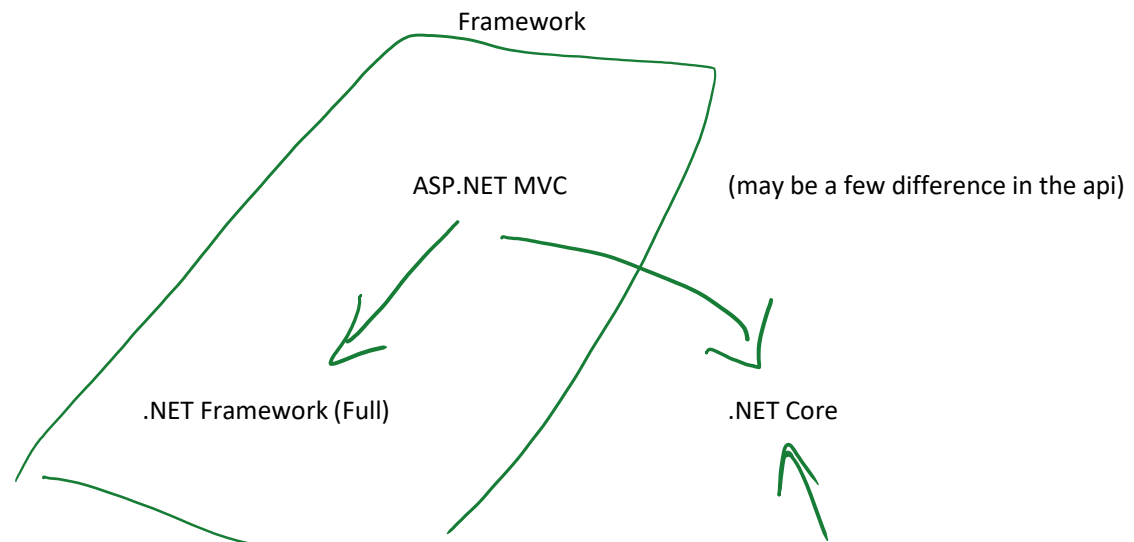


Agenda

Monday, May 11, 2020 9:35 AM

ASP.NET MVC <--- Application Framework <---- Helps you develop the application

.NET Core Application <----- Runtime Framework/Platform <----- helps you execute the application



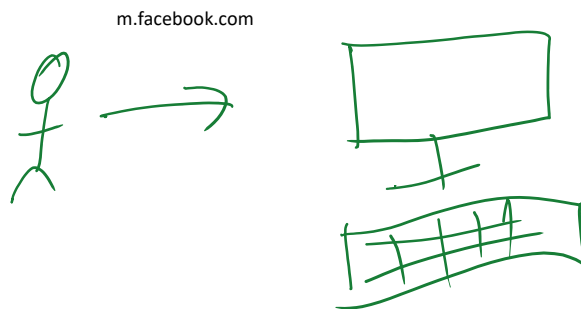
Http Protocol

Monday, May 11, 2020 10:03 AM

<http://m.facebook.com> <---- Open Mobile Site

<http://www.ircctc.co.in/mobile>

GET m.facebook.com/\r\n
User-Agent: chrome, windows10\r\n



It is a contradiction between the URL and the User-Agent

Url --> give me mobile site
User-Agent --> give me desktop site



GET /some/url
connection: keep-alive

- Request to keep the connection alive
- Don't close the Tcp socket (Please)
- Browsers almost always send this header to the client
- Server can (and very often does) ignore this request

Server Response

<https://books.org/list?cat=thriller>

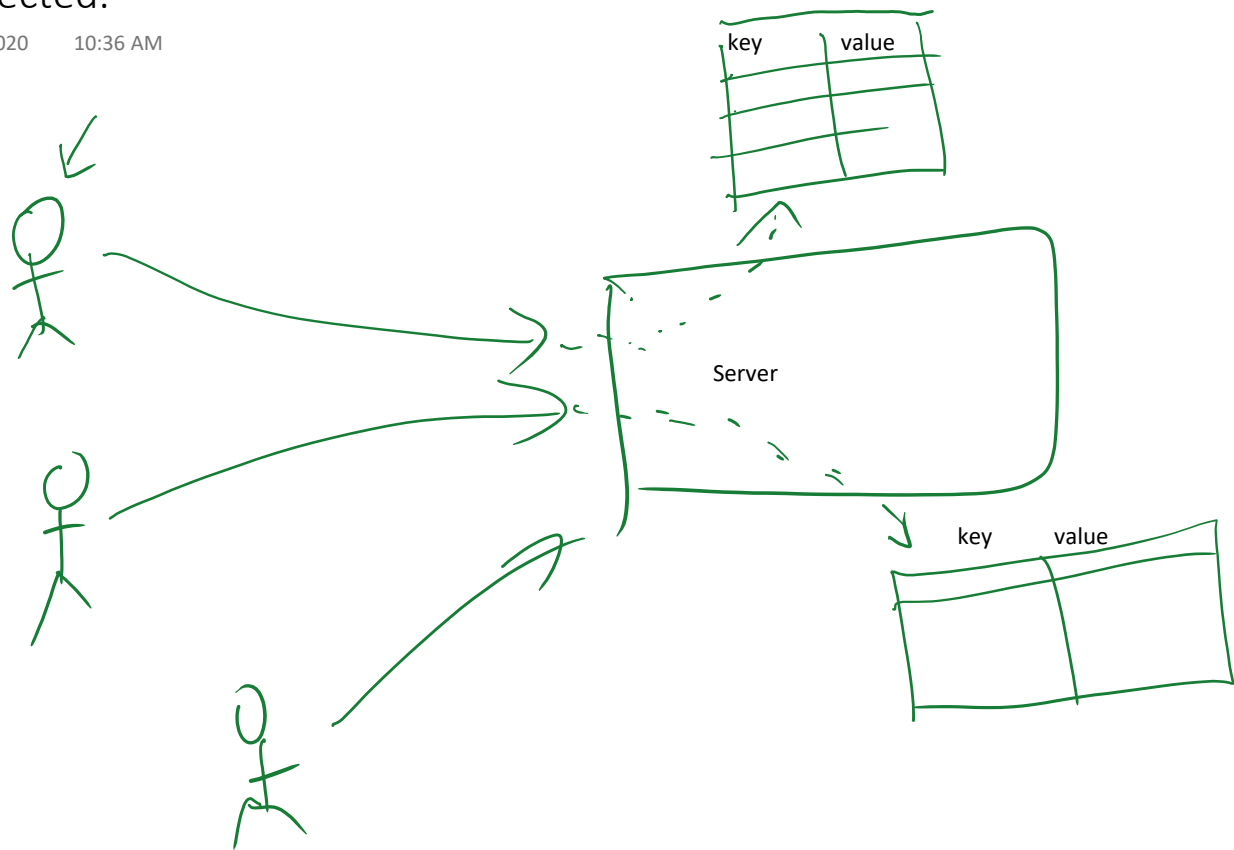
<https://amazon.in/proucts?q=mobile-cover&model=samung-note-8>

