A Brief Journey Through History - From Distributed Objects over SOA to Microservices

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https://icet-lab.eu

The Death Of Microservices?

David Mooter, Principal Analyst MAY 22 2023

https://www.forrester.com/blogs/the-death-of-microservices/

CLOUD SERVICES / MICROSERVICES / SERVERLESS

Return of the Monolith: Amazon Dumps Microservices for Video Monitoring

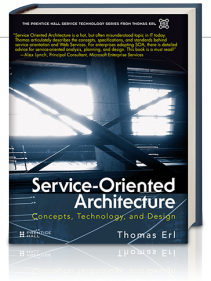
A blog post from the engineering team at Amazon Prime Video has been roiling the cloud native computing community with its explanation that, at least in the case of the video monitoring, a monolithic architecture has produced superior performance over a microservices and serverless-led approach.

May 4th, 2023 7:23am by Joab Jackson

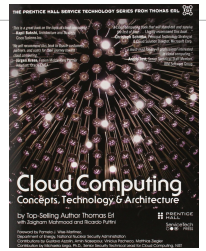
https://thenewstack.io/return-of-the-monolith-amazon-dumps-microservices-for-video-monitoring/

"You cannot understand what is happening today without understanding what came before."

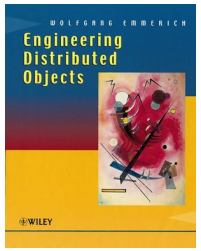
[Steve Jobs]



~2005

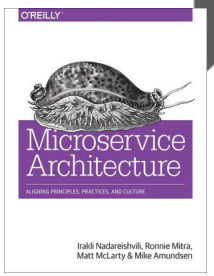


~2013

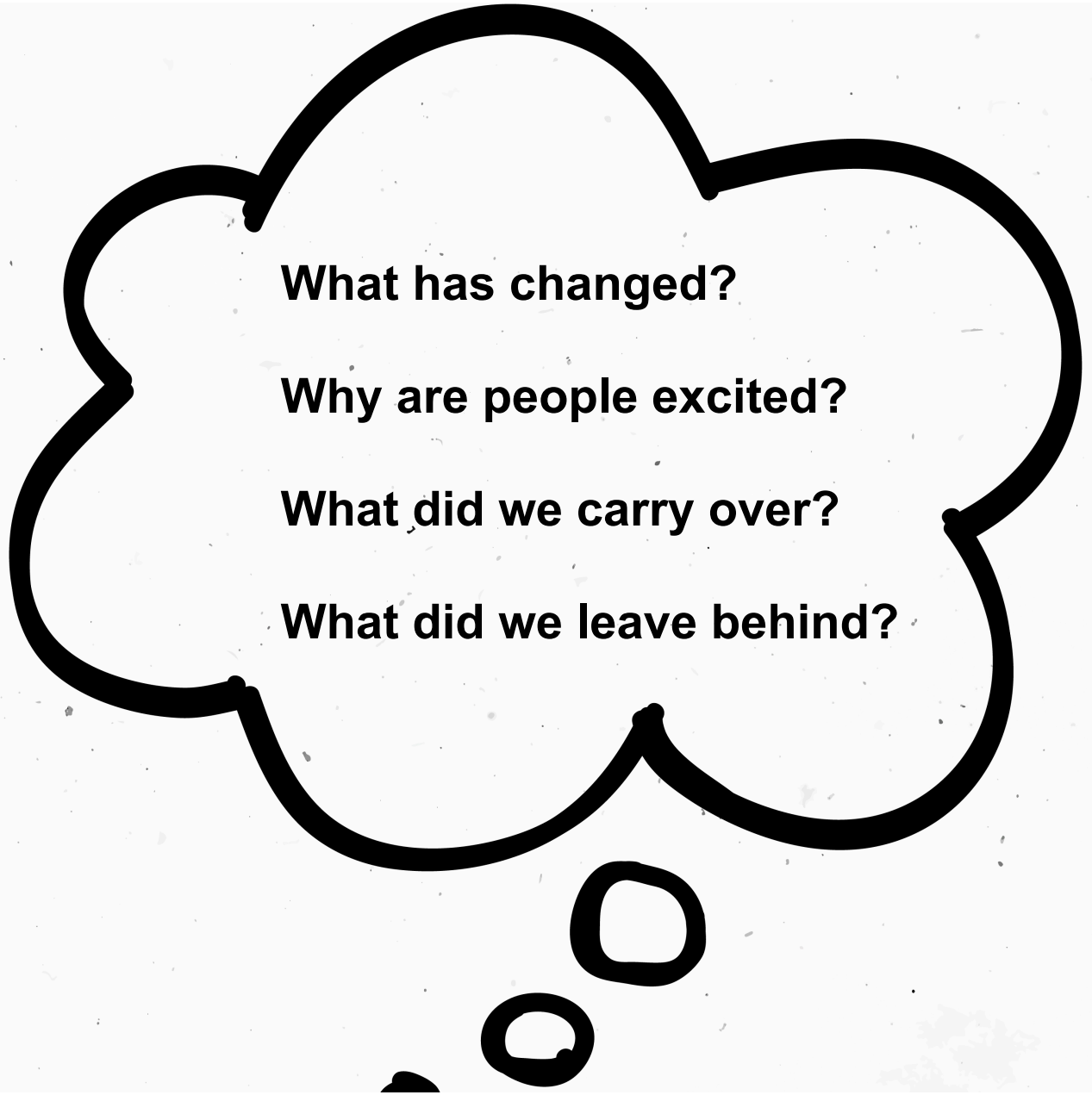


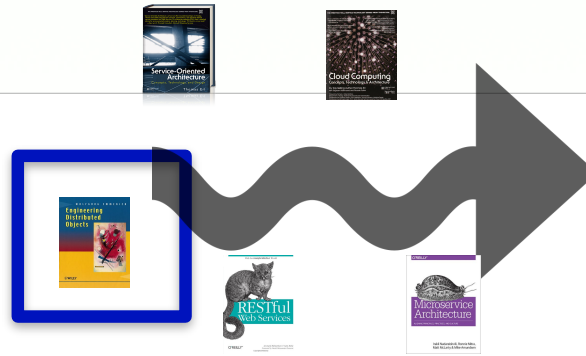
~2000

~2007



~2016


What has changed?
Why are people excited?
What did we carry over?
What did we leave behind?



