



indsay V

👋🏼 Hello and welcome to the webcast “Software Architecture by Example” presented by Mark Richards and Neal Ford. We will get started shortly.

Lindsay V

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Lindsay V

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Lindsay V

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Lindsay V

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Lindsay V

📚 If you experience any audio/visual issues please try refreshing your browser as this will usually correct the issue.

T C

Hello from London

Mark R

Welcome to the class everyone from Boston!

L F

Hello from Chicago!

M D

Hello from Boston

A A

Hello from Singapore.

J F

Hello from Porto :)

H D

Hello from Sri Lanka

Mark R

@AA and @HD - it's really late for you there!

Mark R

(or early)

H D

it's 7.33PM in SL

G G

Hello from Bangalore

N L

Hello from Berlin

P T

Hello from Zurich

J P

Hello from Singapore

G C

hello from budapest :)

B M

Hello from Brazil

H A

Would be covering aspects of interface design, process design, data design....

S H

Hello from Portland, OR

T C

well, you never add water...

P N

Hello from Kenya.

A s

Are there any solutions for the katas available at <http://fundamentalsofsoftwarearchitecture.com/katas/list.html>? How do you advise I can validate them?

U J

is this session recorded?

A R

Yes it is recorded.

T C

should we start with clean architecture or with this new book?

J P

my focus to get more insights on today's design dynamic on Zero trust as key during design Plan

Lindsay V

@U J Recording will be available 24 ours after we conclude here: <https://learning.oreilly.com/attend/software-architecture-by-example/0636920261797/0636920054853/>

Mark R

@As - I'll get to your question in just a little bit - its a GREAT question :-)

A s

Thank you Mark.

Mark R

Fundamentals of Software Architecture Online: <https://learning.oreilly.com/library/view/fundamentals-of-software/9781492043447/>

Mark R

Fundamentals of Software Architecture: <https://www.amazon.com/Fundamentals-Software-Architecture-Comprehensive-Characteristics/dp/1492043451/>

Mark R

Companion Website (with images): <http://fundamentalsofsoftwarearchitecture.com/>

A s

Thank you Neal and Mark.

P N

Any idea how to minimize buffering?

Lindsay V

@P N please close down anything competing with your bandwidth. Make sure to not be on a VPN. Try Chrome or Firefox as your browser.

Mark R

Also, if things seem slow or start to freeze, you can try refreshing your browser - that usually helps as well

A A

I am also facing buferring issue.

R W

here all is fine, just to show that at least one is running well ;-)

M D

What were those two books mentioned?

Neal F

@MD: Fundamentals of Software Architecture and Clean Architecture (R Martin)

Mark R

@MA - anti-pattern coming up!

Mark R

(We'll be looking at all of these architecture styles and more)

Mark R

The Cart Before the Horse AntiPattern

O B

how are elasticity and scalability different?

Mark R

Characteristics Workbook: <https://www.developertoarchitect.com/downloads/worksheets.html>

Mark R

Millers magic number 7 (plus or minus 2): <http://psychclassics.yorku.ca/Miller/>

R C

Trade off priority Changes: How do you handle the following case? At one point, we trade off Security for Performance, after a couple of years we want to trade off Performance Security...

G I

7 including or excluding "implicit" characteristics?

T C

scalability

N L

interoperability

H .

Scalability

P V

scalability

J D

Scalability

V A

scalability

P S

Scalability

V L

Elastic?

S V

scalability

S J

elasticity

A R

Deployability

H B

Internationalization

P S

Registering with international credit cards

V S

testability

Y Y

scalability

R N

scalability

A A

Scalabiity

L C

Scalability

s d

Elasticity

L B

Scalability

S N

scalability

B M

Scalabiity

P S

Concurrency

A s

Elastic - per aution

V L

why not elastic?