200 OK
Content-type:text/html
date-modified:2020/04/13

Clients second request

How will server connect a user to its session when socket is disconnected.

Monday, May 11, 2020 10:36 AM



Cache Redirect

Monday, May 11, 2020 11:28 AM

Server Response

200 OK
Content-type:text/html
date-modified:2020/04/13

Client Next Response

GET /resource
if-modified-since:2020/01/30

//content changed after clients previous visit

200 OK
Content-type:text/html
date-modified:2020/04/13

Gets new Data

Client Next Response

GET /resource
if-modified-since:2020/05/04

//content not modified after the last visit

304 Not Modified
\r\n

Cache Redirect

Can use the existing

MVC

Monday, May 11, 2020 12:19 PM

Presentation

Business

Data

View

~~Controller~~

Model

Model



Standard Network Port

Tuesday, May 12, 2020 9:26 AM

As an admin I can run any server on any available (free) port.

One Machine ----> One Port ----> One App (One socket)

Standard Practice

First 1K port is reserved for standard protocol

- 20,21 ----> FTP
- 25 ----> SMTP
- 80 ----> HTTP
- 110 ----> POP
- 443 ----> HTTPS

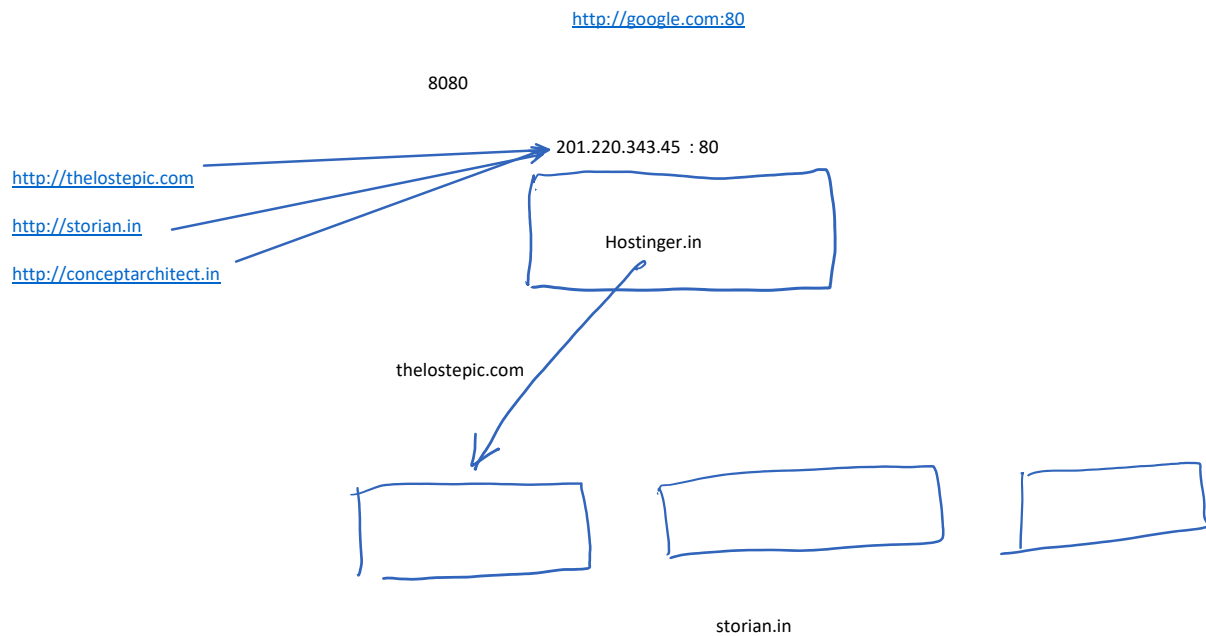
Q. What if I run HTTP Server on a Non Standard Port

A. The URL Will Change

a. <http://books.org:3393/books>

- now we say the server will be available on port 3393.

- You can imagine that default url is a shortform for
 - <http://books.org:80/books>
 - <http://books.org:445/books>



MVC URL

Tuesday, May 12, 2020 10:00 AM

Traditional View

<http://localhost:57586/> <----- index.html/default.html/default.aspx/default.php ---> from root directory