Distributed Objects

~ 2000

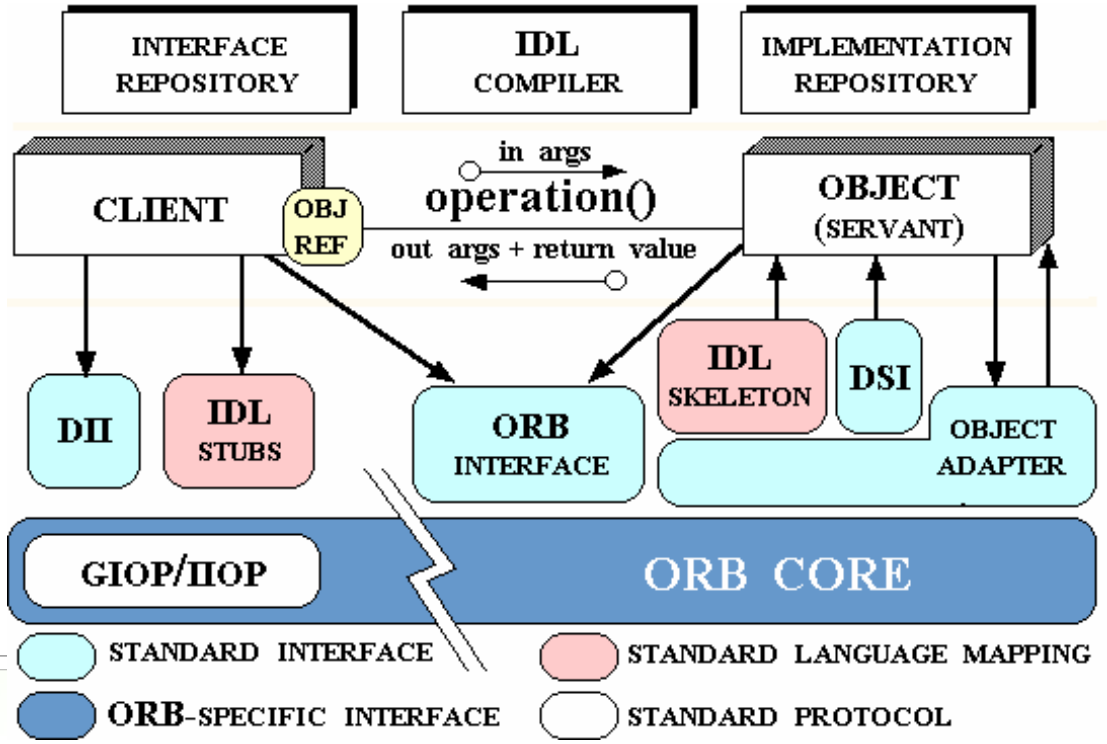
CORBA®

DCOM DISTRIBUTED COMPONENT OBJECT MODEL

Java RMI

Key idea:

Make invoking “objects” on remote servers look as similar as possible to calling a local object.



https://www.dre.vanderbilt.edu/~schmidt/corba-overview.html

Why were we excited?

“Build distributed systems without knowing anything about networks! ”

```
public class Client
{
  public static void main (String[] args) throws Exception {
    ...
    Hashtable env = new Hashtable();

    ...

    Context ic = new InitialContext(env);

    Hello hello = (Hello) ic.lookup(serviceURL + objectName);
    System.out.println(hello.helloWorld());
  }
}
```

Service-Oriented Architecture

(or: Web services)

~ 2005

What has changed?

What has changed?

