As of now I know of below 3 options. I would like to know your experiences with them and others

Struts 2

Spring Portlet MVC

Liferay 6.x MVC Framework

Please try to share Pros/Cons in following areas along with what you think is important

Speed of development Maintenance. Ease of development with Geo Distributed teams

Please suggest any other frameworks which can be used as alternative with some pros.

1134. <https://stackoverflow.com/questions/12412281/where-can-i-find-reusable-asp-net-mvc-ui-components>

T: Where can I find reusable ASP.NET MVC UI components?

Q: I'm new to MVC and am still adjusting to the drastic switch from WebForms. I was a bit happy when I found that the idea of ready-made components is not totally gone when I found <http://nuget.org/packages/TinyMCE.JQuery>, a nuget package that installs an HTML editor component such that it just takes the addition of a UIHint attribute to use it.

My question is where do I go to find more things like this which will help me get closer to the level of efficiency I got used to with WebForms/AjaxToolkit (not withstanding my obvious need to keep learning MVC best practices)?

1135. <https://stackoverflow.com/questions/39327239/php-mvc-requesting-data-from-another-model>

T: PHP MVC Requesting data from another model

Q: This is really a question about MVC standards and efficiency.

I have a User Controller, and want to retrieve data from my Session model. There's 2 ways I can go about doing this:

I can request the data directly from the Session model from within the User Controller. (UserController ---> SessionModel) OR I can ask the SessionController to ask the SessionModel for the data. (UserController ---> SessionController ---> SessionModel).

Both ways would seemingly work, and I'm not sure if either way is an 'incorrect' way of doing what I want. However, the second option seems somewhat inefficient and pointless. It just seems to be adding another layer in order to retrieve the data. However, I'm not sure if the first option goes against the rules of MVC as per say.

Any advice on this would be much appreciated.

1136. <https://stackoverflow.com/questions/33720675/are-there-automatic-field-naming-transformations-conventions-in-asp-net-mvc>

T: Are there automatic field naming transformations (conventions) in ASP.NET MVC?

Q: I am developing an ASP.NET MVC application with SQL Server. I do my best to write good code by using built in elegance and efficiency. However, in the database I prefer to further naming in underscore\_case, like id\_item\_something. On the C# code side, everything is CamelCase, like IdItemSomething. Are there some magic transformation that could be configured for not having to write a lot of ...ToTable().Property(...).HasColumnName(...)? Is the DefaultControllerFactory the right place to look at? I have seen such transformations in the JavaScript-jQuery-CSS domain ("background-color" is addressed by "backgroundColor"), and in ASP.NET there is at least the PluralizingTableNameConvention.

1137. <https://stackoverflow.com/questions/4975642/mvc-architecture-decision-how-to-re-factor-existing-approach-into-controllers>

T: MVC architecture decision - how to re-factor existing approach into controllers/views and database access.

Q: Consider the following scenario:

Page written in classic ASP or PHP, which is rendering a data report (series of HTML tables for simplicity). There is one main database query and then multiple sub queries as the page renders. The report is split into sub panels, which correlate to a sub query. Therefore: Main database query. Loop over result. For each row, execute sub query and render report panel.

How would you architect a similar report using the MVC pattern?

This can be split into two parts:

Efficiency at database level of multiple queries, which are dependent on values from an outer query. If all data was processed and prepared in the controller, would this also be deemed inefficient if looping within the controller and then again in a view to render. Could sub controllers be used or sub panels, which encapsulate smaller sections of logic i.e. loading data and rendering report panel.

1138. <https://stackoverflow.com/questions/735681/what-is-a-good-balance-in-an-mvc-model-to-have-efficient-data-access>

T: What is a good balance in an MVC model to have efficient data access?

1139. <https://stackoverflow.com/questions/21656849/consecutive-daily-user-visits>

T: Consecutive daily user visits

Q: I have an Asp.Net MVC 5 website in which I'm trying to get the number of consecutive days users have visited my website. StackOverflow has this and it's reported on open your profile However, I want to track the users which have checked the Remember Me checkbox to stay logged in. How can I

do this? Note: One thing that came to my mind is to create a global attribute and do this for every action (if(User.Identity.IsAuthenticated)) but I don't think that's a good idea because I have to load the user info for every single request and run the check. Efficiency is very important here.

1140. <https://stackoverflow.com/questions/2074053/refactoring-an-algorithm>

T: Refactoring an algorithm

Q: I'm trying to re-implement ASP.NET MVC routing rules in C++ for my own MVC application.....

I would love for any suggestions for improvements, including in formatting and code structure but mainly in runtime efficiency.

1141. <https://stackoverflow.com/questions/25114707/how-to-use-authorize-attribute-in-project-which-using-mvc-portable-areas>

T: How to use [Authorize] attribute in project which using MVC Portable Areas

Q: My project using MVC Portable Areas, its contain 2 projects, one is the main, and the other is Account project. In AccountController, I use [Authorize] attribute to redirect user to Login page, but I always receive "You don't have permission to access this directory". Any solution for me?

1142. <https://stackoverflow.com/questions/28021807/onion-vs-n-layered-architecture>

T: Onion vs. N-Layered Architecture

Q: One thing beforehand: I arrive from an N-layered background. I have now spent quite a bit time getting my head around Onion Architecture and related Domain Driven concepts such as Hexagonal Architecture reading resources like Jeff Palermo's series of blog posts, Seemann's contribution from a DI-perspective, "Onion-izing your architecture", and "The clean architecture".

What all of these articles have in common is that they claim the following points:

Focus is kept around the domain model of the business use case

Looser coupling between layers by emphasizing the Dependency Inversion Principle

Increased independence of external infrastructures such as frameworks, data persistence, UI

Better testability / maintainability

1143. <https://stackoverflow.com/questions/22546361/how-can-this-layered-architecture-be-improved>

T: How can this layered architecture be improved?