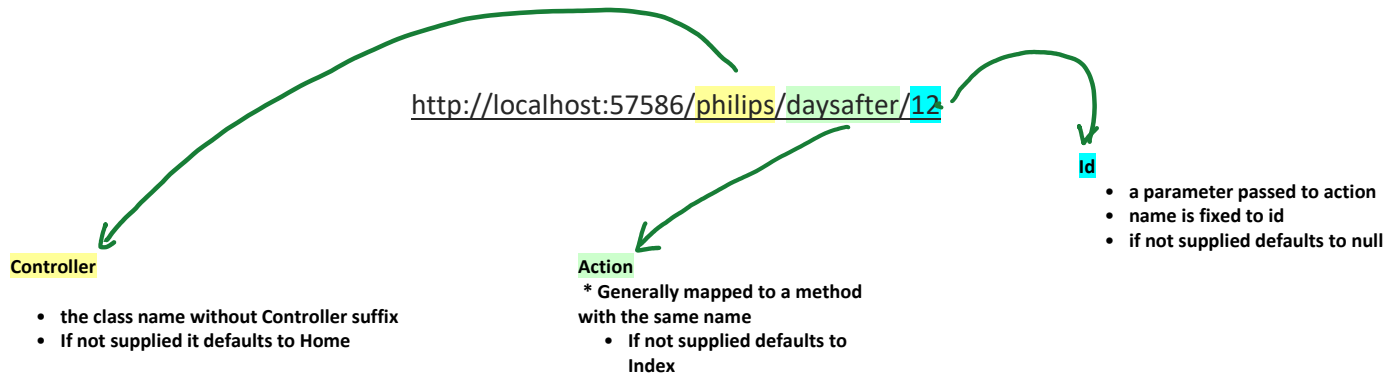
<http://localhost:57586/Home/Contact> <----- index.html/default.html/default.aspx from /Home/Contact directory

<http://localhost:57586/Home/About>

<http://localhost:57586/books.html> <----- request for books.html file in root directory

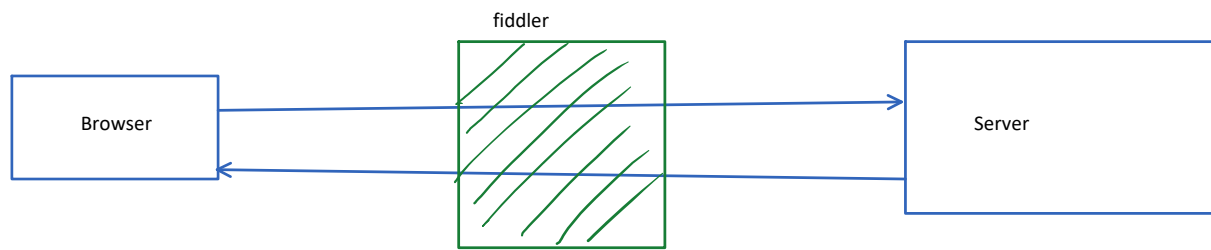
<http://localhost:57586/Home/About/authors.aspx> <----- execute authors.aspx page from /Home/About folder

MVC URL has by default 3 parts



How Fiddler Works

Tuesday, May 12, 2020 10:41 AM



Controller--->Action--->ActionResult

Tuesday, May 12, 2020 11:38 AM

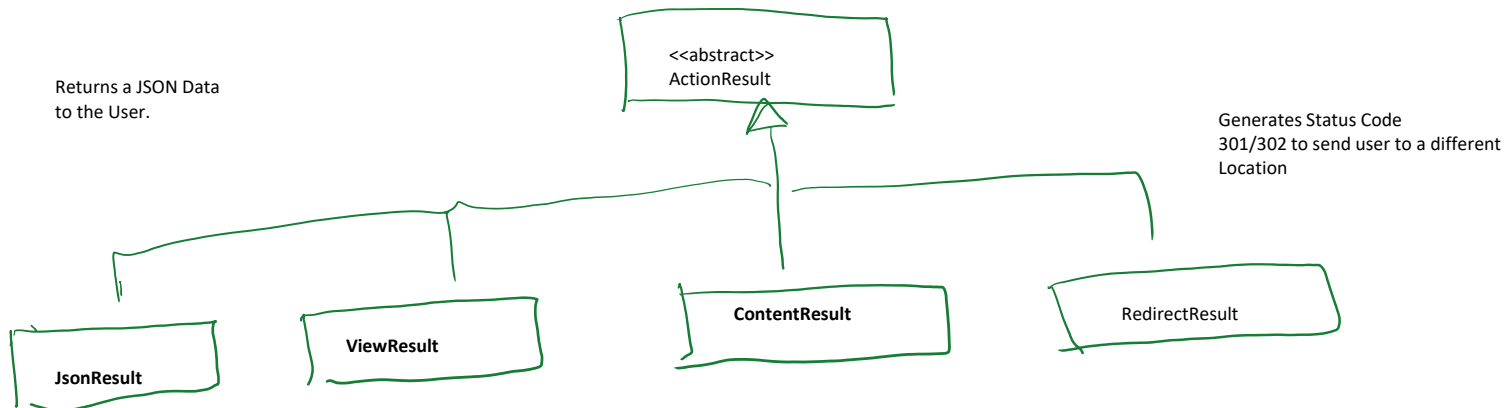
1. An Url is a request for a **Controller** to perform some **Action**
2. Once an Action is performed it returns an **ActionResult**
3. ActionResult is returned to the User As a **View**

Controller ----> is an object

Action ----> is what controller do

ActionResult ----> return of the Action

View ----> what user sees (ActionResult)



ViewResult

ViewResult uses a ViewEngine to generate a dynamic Html View using Model Data and a ViewTemplate

ContentResult

One of the simplest ActionResult
It returns a given String content to the user without any processing.