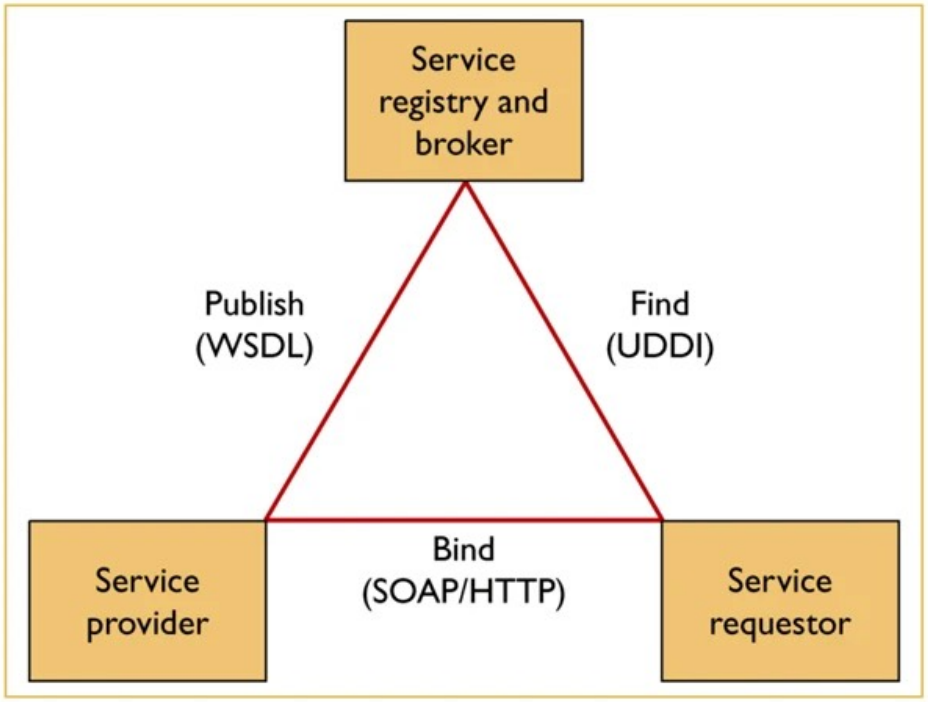
+

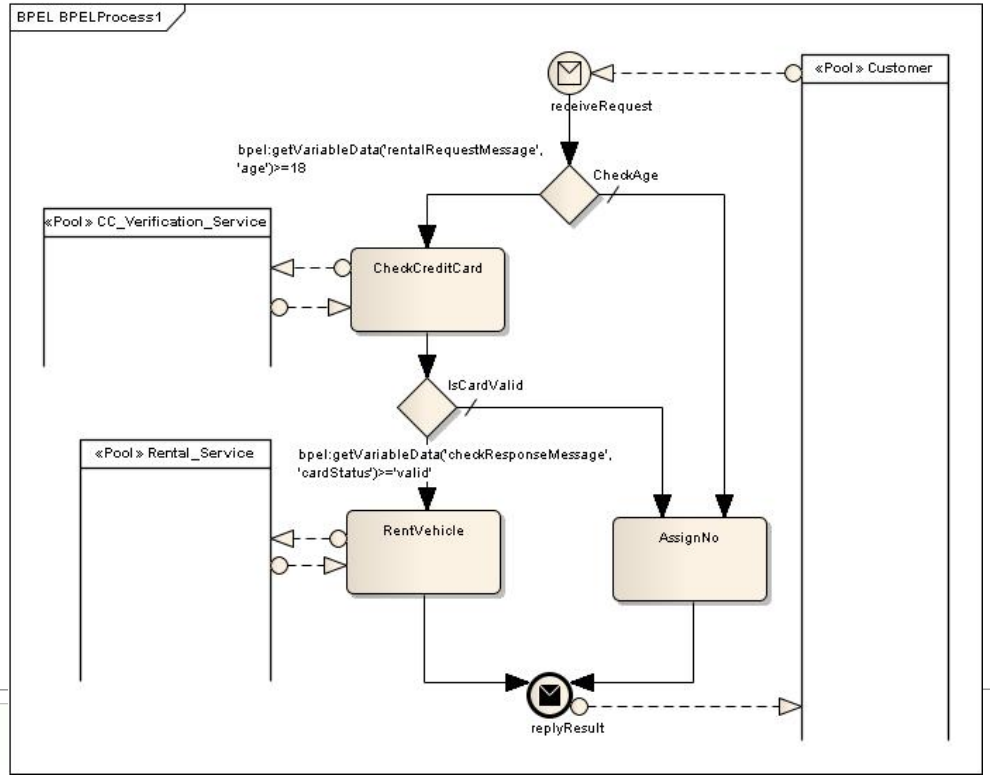
HYPE ENERGY®

Why were we excited?

https://community.sparxsystems.com/white-papers/617-89iconix-process-for-service-oriented-architecture-a-roadmap-for-soa-development-w-web-services

"Entire systems will be built by finding and composing pre-existing services. "





SOA was *all about* standards
WS-* So, so many standards

Subramanian R, K., Kumar Kattumannil, D.S. (2022). Enterprise Architecture. In: Event- and Data-Centric Enterprise Risk-Adjusted Return Management. Apress, Berkeley, CA. https://doi.org/10.1007/978-1-4842-7440-8_5

What did we carry over?

Lots of underlying concepts

Remoting, contracts,
language independence,
…

What changed?

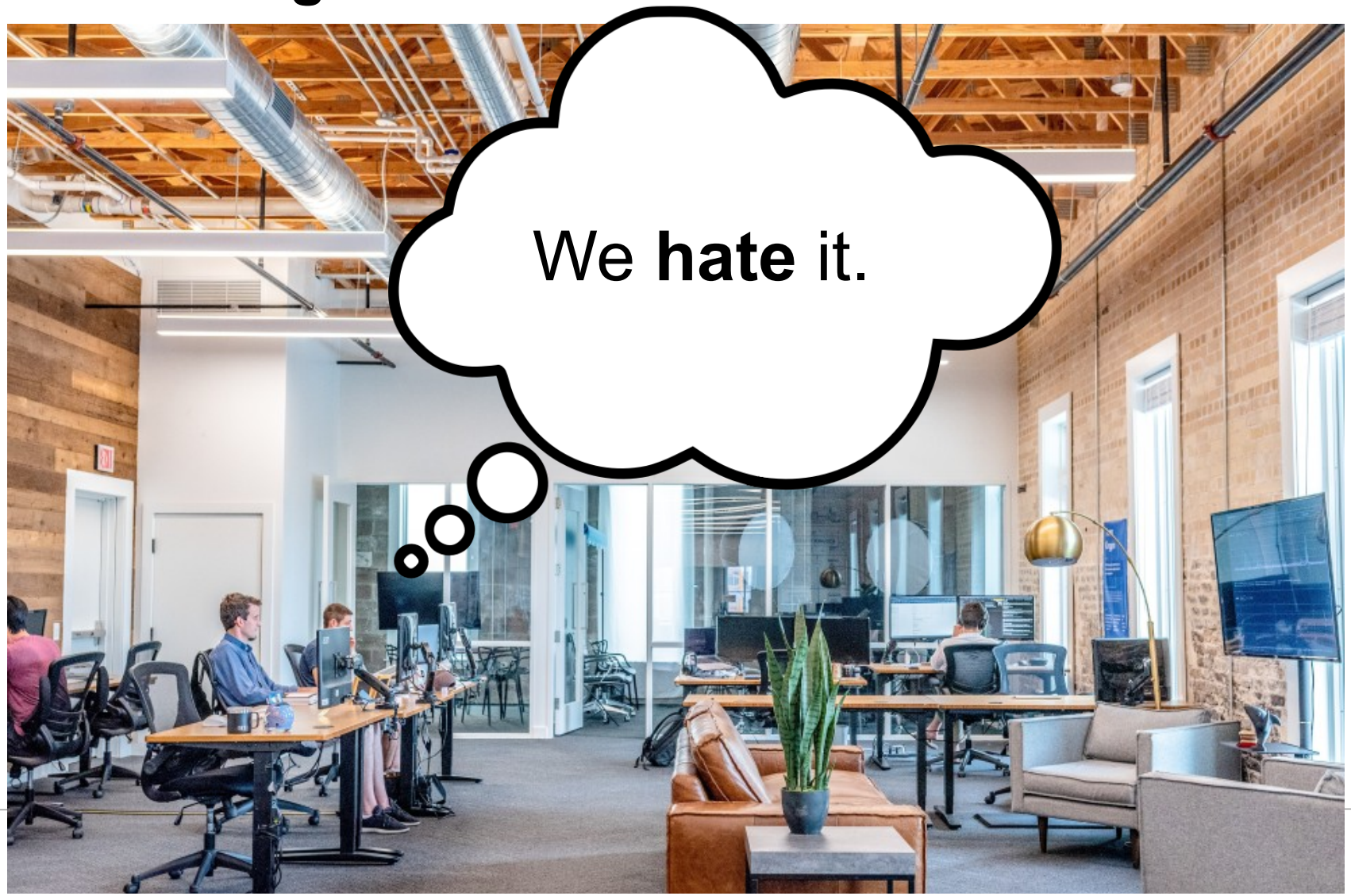
*Small objects turned into **big** services*
Technology turned into standards