Q: My issue with this architecture is if I want to add new functionality like getMostRecentOrder() to a module that depends on our Common project, I have to create 4 methods instead of 1. Also we have another layer for one of our applications that abstracts Spring as engineers don't want/need to know about it which creates 5 methods total.

Has anyone followed a similar layered architecture like this and was able to resolve or find a better solution?

The architect that I work with likes this structure but I am starting to really dislike it as it is tedious for me to add all these methods just to get data out and it seems like I am writing a lot of duplicate code with just data type changes because of the layers that are in place.

The architect wants our BOs to be generic like WeatherBO that has all the business logic for weather, EventBO for all the logic for events, etc. My issue with that is our BOs are starting to be 1000 lines of code and I feel depressed when we have large classes.

Can anyone provide some insights on some successful Java layered architectures that is simple (3 layer vs my 4 or 5 layer), maintainable, flexible, scalable, etc (basically a developer's number 1 dream haha)?

1144. <https://stackoverflow.com/questions/17613530/rest-app-architecture/17614050#17614050>

A: Better create a pure REST service and consume it from both the client. It will provide a clean layered architecture as you are not mixing service with client in one app. By having a common service separately you would have : Separation of concern, Clean Architecture, Proper Laying, Readability and better Maintainability.

1145. <https://stackoverflow.com/questions/6607468/web-application-program-design-architecture/6607561#6607561>

T: Web application / program design architecture

Q: The architecture depends on what kind of project you need to create, complexity of project and business logic, scalability, maintainability, any way you should implement your project in the way that you can easily change your code and the tiers and classes should be much more decoupled you should use ASP.NET MVC for application layer, and I suggest to use IoC-containers for dependency injection, you can start with 3 layer architecture with Repositories data access layer, Services classes business logic layer, ASP.NET MVC application layer and another thing you should use ORM like NHibernate or Entity Framework If you have a complex domain you should look at the DDD.

1146. <https://stackoverflow.com/questions/573201/whats-the-best-way-to-structure-a-project/573256#573256>

T: What's the best way to structure a project?

A: I'm currently working on front-end web application that has a 3-tiered architecture:

Client tier (the browser)

Application tier (Java EE application server, where the application will live)

Backend tier (mainframe and legacy apps, various databases)

It has a layered architecture, and the layers in the Application tier are

Presentation layer: generates the UI that will be used in the Client tier

Application layer: the equivalent of use cases, contains application logic

Service layer: maps domain logic and data from Backend tier onto a Java model

Integration layer: communicates with the Backend tier and contains gateways for JMS, email, ... and DAOs and other stuff

This is just an example project structure, and the end result will depend on the type of application. You can read more in my answer to this question on the division and naming strategy for packages.

You can add/swap/remove layers as you see fit. In a SOA for example, you can layer a Webservice layer on top of the Application layer or Service layer, so that the ESB (Enterprise Service Bus) can connect to your application or services. If any of this is impossible or seems very difficult, you don't have an optimal architecture and design.

When thinking about the structure of your project and to allow scenarios like the one above, some important properties of your modules and components you want are:

Testability

Reusability

Maintainability

You can achieve this by designing for low coupling and high cohesion. Choosing a layered architecture by grouping modules by the level of functionality/abstraction is a good start. Within each layer grouping further by functionality helps as well. Letting each more specific layer only depend on interfaces of a more general layer reduces coupling too.

1147. <https://stackoverflow.com/questions/16937221/bll-dal-obj-and-3-layer-architecture/16937537#16937537>

Q: My question is about 3 layer architecture.

A: From MSDN Article

The main benefits of the N-tier/3-tier architectural style are:

Maintainability. Because each tier is independent of the other tiers, updates or changes can be carried out without affecting the application as a whole.

Scalability. Because tiers are based on the deployment of layers, scaling out an application is reasonably straightforward.

Flexibility. Because each tier can be managed or scaled independently, flexibility is increased.

Availability. Applications can exploit the modular architecture of enabling systems using easily scalable components, which increases availability.

You have tight coupled layers. Try to make them loose coupled.

To start with, following visual studio solution template may help you out.

1148. <https://stackoverflow.com/questions/36365580/yellow-warning-when-referencing-another-project-in-an-azure-webjob/36367130#36367130>

Q: I have a WebAPI running on Azure WebApps developed with EF Code First. Now I need WebJobs for some scheduling tasks which should refer to the same DB and Models. I tried adding reference of the WebAPI project but that marks the DLL as yellow exclamation. I'm unable to get how should I proceed. Can you please guide me a bit?

A: My advice is to modularize your solution and move all your Data Access related classes (DbContext, entities) inside another project which will be referenced by both your Web API and WebJobs projects.

This is a common approach for improving the maintainability of the code and enforce basic software engineering principles like separation of concerns, and is obtained by dividing your application into different functional layers (a.k.a. multi-layered architecture).

1149. <https://stackoverflow.com/questions/14502181/how-to-pass-datareader-value-from-dal-to-presentation-layer/14502370#14502370>

T: How to pass datareader value from DAL to presentation layer.

A: Well, the basic idea of a layered architecture is to decouple the different components for several reasons. Some reasons are testability, maintainability, extensibility but there are many more.

1150. <https://stackoverflow.com/questions/39638085/what-is-the-difference-between-a-layer-and-a-component/39639775#39639775>

Q: What is the difference between a layer and a component?

A: Layers and Componentization are 2 design approaches followed with an intent of architectural concerns. If the architecture/design enforces the need to attain reusability, extensibility, modularity & maintainability kind of features, Layers would help you.

If your application is not too complex with no scope for customizations and extensibility, you may choose to code everything in few components. Ultimately, it is strategic architectural & design need, which normally makes you to orchestrate with Layers & components.

1151. <https://stackoverflow.com/questions/2689576/is-n-tier-software-design-a-subset-of-soa/2689597#2689597>

A: Is n-tier software design a subset of SOA?