If your **Action** is not returning an **ActionResult**
The current object is automatically converted to **ContentResult** by the controller

A code like

```
public Person Contact()
{
    var p=new Person();
    return p;
}
```

Is internally converted to (psudocode)

```
public ContentResult Contact(){
    var p=new Person();
    return new ContentResult()
    {
        Content=p.ToString()
    };
}
```

This happens with the base Controller

Razor view engine processing

Tuesday, May 12, 2020 12:26 PM

Razor is one of the simplest view engine to combine view template (HTML) with C# Code (**CS+HTML = CSHTML**)

```
<h2>Welcome To Philips Server</h2>
@{
    //this is a c# code block. you can write any c# here
    var date = DateTime.Now;
}
<p><strong>Date is </strong>@date.ToLongDateString()</p>
<p><strong>Time is </strong>@date.ToLongTimeString()</p>
```

Razor Block Code

```
@{
    //razor block
}
```

You can write any processing statement, assignments etc in this block. This block doesn't have direct output on the screen unless you write `Response.Write()`

Razor Display Expression

`@something`

It is a shortcut for

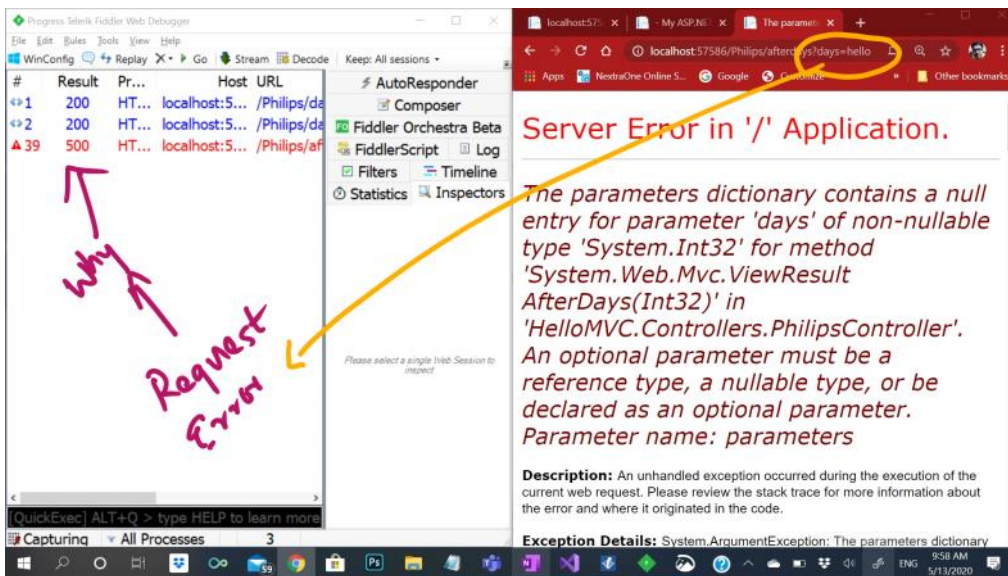
```
@{ Response.Write(something); }
```

Notice there is no semicolon after simple razor expression what ever you type automatically used as argument to `Response.Write()`

Also Note @ is automatically closed when it finds html code

HTTP Errors!

Wednesday, May 13, 2020 9:56 AM

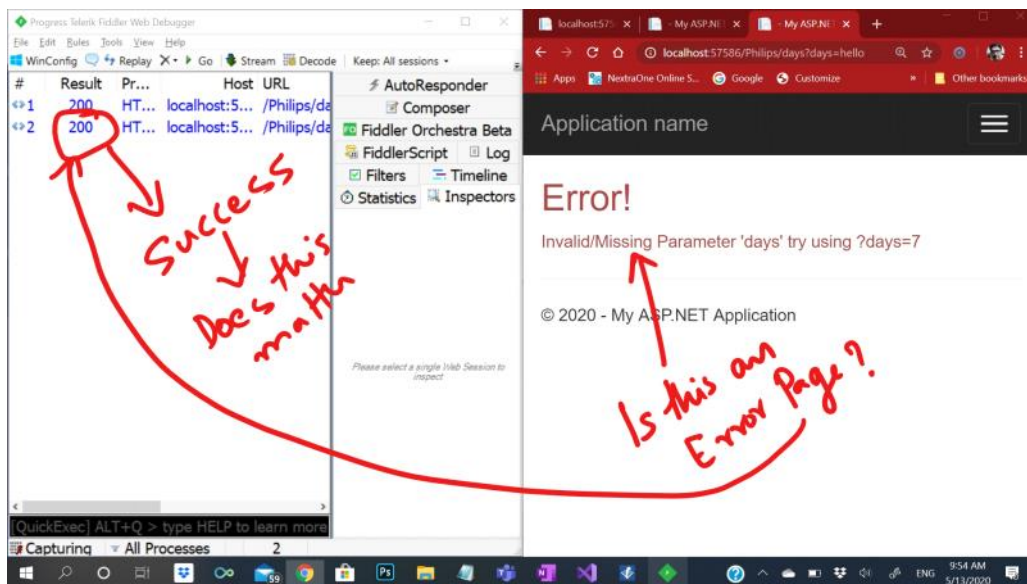


Is this a client request error or a Server Side error as notified.

Ideally it should be request error (400)

But it is server error, because Server didn't tell user they made a mistake

Server is uselessly taking on the guilt!



If This is an error page,

Why is the status code 200?

What should be the status code here?

It should be **400 Bad Request**

Does it matter 200/400? After all end user is going to see Error page and not the actual status code?

YES.
Humans are not the only one who see a webpage

Automated system like search engine crawlers or automated testing frameworks also see these outputs

- Do you want search engine crawlers to index even error page?
- Do you want automated systems to check color of message to decide if it is an error page?

URL Formats

Wednesday, May 13, 2020 10:41 AM

Which is a better URL to get a list of all Books By Jeffery Archer?

Approach#1 -- Traditional with id

<http://books.org/books.aspx?author=2915>

Approach#2 -- Traditional with name

<http://books.org/books.aspx?author=jeffrey-archer>

Approach#3 -- MVC URL

<http://books.org/books/by/jeffrey-archer>

Problem Approach#1

- need to remember an id
- what will be the list of books by john grisham called?