REST
(or: “small” Web services)

~ 2007

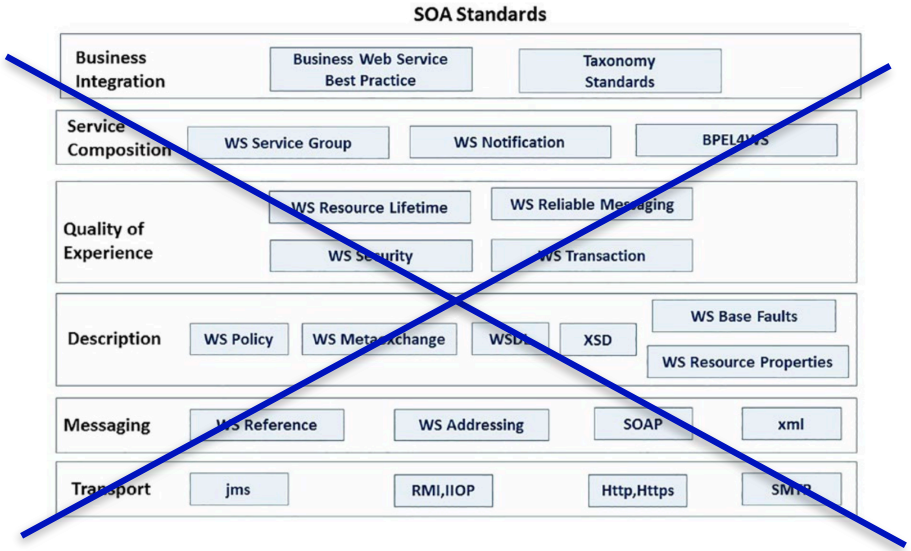
What has changed?

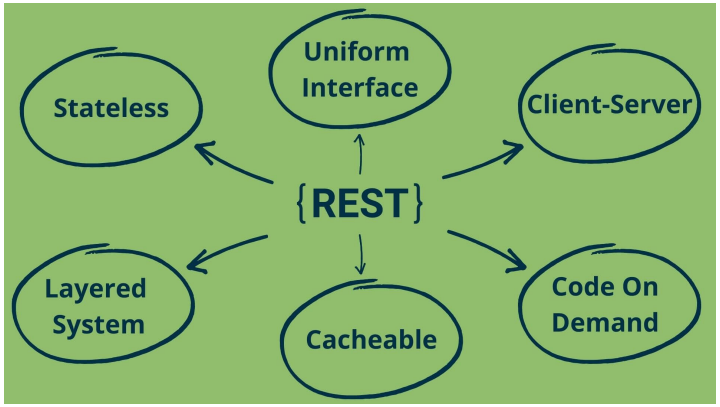
What has changed?



Why were we excited?

“WS- turned into HTTP / URI +*
six simple architectural principles. ”





What did we carry over?

Nobody doubted the value of service-orientation *per se*

What changed?

Implementation-wise - everything

REST is not like WS-*, but it's also not like Distributed Objects

Evolution Through Reduction

REST did not claim new features, nor (necessarily) better performance

REST was defined by what it **didn't** entail:

No interface description language (WSDL)
No communication protocol on top of HTTP (SOAP)
No deep-rooted connection to XML
(Almost) no standards

Aside: **Cloud Computing**

From ~ 2013 on

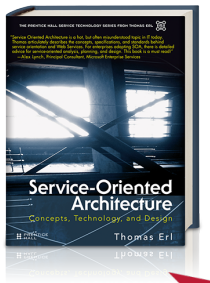
I am cheating … cloud computing isn't an evolutionary stage on the same scale at all.

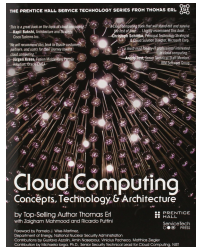
But it certainly **impacts** what came after.