Q: SOA is a design strategy for an enterprise. There is lots written about what it is elsewhere, however it decides how systems interact using services.

N-tier software architecture is application specific. It assists maintainability and scalability by separating layers of code.

1152. <https://stackoverflow.com/questions/2199176/explain-the-different-tiers-of-2-tier-3-tier-architecture/3251982#3251982>

T: Explain the different tiers of 2 tier & 3 tier architecture?

Q: I am not able to understand which elements are called as first tier, second tier & third tier & where they reside. Can they reside on same machine or different machine. Which tier reside on which machine? How we can identify a particular application as a 2 tier application or 3 tier application. Please explain with example.

A: Tiers are nothing but the separation of concerns and in general the presentation layer (the forms or pages that is visible to the user) is separated from the data tier (the class or file interact with the database). This separation is done in order to improve the maintainability, scalability, re-usability, flexibility and performance as well.

1153. <https://stackoverflow.com/questions/33370946/in-n-tier-architecture-which-layer-asks-a-security-layer-to-authenticate-a-login>

A: My question comes from using the first window which is the login window which asks for a user account and password. Once the button at login has been pressed should the Presentation Layer ask the Security Layer to authenticate or should the Presentation Layer Ask the Business Layer which in turn asks the Security Layer?

1154. <https://stackoverflow.com/questions/44689082/is-vpc-enabled-lambda-architecture-can-be-any-better>

Q: Our architecture is a FAAS approach, where our entire backend is on Lambdas. The persistence layer is a managed Cloud Mongo Cluster, so called Atlas. Lambdas in the VPC talk to mongo cluster using a peered VPC connection.

I need a VPC enabled Lambda, because Lambda talks to mongo cluster using the VPC Peering connection. I need a NAT gateway because resources inside Lambda has to talk with external internet resources. Here is my VPC-Lambda-Mongo architecture:

Security and Safety is very important, Do you suggest any better architecture than this? I would be happy to hear it.

1155. <https://stackoverflow.com/questions/73538/do-you-know-any-examples-of-a-pac-design-pattern>

T: Do you know any examples of a PAC design pattern?

Q: Can anyone point to any websites or web applications that are using the Presentation-Abstraction-Control design pattern rather than MVC? Desktop applications are easy to find like this (e.g.; GIMP) but I'm looking for something on the web.

Please check the answer and comments of my previous question in order to get a better understanding of my situation. If I use Google DataStore on AppEngine, my application will be tightly coupled and hence loose portability.

1156. <https://stackoverflow.com/questions/15633110/how-to-build-a-cloud-application-and-keep-portability-intact>

Q: I'm working on Android and will be using backend which will reside in the cloud. I need client-cloud communication. How do I build an application maintaining portability. What design patterns, architectural patterns should I be using?

Should I use a broker pattern? I'm perplexed.

A1: Google AppEngine provides JPA based interfaces for its datastore. As long as you are writing your code using JPA APIs, it will be easy to port the same to other datastores (Hibernate for example also implements JPA).

I would ensure that the vendor specific code doesn't percolate beyond a thin layer that sits just above the vendor's APIs. That would ensure that when I have to move to a different vendor, I know exactly which part of code would be impacted.

A2: In order to maintain portability for my application, I've chosen Restlet, which offers Restful web apis, over endpoints. Restlet would help me to communicate between server and client.

Moreover, it would not get my application locked in to a particular vendor.

A3: If you really want to avoid portability issues use Google Cloud SQL instead. If you use the Datastore unless it's a trivial structure you will not be able to trivially port it even if you use pure JPA/JDO, because those were really not meant for NoSQL. Google has particularities with indexes etc. Of course SQL is more expensive and has size limits.

1157. <https://stackoverflow.com/questions/4564477/dry-vs-security-and-maintainability-with-mvc-and-view-models>

T: DRY vs Security and Maintainability with MVC and View Models

Q: I like to strive for DRY, and obviously it's not always possible. However, I have to scratch my head over a concept that seems pretty common in MVC, that of the "View Model".

The View Model is designed to only pass the minimum amount of information to the view, for both security, maintainability, and testing concerns. I get that. It makes sense.

However, from a DRY perspective, a View Model is simply duplicating data you already have. The View Model may be temporary, and used only as a DTO, but you're basically maintaining two different versions of the same model which seems to violate the DRY principle.

Do View Models violate DRY? Are they a necessary evil? Do they do more good than bad?

A1: This has been brought up time and time again. Not only is it a pretty substantial dupe but the answer is subjective and argumentative. ViewModels are a response to DDD and the concept of persistence ignorance.

To say not using ViewModels is bad means ignoring that Django and Rails and most PHP ORM/MVC frameworks don't care at all about those concepts. Do you want somebody to tell you all those other languages and frameworks are "doing it wrong?".

Whether or not you want to use ViewModels is 100% dependent on what architecture styles you are going for and what the goals of the application are.

This is like asking is dragging and dropping GridViews in a WebForm app appropriate? Depends on a lot of things.

There is also a misconception about DRY that you have here. Do Proxy classes from a WCF service violate DRY? Does the ViewModel contain logic? The primary goal of DRY is to not have duplicated logic with a meaningful purpose. Do a couple of DTOs that share object shapes violate that?

The DDD principle of bounded contexts would make for a good read too. If a ShoppingCart object needs to function differently in a warehouse vs ecommerce website setting does that mean you to share the types? What happens when the only shared functionality is totaling a price ( price + tax + shipping )? Do you create a base class just for that therefore increasing coupling? What are the tradeoffs in time/cost/maintenance for being 100% DRY for a simple method like GetTotal(). Does violating DRY when it makes sense actually decreasing the complexity and overall cost of maintaining your codebase?

I'm sorry for answering with so many questions but hopefully now you can see the nuances and intricacies of the question you asked. ;)

A2: One could also note that not using view models would be a violation of the single responsibility principle -- your entity should not be polluted with UI concerns.