Problem Approach#2

- long and complicated url
- It looks too techy
 - Query Strings are ugly
- **Technology Id (.aspx)**
 - **Why should I include technology id in an URL?**
 - **What Jeffrey Archer book list has got to do with .net framework?**
- **Why Url shouldn't include technology**
 - **because we may switch our technology tomorrow**
 - **Then all urls we created today will be useless**
 - **All bookmarks will be dead**

W3C Recommendation for a URL

A URL should be

- Short
- Simple (Easy to Remember)
- Permanent (Removed Technology ID)
- identification of a resource (business)

URL shouldn't include

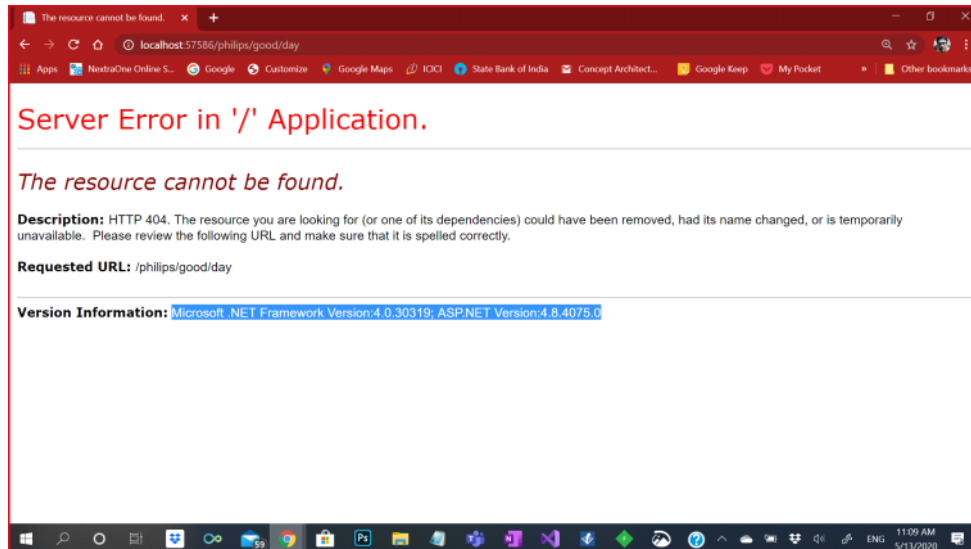
- Technology id such as
 - aspx/php/jsp
 - data format json/xml
 - device id eg m.facebook.com or irctc.in/mobile

<http://yt.be/5x9q8z>

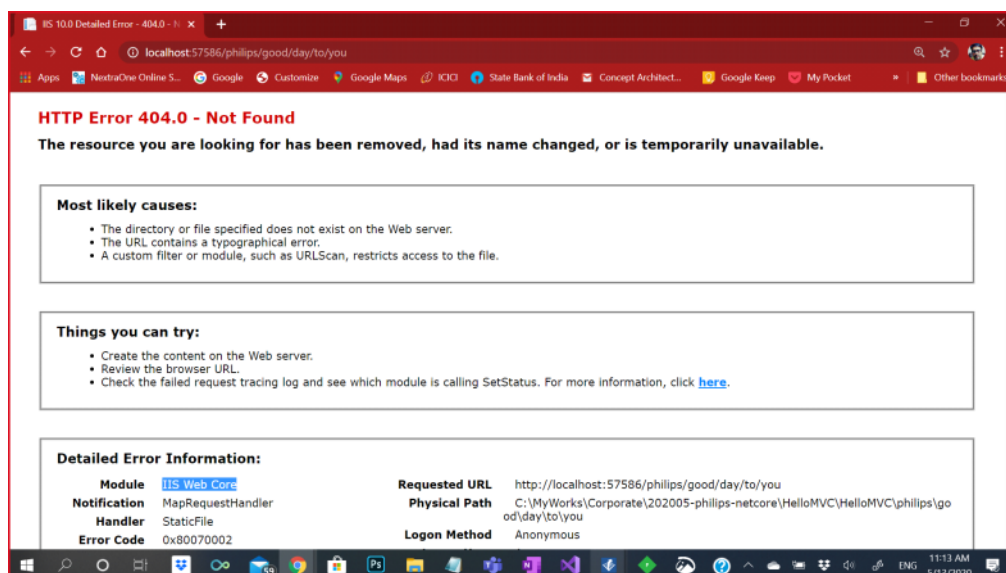
- SHORT BUT NOT SIMPLE!

MVC Lifecycle Error Handler

Wednesday, May 13, 2020 11:09 AM



- A 3 part URL is recognized as an MVC URL
- Routing Module passes control to MvcRouteHandler
- MvcRouteHandler breaks the URL into
 - controller: philips
 - action: good
 - id: 'day'
- MvcRouteHandler passes control to MvcRequestHandler
- MvcRequestHandler successfully creates controller 'PhilipsController'
- Not the action 'good' is not available
- **MvcRequestHandler** returns 404



- A Route that is not configured by the RoutingModule falls back to IIS
- IIS tries to handle the url in traditional way by either
 - extension mapping
 - physical file search
- when both fails **IIS (not asp.net)** generates 404

Assignment

Wednesday, May 13, 2020 11:54 AM

- Create a request for generating the Multiplication Table of a given number
- You choose your own URL structure
- The Url should take the number whose table is to be generated
- It should take an option second parameter for highest multiplier which should default to 10 if not passed
- Define success and error results properly

Use case 1 ---> Multiplication Table of 19 (Till its 10th Multiple)

Table of 19

Number	X	Result
19	1	19
19	2	38
19	3	
19	4	
19	5	
19	6	
19	7	
19	8	
19	9	
19	10	190

Use case 2 ----> Multiplication Table of 19 optional parameter sets highest multiple to 5

Table of 19

Number	X	Result
19	1	19
19	2	38
19	3	
19	4	
19	5	

Conventional Programming

Thursday, May 14, 2020 9:20 AM

Convention over configuration

- * Prefer a conventional coding
 - * reduces the need of configuration
- You are allowed to break/override convention if required
 - * configuration can be one way to override convention

Controller Execute

Thursday, May 14, 2020 9:41 AM

```
class Controller : Icontroller
{

    public void Execute( RequestContext context)
    {
        var httpContext= context.HttpContext;
        var routeData=context.RouteData;

        var actionName= routeData.Values["action"];

        var result= ActionInvoker.Invoke( actionName ); //this will search and execute an action method present in the controller

        ActionResult actionResult;

        if(result is ActionResult)
            actionResult=result;
        else
            result=new ContentResult(){ Content= result.ToString(); } //any normal return type is converted to ActionResult

        result.Exectue(); //generates the response!
    }

}
```


Preventing Javascript Injection Attack!