M A

globally distributed load

R S

reliability

T C

ah spikes

A I

Elasticity = scalibility on demand

T C

elasticity then

V A

elasticity

S J

elasticity

R N

elasticity

Y H

Elasticity

Y Y

Elasticity

T C

spikes

M A

elasticity = spikes

O B

both

A R

Both

Y H

both

R N

both

T C

both

L F

Elasticity

J F

both

V A

both

L L

does elasticity imply scalability?

P S

Scalability is a trend line over Elasticity!

T C

but how about auto scaling?

T C

no need to run always on capacity

Mark R

MTTS - mean time to start

R N

none

L L

performance

V C

interoperability maybe

A A

data integrity

V A

agility

Mark R

Trollability

O B

security

P N

sec urity

O T

reliability

P V

reliability

L C

Security

Y Y

security

P S

data integrity?

S v

security

K L

monitoring

K S

statefull

L F

reliability

P S

Availability

M A

its might be an internal value

V A

agility

Mark R

anti-trollability

M A

GOOD BOY INDEX

M F

Sounds like a GDPR issue here in Europe. :-)

R S

data integrity

a g

Reliability

V S

How many here is real users?

P S

Nice trap!

N L

As a AWS/Azure user yo u can just spin up new instances and it's kind of good. But how amazon deals with elasticity?

V A

it's more about low design patterns like Straetgy?

R N

security

H A

data consistency

K R

Security

T C

security

S V

interopeability

Y H

security

R S

security

R S

availability

A K

reliability

H .

security

I M

reliability

V L

functional

R B

security

J A

reliability

J K

none

L H

security

N L

none?

L C

security

J K

none

S N

security

K L

reliabili ty

R C

Reliability

P S

recoverability--):

a g

Reliability and security

R N

yes

V M

security and responsiveness

J F

none

M A

data separation

G P

None.

M A

maybe have to kept in a separate country

M A

there are vault services that can be integrated for CC info

P S

What's PCI information?

L L

what about any legacy services to integrate with, does this influence architecture design?

G P

So irrespective of any architecture you choose the functional requirement will remain the same so this is not an architectural aspect but more of a functional aspect

O B

PCI is Personal Confidential Information

P S

Thanks OB

A A

concurrency

M A

data consistency

W S

PCI Payment Card Industry

W S

PII Personsable identifiable information

P S

Isn't bids receiving in order more of functional requirement?

T C

we should use natural language processing to find the architecture characteristics

R S

yes PCI is Payment Card Industry, PII is Personal Identifiable Information

O B

YAGNI

L L

is the ability to switch from one architecture to another, a characteristic in iteself?

P S

Thanks Neal

W S

To Neal's comment, available specialist implementations could be useful to open up new architectural soln.

A R

LL, maybe that's "abstraction"? :)

M A

have we considered changing requirements as most customers do? how can we start with something which is flexible

A A

Are i18n and I10n a rchitectural requirements or business requirements?

R S

I believe Arch Char are always on top of business requirements, no?

R S

i18n and l10n are pre dominently Business Requirements

Mark R

Both!

Mark R

(You will see in the next section)

M A

Application should be flexible to adapt to these

M A

if it adapts, product can go countries

Y H

integrability to allow delivery services

A A

Elasticity

J F

Doesn't performance impacts scalability ?

M A

are we architecting for a MVP here?

P V

what is the best way to practise listing these software architecture characteristics? how do we know we are right?

P S

I joined little late - where can i find the worksheet?

A A

<https://www.developertoarchitect.com/downloads/worksheets.html>

P S

thank you AA!

T B

thanks AA

F G

isn't scalability & elasticity usually improves performance?

Mark R

@PV - when the business stakeholders all agree!

R W

you can do everything right and fail

P R

At what point would you say the existing architecture cannot hold further and go back to drawing board from scratch ?

Mark R

@PR - Usually you don't have to go back to the drawing board, but rather migrate to an appropriate architecture that supports those needs. i.e., from layered architecture to service-based

Mark R

@PR - That's what we will be taking a look at after the third break

V C

I find it hard to identify a situation when testability would be a top 3 concern. Maybe adding a new service to an already existing platform? (but then I can assume that it's not such a big issue, because everything else is in place)

R W

would you say that such migration should influence always the whole or only parts of the previous arch?