I also think the real value of view models doesn't necessarily become apparent in version 1.0 of your application. You will thank yourself when working on version 2.0 when you completely re-think how your back-end works but you don't have to carry those changes out to the view layer.

1158. <https://stackoverflow.com/questions/27195486/most-maintainable-way-to-handle-hiding-data-from-different-roles-mvc>

T: Most maintainable way to handle hiding data from different roles MVC

Q: Currently I'm working on a project at work that has about 13 controllers, all have Index, Summary(Table view that goes to index), Create, Details, Edit, and Delete views. Each of these controllers have their own ViewModels.

I recently joined the team and have changed this copy-paste project into a highly maintainable project with inheritance and interfaces.

Problem:

I just started working on the views creating HTML helpers and things of that sort to make the views more maintainable.

All of our controller actions are using the [Authorize(Roles = "...")] attribute. The Index Views are in this style of setup (each list item makes use of each of the ViewModel's properties):

Filter Section

Table Header

Table Contents

Table Footer

Everyone else's initial thought was to just put if (User.IsInRole(...)) in every spot applicable i.e. if (User.IsInRole(...)) { @Html.DisplayFor(SomePropertyInFilterSection) } and 3 more following the pattern if (User.IsInRole(...)) { @Html.DisplayFor(SamePropertyInTableHeader) }. I think this is a massive clutter though and have started looking to make it cleaner (4 if statements to hide a 'single' piece of data seemed silly). I think this is a massive clutter and there should be a much simpler way to have one single check for all of these if-statements (as they're checking the same thing but are in different locations).

Options:

The options that I see:

Do the if-statements in every place.

Have two separate views and check before leaving the controller.

Add css-classes to each piece of data and have a flag on the Master-ViewModel (this is the ViewModel all ViewModels inherit from as they all share 2-3 properties) and have a JavaScript hide/remove those elements appropriately.

From my understanding security shouldn't be an issue since the data isn't sensitive (at the moment) and any links that might get clicked (maliciously or unintentionally) that shouldn't will have the [Authorize] attribute to fix that.

Question:

What would be the most maintainable way to achieve this?

The way I see my options above at the moment:

Way too full of clutter.

Solves the If-Statement clutter but adds an extra view that needs maintained and if one thing changes in one the other is probably going to need changed as well.

May become an issue if we decide to add sensitive data we do not wish those without correct authorization to see.

Are there any options that takes the best of both #2 and #3?

A1: I don't believe that there is a "right" answer. A lot of people will type in caps that you shouldn't even consider putting an if statement inside a view. However we need to remember that as professional developers we're getting paid for shipping products not following dogmas.

My suggestion would be use what's best on a case by case scenario for each view. Is the logic simple? have it inside a view. Does it start to clutter up? Make separate views. Is most of the logic in just one place? Make partial views. Doing this on a case by case scenario will also allow you to figure out what works best for your project.

A2: I ended up making some HTML-Helpers to aid this process.

```
public static MvcHtmlString IfRole(this MvcHtmlString content, HtmlHelper html, Role role)
{
 return html.ViewContext.HttpContext.User.IsInRole(Roles.ToString(role)) ? content :
 MvcHtmlString.Create(String.Empty);
}
```

Which made all of these 4 line sections:

```
@if (User.IsInRole(Role.ToString(Role.MyRole))
{
 @Html.TextBoxFor....
}
```

One line:

```
@Html.TextBoxFor(...).IfRole(Html, Role.MyRole)
```

Additionally I came up with Helpers to abstract away as much content as possible (Buttons, Links, etc) so they all became one line. Some repeated 'control-like' html patterns became helpers as well.

The main thing that will help me is something I'm still considering. I was thinking of creating a function/interface on all ViewModels that returned a Dictionary<String, Object> of all its properties. Then have an HtmlHelper for Filter section, Table Header, etc. to use that data to construct the data. (The reason I haven't done it and I'm only considering it is it would make unique looking pages a bit of work. Though I think in the end I'm going to do it and add optional Dictionary<String, String> parameter to add HtmlAttributes).

I hope this is helpful to someone in the future, it took me (unreasonably) a long while to come up with and I might not have come to this conclusion without Mihai-Andrei Dinculescu's thoughts.

However I would like to advise against having this logic JS or CSS based. It's not only about security, but you will also end up sending (sometimes a lot) of HTML just to have it hidden on browser. And when you will decide that your data is actually sensitive, there's a high chance that you will not be able to secure it 100%.

1159. <https://stackoverflow.com/questions/5010570/optional-route-parameters-and-action-selection/5013249#5013249>

T: Optional route parameters and action selection

Q: I use the default route definition:

{controller}/{action}/{id}

where id = UrlParameter.Optional. As much as I understand it this means when id is not being part of the URL this route value will not exist in the RouteValues dictionary.

So this also seems perfectly possible (both GET):

```
public ActionResult Index() { ... } // handle URLs: controller/action
public ActionResult Index(int id) { ... } // handle URLs: controller/action/id
```

When id is missing the first action would be executed, but when id is present, the second one would execute. Fine, but it doesn't work. It can't resolve actions.

How can I accomplish this?

I'm thinking of writing a custom action method selector attribute like:

[RequiresRouteValue(string valueName)]

This would make it possible to use this kind of action methods. But is this the only way of doing it? Is there something built-in I can hang on to?

A1: Well from the exception that action can't be determined is pretty clear that actions are resolved first then data binder comes into play and examines action's parameters and tries to data bind values to them. Makes perfect sense.

This makes perfect sense. There would be no point in first trying to data bind values to all possible types and see what we get and then look for an appropriate action. That would be next to impossible.

So. Since action selection is the problem here I guess the best (and only) way to solve this (if I don't want to use a multifaceted single action method) is to write a custom action method selector attribute.