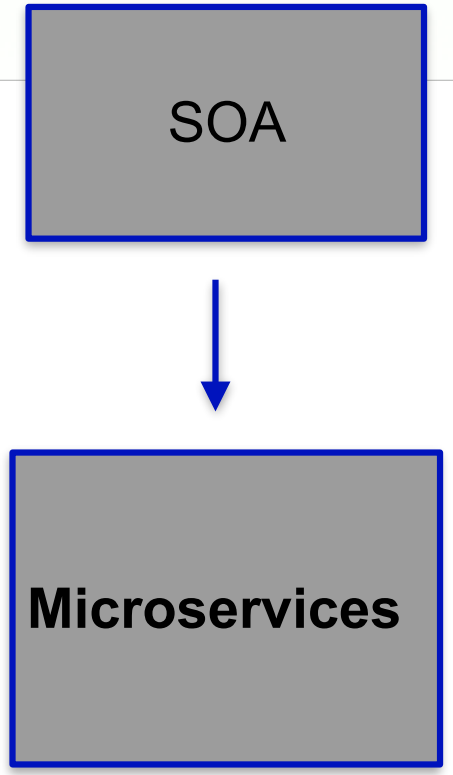
Microservices

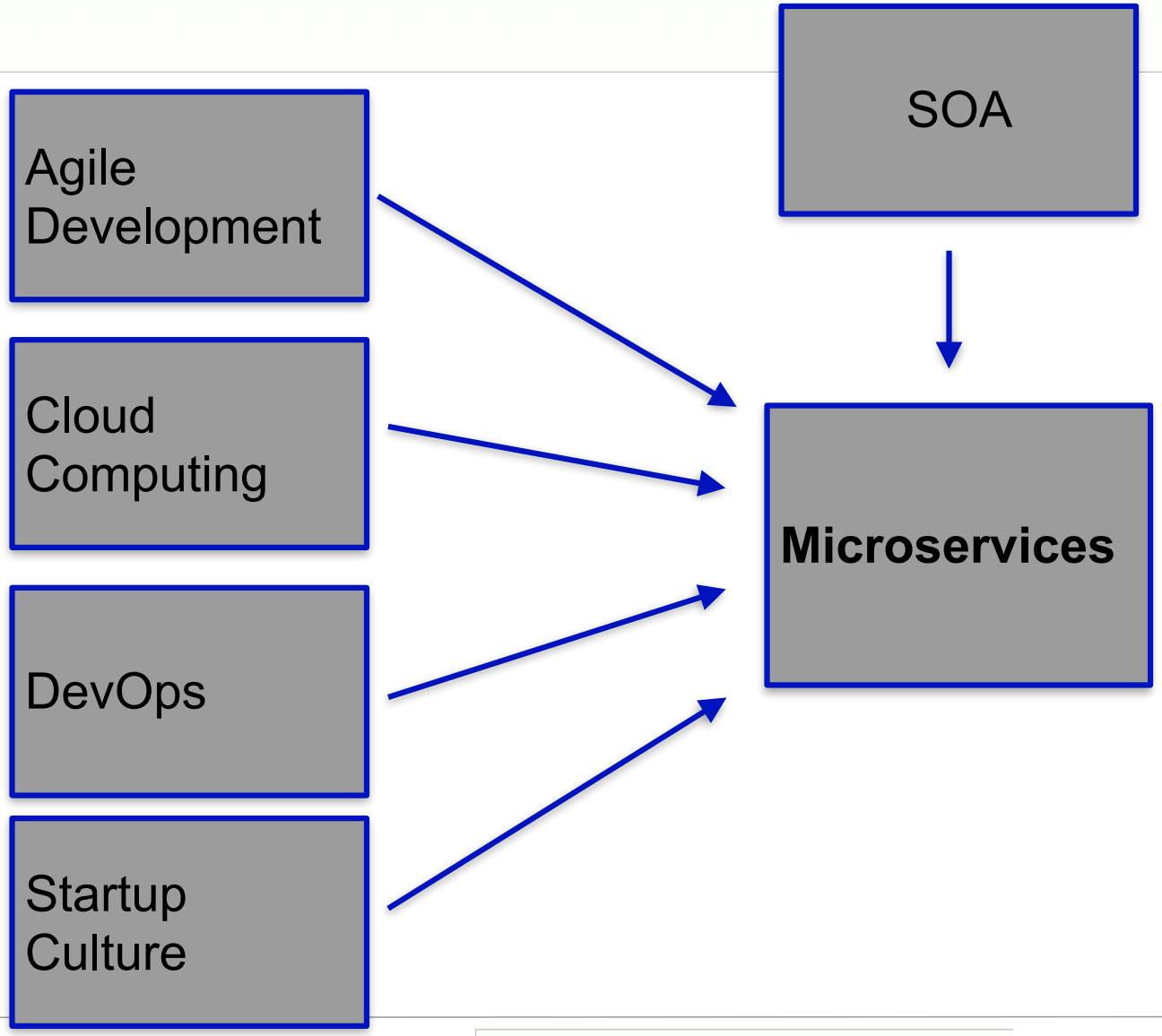
From ~ 2015 on

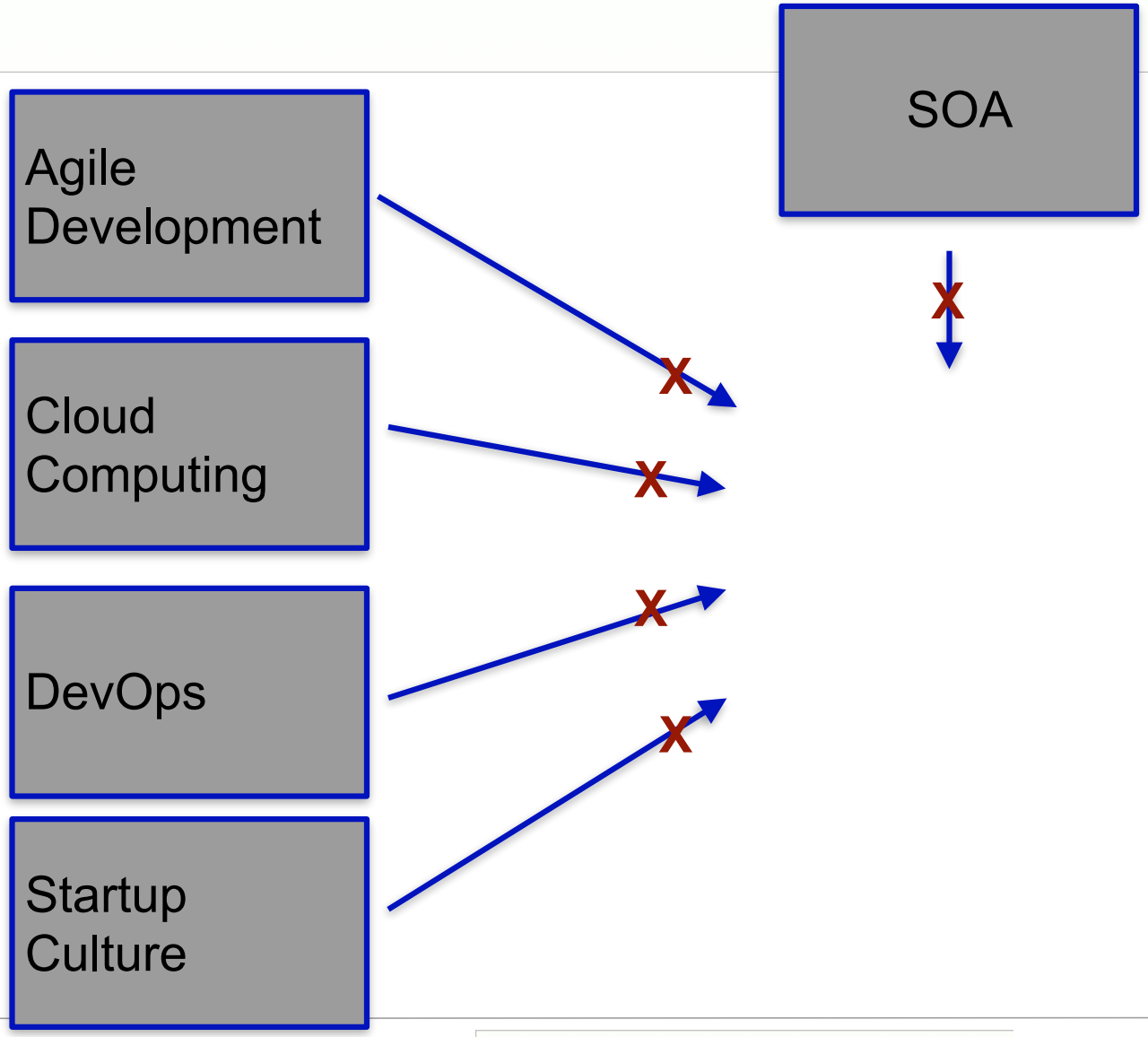
Microservices






SOA
Microservices


SOA
Agile Development
Cloud Computing
DevOps