A A

What about Time to Market for silicon sandwitches application?

Mark R

BINGO!!!

J F

Any safety critical, testability would be a top priority IMO

V C

so, in general, in places where you may cause significant harm or damage (like self-driving car software). thanks for the answer

T C

what is an application though?

V L

Component has many microservices?

R W

more a module of an application

V L

or component is a microservice?

Neal F

An application is a software solution

P S

application is a group of components?

Neal F

@PS: implementation detail. An applicaiton is a software solution.

P S

makes sense :)

Neal F

it might be components, lambdas, stored procedures, etc.

V S

Hi all! Where are you from?

M G

placement

J A

order placement

O B

placement

S B

Order placement

Y Y

order placement

P S

placement

R S

order placement

Y H

fullfilment

R S

o.P

S M

order placement

V G

Placement

O T

placement

S V

op

L B

order placement

M F

I would say we need a new component to handle the order validation

P V

order placement

O B

fulfillment would a bit late

N L

depends on what data we need

H B

Order placement

P N

placement

E W

all 3

A N

fulfillment, what if stock is low

R B

inventory component ?

R N

shipping

R S

order shipping

P S

fulfllment

V A

placement

O B

fulfillment

M G

fulfillment

Y H

shipping

P N

fulfillment

N L

fullfillment

J F

fulfillment

L C

shipping

P V

shipping

S M

fulfillmeny

Y Y

order fulfillment

A W

order fulfillment

V M

shipping

H U

fulfillment

Y R

fulfilment

M A

inventory?

V L

Why do we need 3 components? Can we just have one component/microservice OrderManagement? Separation of concerns or we want to scale them differnly

Y Y

order fulfillment

Y H

fulfillment

M G

fulfillment

N L

order placement?

L C

fulfillment

P N

placement

P V

fulfillment

D B

Fulfillment

R N

fulfilment and placement

O B

before placement

J A

placement

J F

placement

H B

placement

P S

placement

Y R

order placement

J D

placement

R S

fulfilment

R W

we need a new one

A L

placement

T C

placement

M K

fulfilment

G G

placement or earlier.

Y H

another new one

V A

bith

V A

both

A N

both placement and fulfillment

Y R

A new component

A A

Wouldn't initial bucket come from requirements itself? I didn't follow why requirements will be assigned later and not before while figuring out the components list.

R N

new comp

Y Y

inventory component

H B

would it be part of validation?

Y R

single responsibility principle gets broken

N L

oh noes, name including manager is a bad sign

V S

Does anyone alive is present here?

Mark R

manager, supervisor, controller, handler, engine,

Y R

helper

Y Y

coordinator

Y Y

helper

V C

provider

Y Y

provider

M A

what questions should we ask to avoid this trap

A T

orchestrator

T C

I like the workflow approach. another word for user journeys?

Y H

As consultant with initial domain knowledge, it will be a challenge to come with these names?

P S

what if several flavors inside auction creator come up? should we be looking to split it up at that point?

T C

do we start with the components or with the architecture characteristics or it doesn't matter?

N L

imo, naming is the simplest task. If it's hard is either because thing invented does not correspond to objects from business domain or developer does not know how these objects are caled

M F

I see that, although at the end these components will communicate with an underlying database, our components they try to match a more high level concepts

T C

@NL <https://martinfowler.com/bliki/TwoHardThings.html>

M F

regex

M F

is one of them as well

C E

Naming is super hard. You put three people in a brainstorming session to figure out names and you usually get three different perspectives on the same word

R N

system

R N

tracker

V A

another

V A

authentificator

V S

authorization

R N

Auction video Streamer

L F

Video streamer

Y H

video strea mer

V A

user =)

Y Y

new compoment

P N

Stream manager

A J

video viewer

A N

liveVideoStreamer

Y Y

new compoment livStream

V S

netflix

V S

=)

V A

bid streamer

R N

auction session

S K

bid streamer

Y H

auction session

M A

ticker

R C

LiveBidMonitor

R S

bid monitor

O B

auctioneer?