You can read all the details and get the code on my blog:

Improving Asp.net MVC maintainability and RESTful conformance.

1160. <https://stackoverflow.com/questions/25546284/how-to-decide-when-to-use-ajax-vs-javascript-for-maintainability>

T: How to decide when to use Ajax vs Javascript for maintainability.

Q: During ASP.Net development i am often unsure weather i should be performing some functionality using an ajax request vs handling it all on the client with JavaScript. I often will want to use Jquery ajax functions in order to speed development up and improve maintainability even though i can achieve the same result without contacting the server.

Here is one example. In my MVC view i need to update a partial view in response to a button click. Here is a simplified version of my partial view.

I am torn on which will be better maintainability wise, as with the ajax way i don't have to write html in JavaScript pages and i think it will be clearer and more readable when revisiting the code. However i am then using a unnecessary request to the server when i could it handle all on the client.

So my question is should i always be doing everything on the client if possible even at the result of maintainability. Any feedback on my example is much appreciated as well.

A1: I recommend you to use AJAX for operations, which require some background calculations on the server or to retrieve some DB data from the server. For GUI generation I would use JS, as it is quite quick, thanks to V8.

If you need to generate GUI by embedding some server data into it and this page has complex layout, I would use server side template engine.

A2: In the example you've given, I would recommend the JS approach to control the availability of the edit and delete buttons. Or possibly a combination of the two.

When you make an Ajax call it creates a background request that causes some HTTP traffic. Unless there's some processing needed on the server to fulfil the request, then there is not much use sending that request to the server.

From looking at your code then the action you want to perform is to add two anchors to the page. This can be done easily with JS. You could even combine the two by including a partial view on your page that contains the elements you wish to include, wrapped in some markup to hide them.

You could create a partial view with the button markup.

Conclusion: If an event/action only affects what the user can see on the UI (i.e. controlling visibility and initiating animations) then you would probably only want to use JS/jQuery. If there's something more happening like server processing or fetching data from DB required then consider using Ajax.

In your example it seemed like the choice was between adding the elements dynamically to the page with JS or executing an Controller method via Ajax to get the elements as a partial view. I hope this answer provides a good solution for you.

1161. <https://stackoverflow.com/questions/43991787/asp-net-mvc-reuse-code-between-different-website>

T: ASP.NET MVC reuse code between different website

Q: I have two asp.net mvc website, they have the same page to update account data.

How to separate the repeated code(controller, \*.cshtml, \*.js, \*.css... etc) for better maintainability? I don't want to modify code from one website and copy it to the other.

I have tried creating new website project only contains account pages, but the static files(\*.js, \*.css) can't be reused in this way.

1162. <https://stackoverflow.com/questions/18199174/angular-js-and-asp-net-mvc-4>

T: Angular.js and ASP.NET MVC 4 [closed]

Q: I have an ASP.NET MVC 4 project and I'm stuck on an architectural decision on which JavaScript framework or library to use Angular.js or Knock.js. I am currently leaning towards using Angular.js over Knockout.js, but don't want to find out midway during project development I made a mistake.

Here is some background:

We need two-way model data binding

A1: my 2 cents worth.

preamble - i have worked with both angular and knockout. I'm on my 3rd non trivial front end built with a MVVM/MVC lib.

I started with knockout because its MVVM is very similar to the wpf/silverlight mechanics. And it works well. The tutorials and documentation are top notch. All your coders will be able to work with knockout.js within days or if they have used mvvm under .net, then within hours.

However, these days I am using angular and will probably stick with it for the following reasons.

angular is a complete framework - knockout is really about just the 2 way binding. you still need other libraries like backbone.js/jquery to do the rest of your work.

angular has dependency injection. which is perfect for adding

mocking for testing as well as giving structure to your code.

angular treats normal JS variables as observables within its \$scope object. that means you dont have to declare them in a special way

I'm not an angular fanboy, i still think they could move more over to the MVVM architecture instead of the "funky" MVVM/MVC hybrid architecture they currently have.

The biggest problem with angular is the documentation. Compared to knockout, it is woeful. It will add additional time and cost to getting your coders up to speed. Once they are there however, it is currently the best choice IMHO.

We need the ability to test views. I want to be able to do end to end unit testing. Also, we are using continuous integration.

"Save Changes" functionality. i.e. if a user makes changes on a page we need the ability to detect any changes and prompt the user to save their changes before they navigate away from the page

"Notifications" functionality. i.e. user will be logged on approximately 8 hours and will need to be notified and updated of changes made by other users (errors, data status changes and the like)

We need to "future proof" our application. Currently the business unit hasn't decided if we will need to support mobile devices, but I know it's just a matter of time.

Our team consists of developers with varying experience levels from very junior to senior developers.

Currently our models are complicated and may get even more so

We need to also consider RAD, code reuse, and maintainability

I have read the excellent answer here and watched Scott Allen's interview about Angular here

Since we are unable to change from our current ASP.NET MVC 4 architecture to use something on the server side like Web API I have some concerns in trying to implement Angular.js with MVC 4. Will this cause us to have two models one on the server and one on the client?

I am not looking for a "which is better" discussion about Angular and Knockout because I think they both have their pros and cons. I am looking for actual code on implementing a JavaScript framework or library in an ASP.NET MVC 4 application. I need a solution that I can live with 2+ years from now :)

Any ideas or suggestions? Maybe the answer is not Knock or Angular, but some other JavaScript framework?

A2: Glad to see this questions was of interest to the community ;) Just for completeness here's what I ended up doing:

I did go with AngularJS and ASP.NET MVC 4 and was glad that I did. Although, Angular has a steep learning curve but its worth it because of the power of directives.

We need two-way model data binding - On occasion I needed to set some initial values coming from the MVC controller. I used the ng-init attribute to accomplish this.