Startup Culture
Microservices


SOA
Agile Development
Cloud Computing
DevOps
Startup Culture
X
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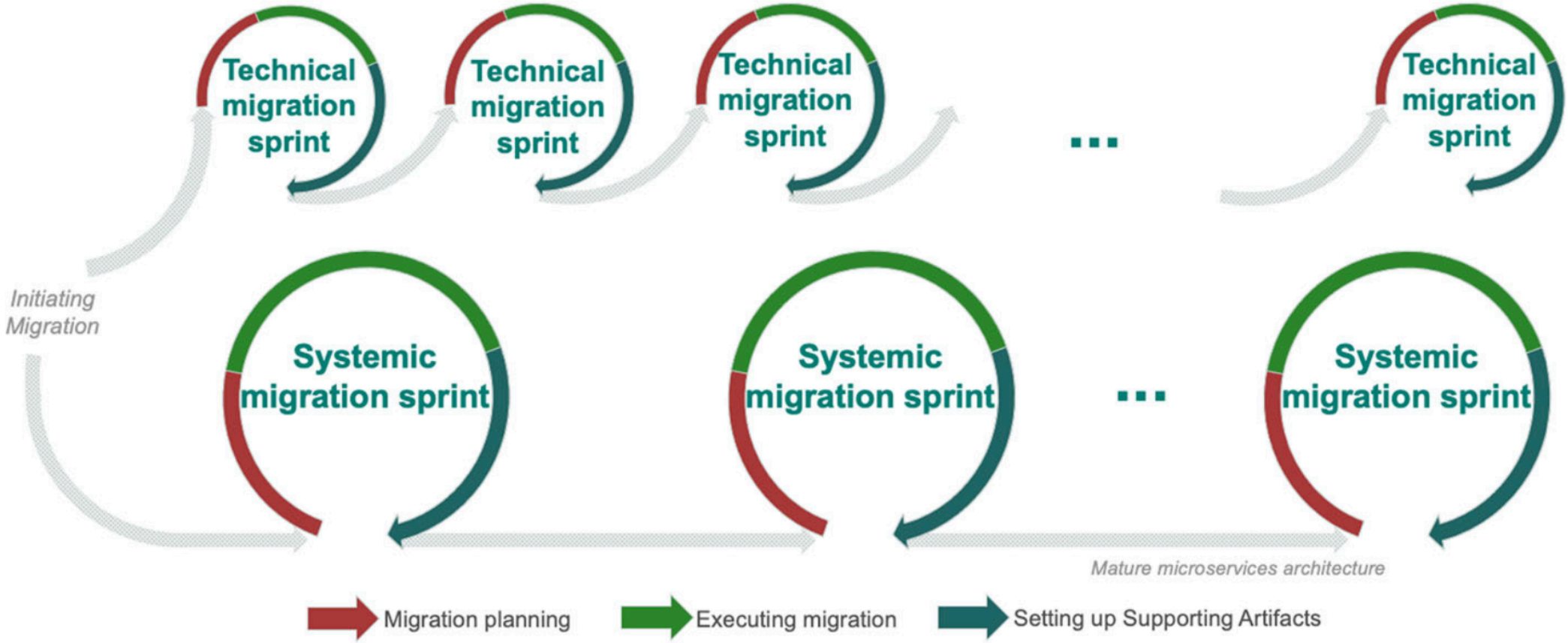
Are Microservices even about software architecture?