R N

bid streamer depends on auction session

I M

bidplacer

R N

?

Y H

auction session

R S

bid tracer

S K

auction session

V A

bidder tracker

P S

bid placer

M W

bidcatcher

J F

bid processor

V A

tracker

R C

BidProcessor

G G

bid manager

R N

bid acceptor

V A

bid capture

Y H

bid capture

O B

auctioneer seems to be a component by itself

N L

bid capture

J F

the bid capture

V A

bid tracke r

D B

auction session

G G

bid capture

P S

bidplacer/capture - reused?

A A

bid capture

T C

bid placer

R S

AS

R Z

bid recorder

V C

you end up with 2 adaptors for bid capturing

R N

capture

P V

streamer

K P

streamer

S J

streamer

P S

bidcapture -

V A

capture

Y H

auction session

G P

BidReceiver

P S

since streamer can be 'readonly'

R N

auction session

V A

auction session

G G

both bid capture and auction session

Y H

payment

V A

payment managment

I M

stripewrapper

R N

no

V A

pain

M A

do we draw a sequence diagram here?

T C

the lines are traffic flow?

N L

@TC the lines are "uses "

Y H

What are common and local, componenets?

R S

both

Y H

1st is better

M A

this one has lesser dependencies

Y H

coherence

P V

can you explain a bit about what microkernel is?

O B

when can be a monolith acceptable?

J F

what does total cost refers to? Operation or implementation cost?

K P

what is microkernel?

R S

simplicity kind of misses the scalability of the code, no? Some are really simply to first impl ement, but to maintain sometimes is a nightmare

P M

would event driven potentially using a set of micro services listening to the events and therefore be just as scalable?

V L

but its still worth it!

C E

It is a very hard discussion though. To try convince a dev group that's already decided on implementing a Microservice architecture that the choice is not fully align with what they need to implement

Mark R

total cost of ownership...

J F

Ok , Thanks!

T C

why 1 star for deployment in the monolith? it is super easy to deploy.

R S

but risk is high

Y H

based on the monolith size

T C

hmmm fair enough

Mark R

From our book: <https://learning.oreilly.com/library/view/fundamentals-of-software/9781492043447/ch17.xhtml>

Y H

and dependent services

N L

monolith is super-easy to deploy when everything goes smoothly. Which is never

Mark R

Right you are!

T C

you can use blue green environments

Mark R

(which always seem to turn red) :-)

T C

haha

D B

the diagram does not show how service to service interacton is done. we may need orchestration

Mark R

@DB - I'll talk about that in a bit

D B

ok.

M G

what is space based ?

Mark R

@MG - we will see that on ein a bit

R S

I feel some of them could be combined, no? Event-drive, for example, can be with microservice or monolith

A I

Data What about Data Duplication between these Databases and transaction processing problems in Microservices?

Y H

space is where data mirrored for you using data grid

Mark R

@RS - most typically these are combined into hybrids

R S

got it

A I

What about Data Duplication between these Databases and transaction processing problems in Microservices?

N L

but what if we start with modular monolith to ensure time to market and serve some users, then refactor to service based as client base growth and then to microservices. HAving production system will allow us to know how to achieve maximum cohesion

Mark R

My MS Class: see <https://www.oreilly.com/pub/au/3609>

N L

and optimise for performance since we will be able to monitor performance on priod

M A

how do we move from monolith dbs to Microservices DBs?

Y H

transaction better to be within the same microservice not outside it

Y H

small scope and code size

Mark R

12,345 tests

Mark R

214 fail

J K

revert and see if 214 still fail.

C E

Lots of work for the QA team

R S

total cost seems to be hand in hand with many of the others. The problem with testability in layered mono seems to be covered in Total cost in this case

V C

that's a good spot where you can say....let's take a step back and refactor a bit :). I'm a bit scared about the 'bit'

J F

the tests are still running :-) , not the result you wanted with your change

J A

Is this a distributed monolith? :)

T C

micro monolith

T C

I've inherited one in the past and it was a nightmare

C E

so if we see a project where the integration tests are too vast, is this an indicative of a decayed microservice architecture ?