We need the ability to test views - I followed the AngularJS docs for testing

"Save Changes" functionality - I implemented this using a directive in Angular

"Notifications" functionality - I implemented this using toastr.js and directives (schweet)

We need to "future proof" our application - I don't know Google's plans for AngularJS, but after working with AngularJS I can't see it going anywhere anytime soon and expected it to become more widely adopted :)

A3: I don't have a lot of input on AngularJs, but want to provide some thoughts on Knockout.

Knockout is primarily a data-binding library to connect views to view model, but doesn't really provide a lot of capabilities beyond that. I wouldn't recommend using knockout alone as the main library to build a complex client-based web site.

You didn't mention whether you're implementing spa-like functionality (i.e. hash-tag navigation) or whether you're primarily using MVC server-side views (e.g. Razor). If you're just looking for quick data-binding on a per-page level, I would even reconsider that. To me, both of these (angular or knockout) are designed to enhance the client-side development experience - not so much a server-side approach such as MVC.

If you're considering an SPA approach, even in part, you'll likely want some framework that provides some level of control over the view activation life cycle.

As far as data-binding power and reliability, I believe in Knockout. I have been using it extensively, and have grown quite fond of it. If you like the feel of knockout, you may want to look into Durandal. Durandal is a decent framework able to meet the needs of many "spa" web projects. It's a client-side framework built on top of several proven libraries, including Knockout. It's a little (lot) more lightweight than Angular, and possibly easier to use.

We are building a fairly large ASP.Net MVC web site using Durandal with Knockout in conjunction with an additional facade to tighten things up from a development standpoint, and the integration with ASP.Net MVC is straight-forward. I don't recommend trying to use the server-side knockout stuff that's out there; I just find that to limit the real power of the MVVM pattern.

1163. <https://stackoverflow.com/questions/3150008/which-mvc-flavor-is-more-widely-accepted>

T: Which MVC flavor is more widely accepted?

Q: I notice 2 distinct "flavors" of MVC:

1) "Original" MVC where the Model talks directly to the View 2) "Apple Cocoa" MVC where the Controller uses the Mediator pattern and Model and View never communicate directly

From link text:

The goal of MVC is, by decoupling models and views, to reduce the complexity in architectural design and to increase flexibility and maintainability of code.

That makes great sense to me. However with #1, as shown on wikipedia, you have a link between Model and View and therefore they seem quite coupled to me. It seems like "original" MVC does not solve its goal.

In contrast, #2 to me very clearly results in a generic View that only knows how to display and input data via UI, a Model that does not care at all about how it is represented, and a Controller that knows about both and becomes the only potentially un-reusable code. It achieves the MVC goal.

This is good for me because I'm working in Cocoa which "Believes in" #2, and I'm working in plain C++ which I can make believe in anything. But which of these MVC flavors will I find out in the wild more? For instance, Ruby on Rails, Struts, PureMVC.. these "use MVC" but would I expect to see #1 or #2 there?

EDIT: Sounds like #2 is the more accepted one, so does any modern approach use #1, if so then what?

A1: I'm not sure what's more universally accepted, but most people see Rails as being pretty much the 'spec' for MVC, and in Rails the model and view never (almost never) talk directly. The controller does all the finding and sending of model data to the view.

A2: In asp.net Mvc the #2 approach is taken: the controller reads and writes from/to the model, sends and receives data to/from the views. Views and models never talk directly.

1164. <https://stackoverflow.com/questions/4159622/why-is-using-if-else-blocks-inside-views-dreaded-mvc>

T: why is using if-else blocks inside views dreaded? – MVC.

Q: What areas get affected by it?

code readability? maintainability? performance? security? any other?

my views have been using something like

```
if(Model.Showthis) {<div id = "showthis">...</div>} }
```

and does doing something like the following have security implications? --

```
<%if (HttpContext.Current.User.Identity.IsAuthenticated && item.Poster.UserName == HttpContext.Current.User.Identity.Name)%>
```

```
<%{ %>
```

...

```
<%}%>
```

yes I read "if" considered harmful in ASP.NET MVC View (.aspx) files? too, but it didn't exactly specify what areas get affected by it. I mean I wanted to make sure there are no security and performance implications, which the link didn't answer exactly.

A1: I don't see an issue with it as long as the branching logic is purely for UI concerns. With that in mind I would change your second if to:

```
<%if (item.Poster.UserName == Model.CurrentUserName)%>
```

```
<%{ %>
```

...

```
<%}%>
```

And set your model up so that the CurrentUserName property looks like this:

```
public string CurrentUserName
```

```
{
```

```
 get
```

```
 {
```

```
return HttpContext.Current.User.Identity.IsAuthenticated
 ? HttpContext.Current.User.Identity.Name
 : String.Empty;
}
```

Or even better if you're going to be checking author against current user a lot in your system, offload that property to a helper class that can be reused from multiple models. Basically I wanted to get the implementation detail of what the current user's name is out of the view.

A2: I think the stigma persists from the transition from ASP to ASP.NET Forms. MVC is a different beast. With MVC3 and Razor it should help break the stigma and allow for more readable, easier to write Views.

That said, Domain and Business logic should never be in your template. But I see no problem, and frequently make use of conditional statements and loops to render UI in my Views.

A3: There's nothing wrong with if else statements in your view template. What you want to avoid is business or model logic in side your view template. If the conditional is directly related to user interface, then it belongs in the view.

Yes, it can be a bit difficult to read because of the mix of HTML and C#, but so long as your view logic is in your view, and your model logic is in your model, you are properly maintaining separation of concerns.

With your second sample; it might make more sense to only have your Poster available to the View if the correct user is logged in in the first place; this seems like more of a Controller thing than a View thing to me.

A lot of people see if statements in the View and cringe, because it reminds them of classic ASP. But the problem with classic ASP was never that there was code and HTML in the same place; it was that there was business logic and presentation logic in the same place.

A4: Why are they bad?