Three pillars:

Organization (2-pizza rule, Inverse Conway Manoeuvre)
Process & Delivery (Independent deployment)
Technical Architecture



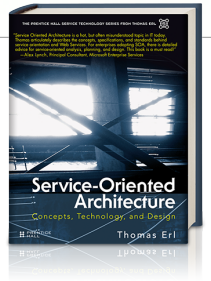
An empirical study of the systemic and technical migration towards microservices. Hamdy Michael Ayas, Philipp Leitner, and Regina Hebig. Empirical Software Engineering, May 2023

What did we carry over?

SOA concepts continue to remain intact
So do core REST ideas
    Focus on principles over standards

What changed?

Massive broadening of what is part of "architecture"



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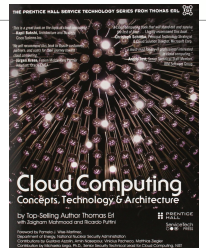
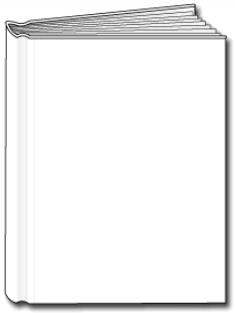


~2013



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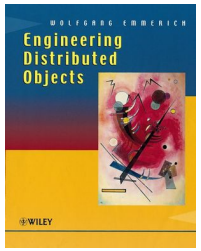

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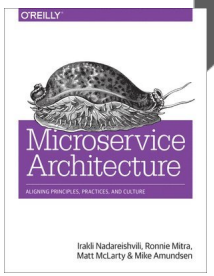
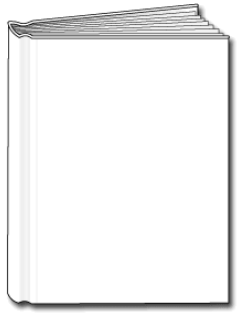


~2016



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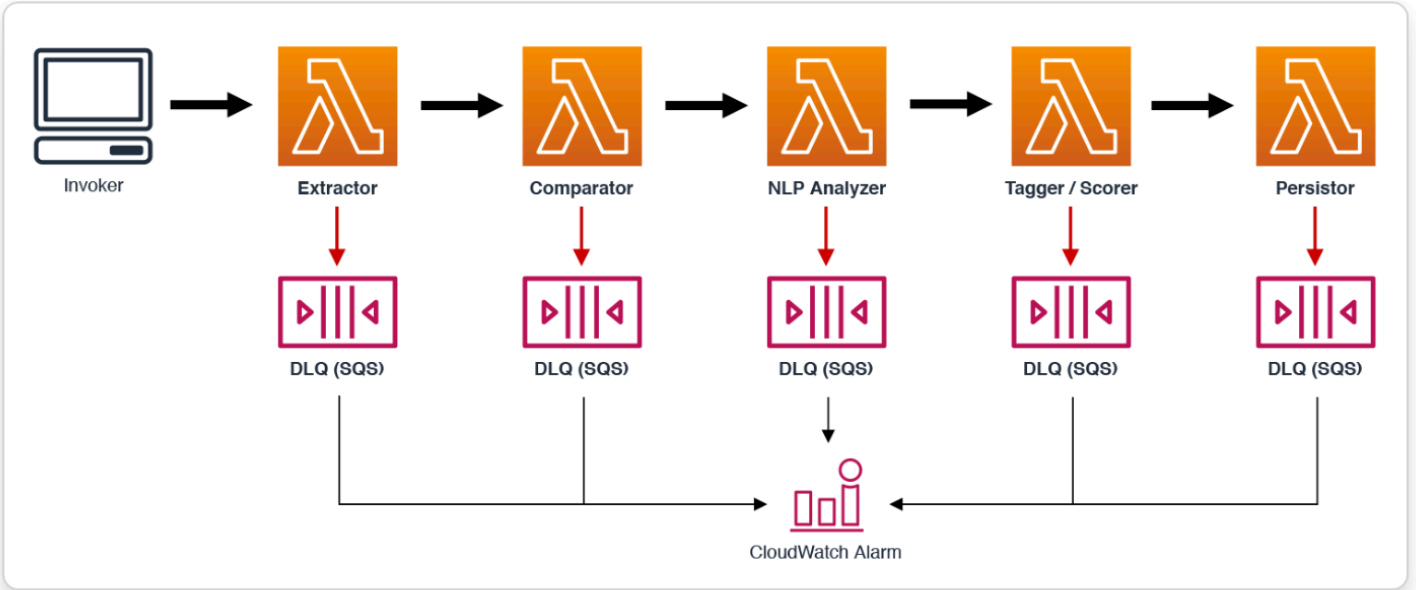
What are the next evolutionary steps?