Mark R

Service-based: <https://learning.oreilly.com/library/view/fundamentals-of-software/9781492043447/ch13.xhtml>

M A

is this a single physical database with multiple db for each components?

R S

that's a fantastic insight

R N

Can we move to space based -> service based -> microservices

H A

the components that needs scale/elastic can be converted to microservice...

Mark R

MTTS

M G

why microservices is rated low on performance ?

Mark R

network, security, data latency

M A

can that be improved using caching?

Mark R

yes indeed!

N L

highly dependent on design, if you've no data dependency between microservices these requests could be made in parallel

Mark R

Also co-service location, local network, Pod sharing, service consolidation, data domains, and...caching

Mark R

@NL - oh yes, then in parallel as well...

C E

Cloud vendors seem to over sell this architecture

Mark R

#CE - indded they do - that's one of my soapboxes

Mark R

@CE - all the positives, and no mention of the negatives...

M A

event driven has a cost implication, e.g., a Kafka farm managed service can cost a lot.

Mark R

Event-driven: <https://learning.oreilly.com/library/view/fundamentals-of-software/9781492043447/ch14.xhtml>

V C

many of the applications which say they do microservices, they actually do service based + separate databases

Mark R

@MA - yet another pitfall - yes, it is very costly to get right

Mark R

@MA - streaming I mean

M G

Do we apply CAP theorem to architecture styles ?

Mark R

@MG - CAP Theorem - see <https://www.developertoarchitect.com/lessons/lesson111.html>

T C

I like the product placement :P

M G

Thank you

Mark R

@MP - it really spans orthogonally to these architecture styles, but mostly impacts distributed styles

P M

you have to build compensation

Y H

Error queues

I M

shouldn't warehouse be triggered by both inventory-update and payment-update? If the user fails to pay, the inventory doesn't need to be updated no?

Mark R

@IM - depends on what the business rules - if payment fails, inventory would be replentished, which would send an event to the warehouse service

M G

will user be waiting till all the steps are completed ?

Y H

broker

A N

broker

K S

broker

Mark R

broker!

O B

broker has a higher performance because of lack of a potential bottleneck

R N

broker - lesser time spent in queue

D B

event driven is highly scalable and performance

Y H

Mediator add more network and orchestration

V C

broker should allow better performance / scalability. mediator should be easier to maintain

R S

is it a good practice to always keep a database warehouse with the streamed events?

Mark R

@RS - of course, it depends! But usually streaming is a popular choice for a data warehouse data pump

R N

Can we use event driven to communicate between microservices right ?

D B

combination of microservices and event driven is best i feel for going going gone

Mark R

tuple-space

Y H

database

J F

db

N L

depends on what they do

V L

cache!

Mark R

Space-based: <https://learning.oreilly.com/library/view/fundamentals-of-software/9781492043447/ch15.xhtml>

O B

that's radical...

T C

implementation is something like hazelcast?

N L

oh, that's scary. Data loss problems?

V L

Why this name is not popular --space based Architecture?

Mark R

Hazelcast, ignite, coherence, gemfire

M G

how about consistency ?

S v

So, space-based uses a data publish and subscribe messaging?

M A

what kind of dbs are suitable, dbms or nosql?

M A

\*rdbms

M W

is the first processing unit the master node? Only the first processing unit reads/writes to DB?

H A

are we "partitioning" data across various processing units so that not to replicate all the data? in that case how do we decide to which all Units to replicate?

M A

any practical example where this arch is used in our daily lives?

R S

It seems like using event-driven with dedicated memory database for each service and database being the event store

J K

JMeter!

R S

total cost: 2 ?

T C

Hazelscast is promoting this for continuous intelligence as they call it

M G

what are the steps to reach space based from monolith, monolith -> service-based -> microservices -> space-based

Mark R

Which one would you choose and why???