Thursday, May 14, 2020 10:04 AM

What if I type these content in a facebook wallpost

```
<h1>Hello There, I hav a news</h1>
```

```
<script>alert("Hi, I have a news");</script>
```

```
<script> for(i=0;i<100;i++) alert("Hello World"); </script>
```

If you are allowed to add any arbitrary html content to a web page user may

- Use Rich HTML/CSS format to express their idea, but it may break the site's theme
- Inject Scripts that may
 - deface the page at best
 - may inject malicious javascript to steal information and so on.
- Damage potential is endless

Solution!

- Most modern ViewEngine doesn't allow you to inject any HTML code as data to a page
- Any data inject to a page will automatically be encoded by replacing "<" with "<" and ">" with ">"
- These codes will appear on the page but will not be treated as HTML
- Some application may simple refuse to inject the code and fail with a validation error.

Books Web Site

Thursday, May 14, 2020 12:49 PM

Overview

- A web app for book lovers where user can find
 1. A List of Books with informations such as
 - i. Title
 - ii. Author
 - iii. Price
 - iv. Description
 - v. Coverpage etc
 - vi. Reviews and Rating
 - vii. User can also leave their review about the book
 2. A List of Authors
 - i. Author Name
 - ii. Their Biography
 - iii. Photograps
 - iv. Books Written By Them
 - v. Reviews and Rating
 3. User
 - i. Login
 - ii. Logout
 - iii. Maintains A Book Shelf
 - iv. Maintain Contributions such as
 - 1) Reviews

Assignment

1. Create The Model Classes
 - a. Book
 - b. Author
 - c. User
2. Plan the Routes (URL) to
 - a. what information you want to access
 - b. what operations you need to provide etc
3. Plan a outline of the pages that you need

Book List

Friday, May 15, 2020

9:35 AM

Title	Author
My Experiments with Truth	Mahatma Gandhi
Mahatma Gandhi	Xyz
My Understanding Gita	Mahatma Gandhi

```
<table>
  <tr>
    <td>Title</td>
    <td>Author</td>
  </tr>

  <tr>
    <td>My Experiements with Truth</td>
    <td>Mahatma Gandhi</td>
  </tr>

  <tr>
    <td>Mahatma Gandhi</td>
    <td>Xyz</td>
  </tr>

  <tr>
    <td>My Understanding of Gita</td>
    <td>Mahatma Gandhi</td>
  </tr>
</table>
```

What is difference Xml Vs HTML?

Xml is the information, HTML is presentation of information.

Xml retains the structure and meaning of data it holds

- you can easily find out all the books authored by Mahatma Gandhi
 - Mahatama Gandhi doesn't appear in 'td' but in 'author'

HTML looses the information in trying to a create a presentaion!

Xml vs Json

- both are used in same scenario -- represent information
- JSON is more compact than XML
- JSON is easily understandable by Javascript
 - The most popular client for consuming services

How to I select Book by Mahatma Gandhi and not on Mahatma Gandhi????

**HTML is a picture of the information
And sorrounded by HTML tags the information is often lost**

Xml Representation

```
<books>

  <book>
    <title>My Experiements with Truth</title>
    <author>Mahatma Gandhi</author>
  </book>

  <book>
    <title>Mahatma Gandhi</title>
    <author>Xyz</author>
  </book>

  <book>
    <title>My Understanding of Gita</title>
    <author>Mahatma Gandhi</author>
  </book>

</books>
```

JSON Representation

```
[
  "book":{
    "title": "My Experiements with Truth",
    "author": "Mahatma Gandhi"
  },
  "book":{
    "title": "Mahatma Gandhi",
    "author": "Xyz",
  }
  "book":{
    "title": "My Understanding of Gita",
    "author": "Mahatma Gandhi",
  }
]
```

Cloud Vs Normal Internet Deployment

Friday, May 15, 2020 11:07 AM

- Internet deployment may take form of IAAS, PAAS, SAAS etc
- Each will have few layers

Cloud

- defining feature is **Virtualization a.k.a Virtual Machine**
- Multiple Virtual Machines may be present on the same physical infrastructure
- Each Virtual machine will get promised computation power (CPU/Storage/RAM/Bandwidth)
- **A virtual machine may be replicated on multiple infrastructure located in different geographical regions**
- Each change may be synchronized across various instances of the same server
- This allows
 - Scaling of requirement
 - We can launch a copy of virtual machine within a short span of time. A real hardware installation requires longer
 - We can launch such VMs nearest to my consumer base reducing the turnaround time.
 - Proper Load Balancing among various instances
 - Robust
 - Even if one VM or geographical location is compromised your system is still available via other instance
 - You are not completely out of business because of geographical conditions.

Virtual Machine Requirement

- Light weight software system
 - Easy to replicate
- Smaller virtual machines
- Design which can handle failures and crashes.