As many people have already suggested it's because it can be a warning sign that business logic is leaking into your views which is a bad thing. Or that you are trying to do too much in your view. Often it's easier to setup the necessary data in your controller and just pass everything required (including any computed values) and have your view render it straight out. The flatter and simpler your view model is the better.

I don't think there is anything wrong with using if/else's for the true purpose of conditionally rendering UI. For example, if a user is logged in render this partial if they aren't than render something else.

I think a lot people get taken back and draw a hard and fast 'it's bad practice' because it can easily lead to tag soup. This phenomena has already been highlighted as a carry over from the asp.net webforms engine. Whilst still a good thing to be aware of, it is likely less of an issue with the razor engine as it's much cleaner and requires less syntax to achieve the same thing. The automatic switching in and out of C#/VB code to html and back is very simple with only an @ required to re-enter a code block. I

don't think this will create tag soup in the same way that angled brackets did <% %>. The amount of noise in the latter was what most people objected to (and rightly so).

Lastly, circumstances depending, if you find you are starting to get a lot of if/else logic in your view sometimes it is cleaner to put that into a HTML helper. I can't find the reference but I remember Rob Connery once saying that if you find yourself starting to write if statements in your view than it's a candidate for a html helper.

Is there performance or security concerns?

I don't think there is going to be any noticeable performance differences or security concerns with what you are asking. But considering an authentication check like that is likely to be used in multiple views I would put it into a Html helper.

A5: If-else blocks are not bad specifically. Code in views is bad because you are mixing HTML markup with code. ASP.NET MVC is bad for separating static page design from dynamic UI code. Web Forms is better at separating static and programmatic UI elements.

1165. <https://stackoverflow.com/questions/639622/separation-of-concerns-mvc-why>

T: Separation of concerns; MVC; why?

Q: I'm currently reading up on OO before I embark upon my next major project. To give you some quick background, I'm a PHP developer, working on web applications.

One area that particularly interests me is the User Interface; specifically how to build this and connect it to my OO "model".

I've been doing some reading on this area. One of my favourites is this: Building user interfaces for object-oriented systems

"All objects must provide their own UI"

Thinking about my problem, I can see this working well. I build my "user" object to represent someone who has logged into my website, for example. One of my methods is then "display\_yourself" or similar. I can use this throughout my code. Perhaps to start with this will just be their name. Later, if I need to adjust to show their name+small avatar, I can just update this one method and hey-presto, my app is updated. Or if I need to make their name a link to their profile, hey-presto I can update again easily from one place.

In terms of an OO system; I think this approach works well. Looking on other StackOverflow threads, I found this under "Separation of Concerns": Soc

"In computer science, separation of concerns (SoC) is the process of breaking a computer program into distinct features that overlap in functionality as little as possible. A concern is any piece of interest or focus in a program. Typically, concerns are synonymous with features or behaviors. Progress towards SoC is traditionally achieved through modularity and encapsulation, with the help of information hiding."

To my mind I have achieved this. My user object hides all its information. I don't have any places in my code where I say \$user->get\_user\_name() before I display it.

However, this seems to go against what other people seem to think of as "best practice".

To quote the "selected" (green one) answer from the same question:

"The separation of concerns is keeping the code for each of these concerns separate. Changing the interface should not require changing the business logic code, and vice versa. Model-View-Controller (MVC) design pattern is an excellent example of separating these concerns for better software maintainability."

Why does this make for better software maintainability? Surely with MVC, my View has to know an awful lot about the Model? Read the JavaWorld article for a detailed discussion on this point: Building user interfaces for object-oriented systems

Anyway... getting to the actual point, finally!

1. Can anyone recommend any books that discuss this in detail? I don't want an MVC book; I'm not sold on MVC. I want a book that discusses OO / UI, the potential issues, potential solutions etc.. (maybe including MVC) Arthur Riel's Object-Oriented Design Heuristics

touches on it (and is an excellent book as well!), but I want something that goes into more detail.

2. Can anyone put forward an argument that is as well-explained as Allen Holub's JavaWorld article that explains why MVC is a good idea?

Many thanks for anyone who can help me reach a conclusion on this.

A1: This is a failure in how OOP is often taught, using examples like rectangle.draw() and dinosaur.show() that make absolutely no sense.

You're almost answering your own question when you talk about having a user class that displays itself.

"Later, if I need to adjust to show their name+small avatar, I can just update this one method and hey-presto, my app is updated."

Think about just that little piece for moment. Now take a look at Stack Overflow and notice all of the places that your username appears. Does it look the same in each case? No, at the top you've just got an envelope next to your username followed by your reputation and badges. In a question thread you've got your avatar followed by your username with your reputation and badges below it. Do you think that there is a user object with methods like getUserNameWithAvatarInFrontOfItAndReputationAndBadgesUnderneath() ? Nah.

An object is concerned with the data it represents and methods that act on that data. Your user object will probably have firstName and lastName members, and the necessary getters to retrieve those pieces. It might also have a convenience method like toString() (in Java terms) that would return the user's name in a common format, like the first name followed by a space and then the last name. Aside from that, the user object shouldn't do much else. It is up to the client to decide what it wants to do with the object.

Take the example that you've given us with the user object, and then think about how you would do the following if you built a "UI" into it:

Create a CSV export showing all users, ordered by last name. E.g. Lastname, Firstname.

Provide both a heavyweight GUI and a Web-based interface to work with the user object.

Show an avatar next to the username in one place, but only show the username in another.

Provide an RSS list of users.

Show the username bold in one place, italicized in another, and as a hyperlink in yet another place.

Show the user's middle initial where appropriate.

If you think about these requirements, they all boil down to providing a user object that is only concerned with the data that it should be concerned with. It shouldn't try to be all things to everyone, it should just provide a means to get at user data. It is up to each of the many views you will create to decide how it wants to display the user data.