M A

Event driven

R S

hybrid xD

M A

I would start with service based and improve to add elements of Event Driven

R S

it's hard to choose only one without mixing benefits from the others

R S

hybrid of service-based and event-driven?

Mark R

Hint: Hybrids are okay!

T C

it also depends on the organisation

T C

the team structure, the expertise

T C

it is not just technology

J F

yup, the simplicity factor there is important

V C

I'd also go with a hybrid. The bid streamer could be implemented with space-based (as real time as possible, elasticity and scalability). The rest could work smoothly with event based, since you're already leveraging async communication for space-based

K S

service based + space based for some of those services that require that high elasticity, with performance charachteristics.

J F

I would go for a hybrid , service based for most of the things and the performance demanding parts event driven (online bid capturer ) ...

R S

Id go for event + space. It's clearly a system that needs performance, but at the same time needs availability. Events give that when using carried-state events, one service does not depend on each other to receive and respond to a request

V L

evert based are hard to support in production. You need good devops team!

O B

space-based has a testability too low for a critical applciation

Mark R

Bid

A N

bids

R N

bids

V L

winner

O B

remind please quickly why was the service-based voted off the island for the auction?

Mark R

Elasticity and scalability, plus single database

Mark R

and concurrency

Mark R

BUT, it might have been a good and responsible stepping stone

C E

Love the C4 framework

Mark R

@OB - if we were doing the FULL application, complete with the admin portion for creating auctions, scheduling, etc. then I would have added service based in, combined with some microservices and event driven

Mark R

(oh, and reporting)

O B

Thanks Mark!

M R

does event-based architecture needs a kafka type tool to maintain the source of event sequence=ing?

Mark R

@MR - no, not required for EDA - message brokers would work just as well.

Mark R

domain to architecture isomorphism

C E

the browser is a microkernel

Mark R

exactly!

M A

Eclipse ISE is microkernal

M A

\*IDE

Mark R

as are most of the dev tools we use - Jira, rally, PMD, jenkens, etc.

M A

correct!

Mark R

U.S. Tax Software is another good example

Mark R

BFF Pattern: <https://samnewman.io/patterns/architectural/bff/>

Mark R

@DR - hexagonal architecture is just a different way of doing microkernel. ports and adapters - the plug-ins become the adapters to ports, and the core system is the application domain. Same architecture!

D B

ok. thxs

Mark R

email-driven architecture antipattern: <https://www.developertoarchitect.com/lessons/lesson115.html>

A R

It looks like you're designing software architecture. How can I help? -- Clippy

J F

:D

J K

.\_.b

C E

I like the idea of targeting to have only one diagram, all other diagrams are auxiliary. One diagram to rule them all :)

N L

DACI

O B

this looks like a special kind of Jira ticket to me

V C

would it make sense to also load them to Git?

Mark R

covering your assets antipattern

Mark R

Groundhog day antipattern

Mark R

adr-tools (pryce)?

A R

<https://github.com/npryce/adr-tools>

T C

we have an architecture wide one and github pages to expose them

V C

cool. thanks a lot for the perspective

T C

wow this is great

R C

We lost your voice

R C

I can see the slides update

L F

What was the Michael term just used?

A R

Good on my end, might be you RC. :(

Neal F

@RC: refresh—it's good here

J F

all ok here also

Neal F

@LF: Michael Nygard

L F

TY

T C

off-topic question, but how do you keep getting better in architecture when you're working in a company where no many new architecture decisions need to be made? Do you leave the company?

Mark R

@TC - katas!

Mark R

Developer to architect: <https://www.developertoarchitect.com/>

T C

lol yes, you answered my question!

S M

Can technical product manager be a good software architect?

Mark R

Software Architecture Monday: <https://www.developertoarchitect.com/lessons/>

Mark R

Characteristics Workbook: <https://www.developertoarchitect.com/downloads/worksheets.html>

A T

Thank you Mark and Neal. This was great session.



Submit