.Net Core vs .NET Framework

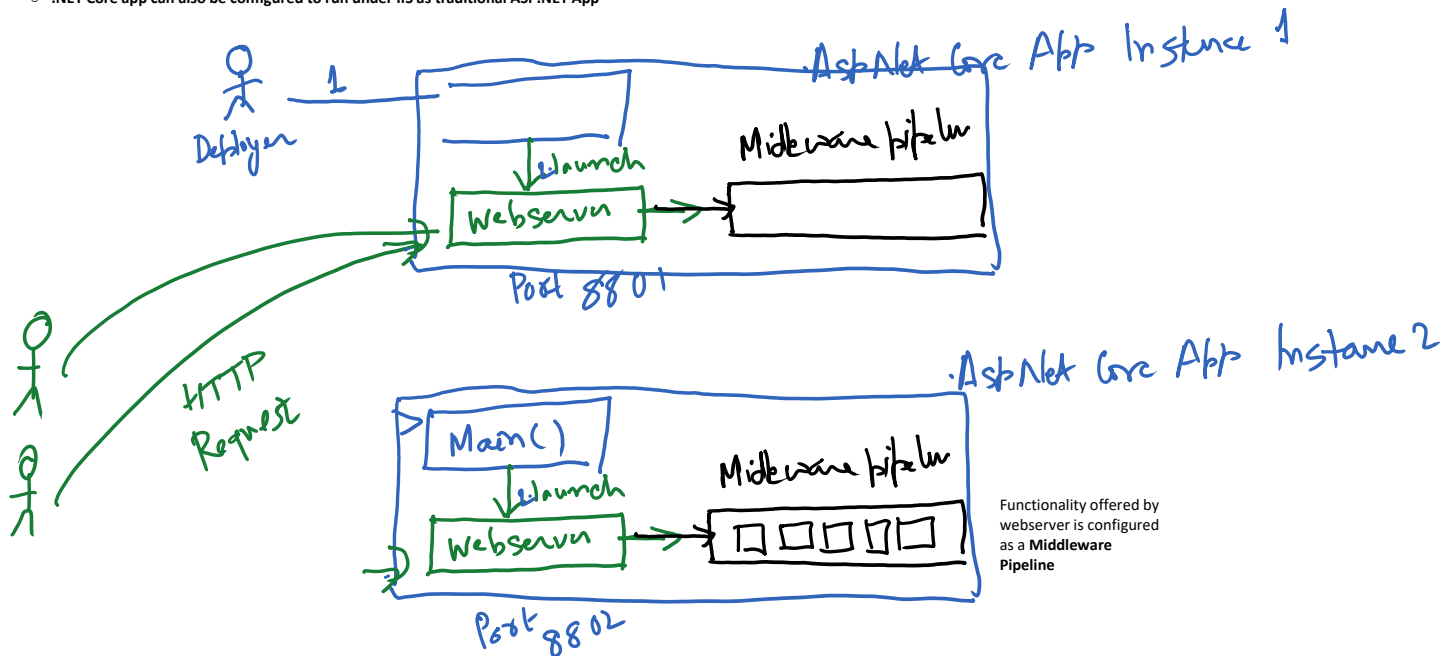
Friday, May 15, 2020 11:23 AM

- .NET is
 - Lightweight (more like a subset) of full .NET Framework.
 - Doesn't support all features of .NET Framework.
 - WinFrom
 - WebForms
 - WCF
 - WPF
 - Make it universally available. unlike .NET Framework .NET core is easily deployed on
 - Linux
 - Mac
 - **High avialbility**
 - Restructure design to support scalable features for
 - MVC Application
 - WebAPI
 - Entity Framework
 - Highly configurable
 - Zero Installation
 - .NET core runtime may be embedded within your application
 - Application can run anywhere.
 - Less deployment problems!
- Introduced in .NET Core 3
- .NET Core 2 onward the runtime can be installed on deployment machine running any OS

ASP.NET Core

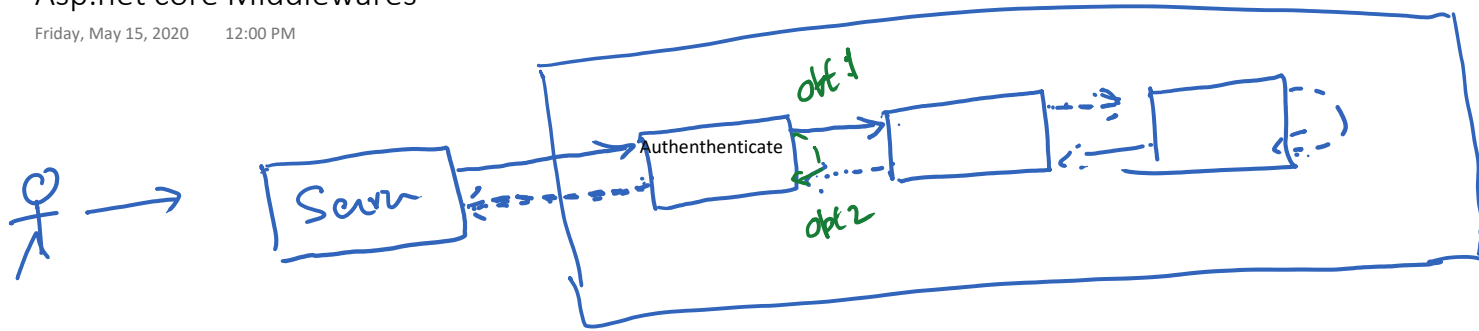
Friday, May 15, 2020 11:31 AM

- ASP.NET core is different from .NET Core in the sense
 - It is not container architecture
 - Your application doesn't run inside IIS (or a server)
 - **Your application runs (lightweight) server inside it**
 - **Your application is more like a console application with its own Main**
 - When you run Main(), it launches an IIS Server
 - Very easy to deploy. Just run Main
 - ♦ **Remember a traditional ASP.NET Web Applications don't have their functions.**
 - Since Server is embedded the underlying machine just need .NET Core framework on NOT IIS
 - Your machine listens to its own request and responds back on its
 - You may run multiple instances of your application on same machine (may be different port)
 - Your application contains
 - Server
 - Web Application
 - The server is not heavy weight structure like IIS
 - **.NET Core app can also be configured to run under IIS as traditional ASP.NET App**