Your idea about updating code in one place to update your views in many places is a good one. This is still possible without mucking with things at a too low of a level. You could certainly create widget-like classes that would encapsulate your various common views of "stuff", and use them throughout your view code.

A2: Here's the approach I take when creating websites in PHP using an MVC/separation of concerns pattern:

The framework I use has three basic pieces:

Models - PHP Classes. I add methods to them to fetch and save data. Each model represents a distinct type of entity in the system: users, pages, blog posts

Views - Smarty templates. This is where the html lives.

Controllers - PHP classes. These are the brains of the application. Typically urls in the site invoke methods of the class. example.com/user/show/1 would invoke the \$User\_controller->show(1) method. The controller fetches data out of the model and gives it to the view.

Each of these pieces has a specific job or "concern". The model's job is to provide a clean interface to the data. Typically the site's data is stored in a SQL database. I add methods to the model for fetching data out and saving data in.

The view's job is to display data. All HTML markup goes in the view. Logic to handle zebra-striping for a table of data goes in the view. Code to handle the format that a date should be displayed in goes in the view. I like using Smarty templates for views because it offers some nice features to handle things like that.

The controller's job is to act as an intermediary between the user, the model, and the view.

Let's look at an example of how these come together and where the benefits lie:

Imagine a simple blog site. The main piece of data is a post. Also, imagine that the site keeps track of the number of times a post is viewed. We'll create a SQL table for that:

This snippet is pretty straightforward and works well if:

It is the only place you want to show the most popular posts

You never want to change how it looks

You never decide to change what a "popular post" is

Imagine that you want to show the 10 most popular posts on the home page and the 5 most popular in a sidebar on subpages. You now need to either duplicate the code above, or put it in an include file with logic to check where it is being displayed.

What if you want to update the markup for the home page to add a "new-post" class to posts that were created today?

Suppose you decide that a post is popular because it has a lot of comments, not hits. The database will change to reflect this. Now, every place in your application that shows popular posts must be updated to reflect the new logic.

You are starting to see a snowball of complexity form. It's easy to see how things can become increasingly difficult to maintain over the course of a project. Also, consider the complexity when multiple developers are working on a project. Should the designer have to consult with the database developer when adding a class to the output?

Taking an MVC approach and enforcing a separation of concerns within your application can mitigate these issues. Ideally we want to separate it out into three areas:

data logic  
application logic  
and display logic

A3: The problem with the idea that all your objects know how to display themselves is that each object can only be displayed in one way. What happens if you want to provide a detail view of a user, and a summary view. What happens if you want to display a view that merges a number of objects (users and their associated addresses for example). If you separate your business objects (users) from the things that know how to display them then you have no more code to write, you just separate it into different places.

This makes software more maintainable because if a user object is behaving incorrectly, you know it is the user, if it is not displaying properly, you know it is the view. In the situation where you need to provide a new interface to your application (say you decide to provide a new look and feel for mobile browsers), then you don't need to change your user object at all, you add a new object that knows how to render the user object for a mobile browser.

SOLID principles provide some good reasoning for this, here is a relatively concise look at these. I am afraid that I don't have a book to hand that sums it up well, but experience has taught me that it is easier to write new code than it is to update old code, and so designs that favour small modular classes that plug together to achieve what is needed, while harder to design up front, are far easier to maintain in the long run. It is great to be able to write a new renderer for a user object, without ever having to delve into the internals of that object.

A4: Can anyone put forward an argument [...] that explains why MVC is a good idea?

It keeps you sane by helping you remember what your code does because they are isolated from each other.

A5: I don't know any good books on the MVC subject, but from my own experience. In web development for example, many times you work with designers and sometimes dbas. Separating the logic from the presentation allows you to work with people with different skill sets better because the designer doesn't need to much about coding and vice versa. Also, for the concept of DRY, you can make your code less repetitive and easier to maintain. Your code will be more reusable and make your job a lot easier. It will also make you a better developer because you will become more organized and think of programming in a different way. So even if you have to work on something that is not MVC, you might have a different approach to architecting the project because you understand the MVC concepts.

I guess the tradeoff with a lot of MVC frameworks for large sites is that it may not be fast enough to handle the load.

A6: Consider the amount of code that would go into that single class, if you want to expose the same info not only as Html on the UI, but as part of an RSS, a JSON, a rest service with XML, [insert something else].

It is a leaky abstraction, meaning it tries to give you the sense that it will be the only piece that will ever know that data, but that can't be entirely truth. Lets say you want to provide a service that will integrate with several external third parties. You will have a really hard time forcing them to use your specific language to integrate with your service (as it is The class the only piece that can ever the data

it is using), or if in the other hand you expose some of its data you are not hiding the data from those third parties systems.

Update 1: I gave an overall look at the whole article, and being an old article (99), it isn't really about MVC as we know it today vs. object oriented, nor has arguments that are against the SRP.

You could perfectly be in line with what he said, and handle the above scenario I mentioned with specific classes responsible to translate the object's public contract to the different formats: the main concern was that we didn't have a clear place to handle the changes and also that we didn't want the information to be repeated all over. So, on the html case, you could perfectly have a control that renders the info, or a class that transform it to html or [insert reuse mechanism here].

Btw, I had a flash back with the RMI bit. Anyway, in that example you can see he is tied to a communication mechanism. That said, each method call is remotely handled. I think he was also really concerned on developers having code that instead of getting a single object and operating on the info returned, had lots of small Get calls to get tons of different pieces of information.

Ps. I suggest you read info about DDD and Solid, which as I said for the SRP I wouldn't say it is the type of things the author was complainig about.

A7: My 2c.. another thing you could do besides what was said is to use Decorators of your User objects. This way, you could decorate the user differently depending on the context. So you'd end up with WebUser.class, CVSUser.class, RSSUser.class, etc.

I don't really do it this way, and it could get messy, but it helps in avoiding the client code from having to pull a lot of info out of your User. It might be something interesting to look into ;-)