Let’s look at some candidates …

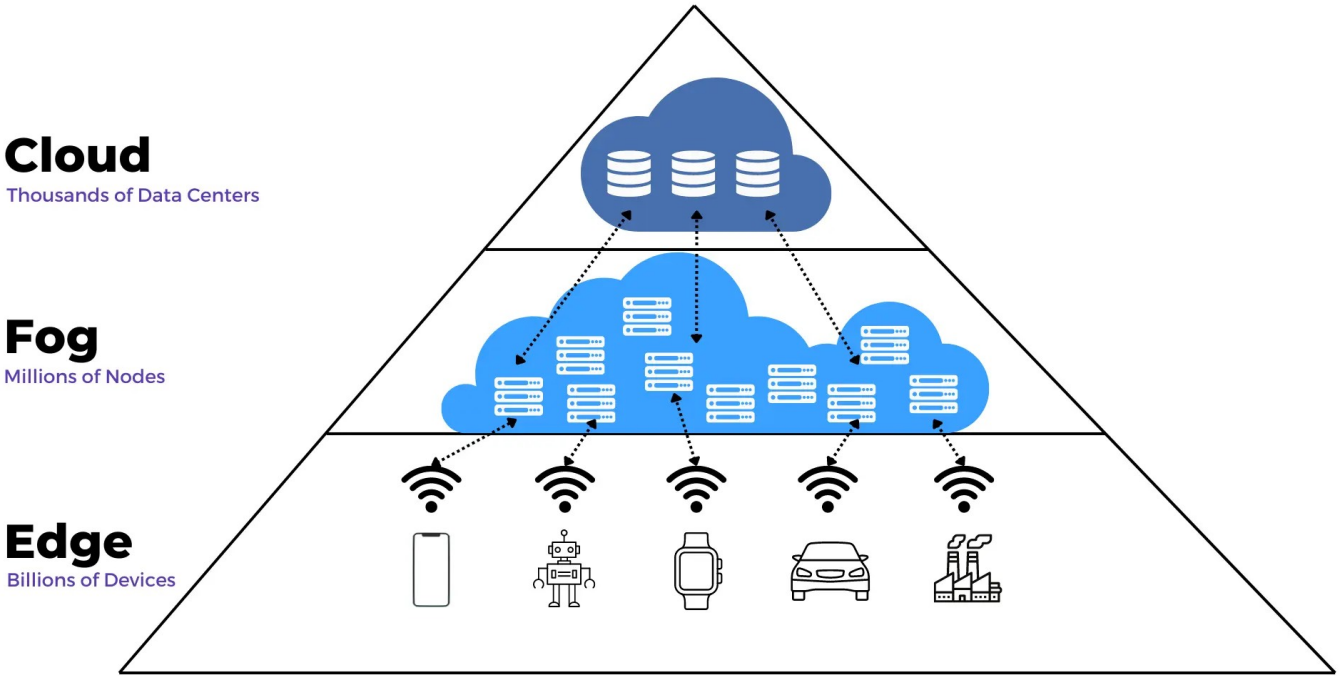
Serverless?

The return of service composition

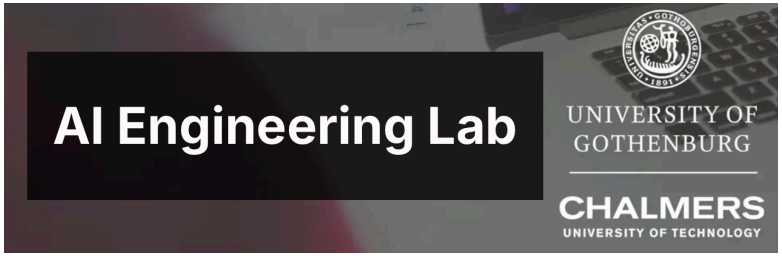


https://www.jeremydaly.com/the-dynamic-composer-an-aws-serverless-pattern/

Edge, Fog computing - Internet of Things?



AI engineering?



https://www.chalmers.se/en/projects/ai-engineering-lab/

ICEIS25-1B: Oral Presentations: Artificial Intelligence and Decision Support Systems

Friday, April 4th, 2025

10:45 - 12:45

Room Stanley Kubrick

https://us06web.zoom.us/j/82235035204?pwd=saaiis1wngdfUeELWMgdX5eu2jf4MG.1

CHAIR:

Silvia Regina Vergilio

PRESENTATIONS:

#100: Improving Large Language Models Responses with Retrieval Augmented Generation in Animal Production Certification Platforms

Speaker: Alencar Machado — Artificial Intelligence and Decision Support Systems

#273: Towards an Ontology-Based Approach for Enhancing Animal Sanitary Event Management

Speaker: Vinicius Maran — Artificial Intelligence and Decision Support Systems

#38: Modelling and Clustering Patterns from Smart Meter Data in Water Distribution Systems

Speaker: Mariaelena Berlotti — Artificial Intelligence and Decision Support Systems

#306: Using Large Language Models to Support the Audit Process in the Accountability of Interim Managers in Notary Offices

Speaker: Leonardo Marques — Artificial Intelligence and Decision Support Systems

Quantum computing?

Quantum Software Engineering: Roadmap and Challenges Ahead

JUAN M. MURILLO, JOSE GARCIA-ALONSO, and ENRIQUE MOGUEL, Universidad de Extremadura, Spain
JOHANNA BARZEN and FRANK LEYMANN, University of Stuttgart. Institute of Architecture of Application Systems, Germany
SHAUKAT ALI, Simula Research Laboratory, Norway
TAO YUE, Beihang University, China
PAOLO ARCAINI, National Institute of Informatics, Japan
RICARDO PÉREZ-CASTILLO, IGNACIO GARCÍA RODRÍGUEZ DE GUZMÁN, and MARIO PIATTINI, University of Castilla-La Mancha, Spain
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ANTONIO BROGI, University of Pisa, Italy
JIANJUN ZHAO, Kyushu University, Japan
ANDRIY MIRANSKYY, Toronto Metropolitan University, Canada
MANUEL WIMMER, Johannes Kepler University Linz, Austria

So … are Microservices “dead”?

So … are Microservices “dead”?

No, we just got used to many of the key ideas

DevOps, cloud-native, …

References

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Cloud Computing: Concepts, Technology & Architecture. Thomas Erl, Ricardo Puttini, and Zaigham Mahmood. Prentice Hall Press, USA. ISBN: 978-0-13-338752-0. May 2013.

Microservice Architecture: Aligning Principles, Practices, and Culture. Irakli Nadareishvili, Ronnie Mitra, Matt McLarty, and Mike Amundsen**.** O'Reilly Media, Inc. ISBN: 978-1-4919-5625-0. August 2016.