Asp.net core Middlewares

Friday, May 15, 2020 12:00 PM



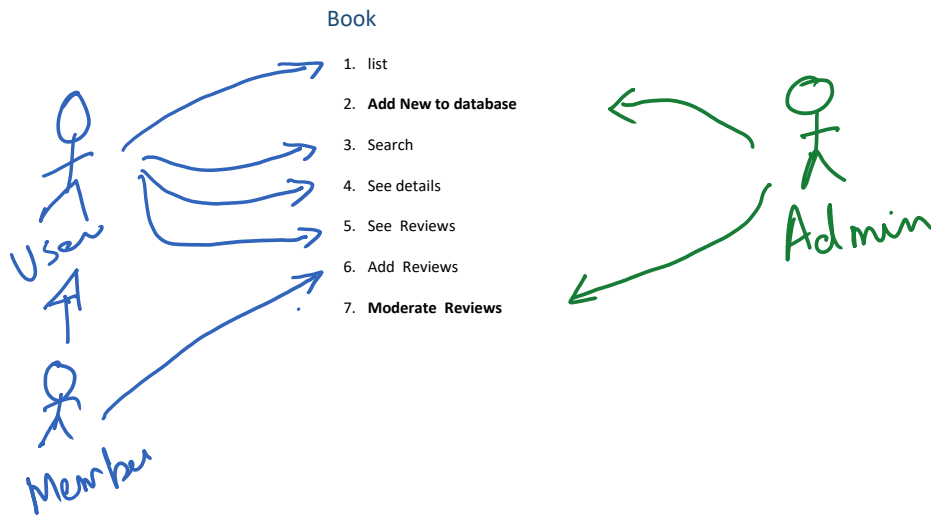
Key Elements

Book Database Management

Author Database Management

Reviews

User and Authnetication



Urls

List all books

<https://books.org/book/list>

or

<https://books.org/books>

Search Books

<https://books.org/books?q=TheAccursedGod>

Create New Book

<https://books.org/books/create>

Book By Id

<https://books.org/books/info/the-accursed-god>

Edit Book

<https://books.org/books/edit/the-accursed-god>

Edit Book

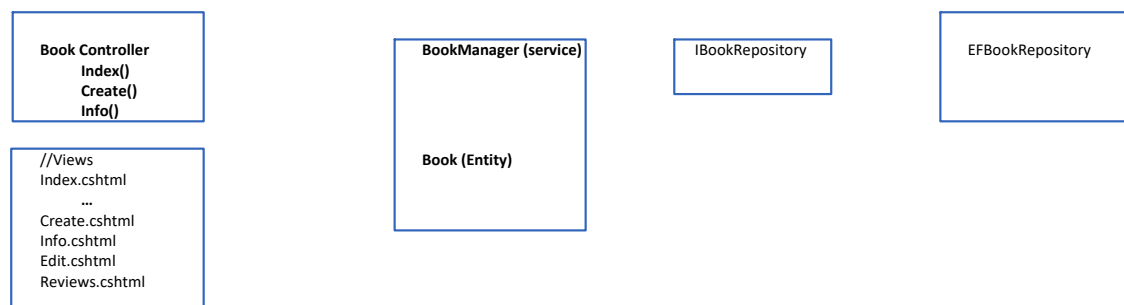
<https://books.org/books/delete/the-accursed-god>

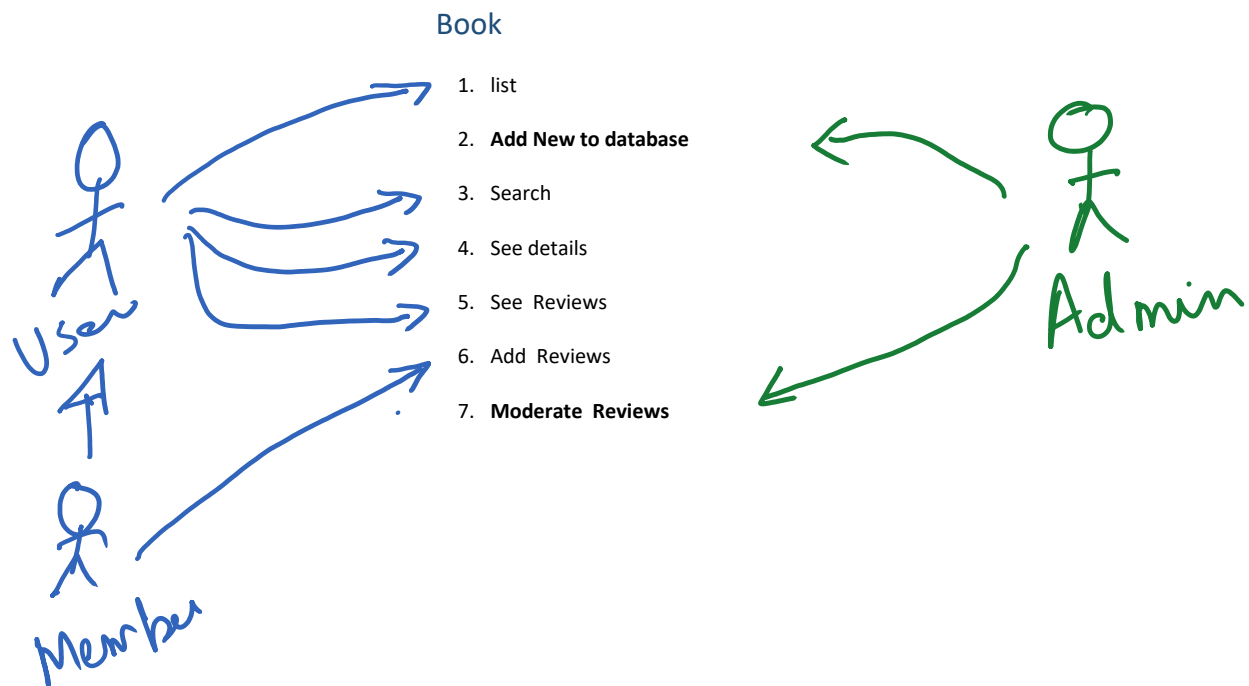
List of Book Reviews

<https://books.org/books/reviews/the-accursed-god>

alt

<https://books.org/books/info/the-accursed-god/reviews> <--- Note requires a New Route





User

Friday, May 15, 2020

8:45 AM

