SOA, Microservices and Cloud-Native

Diego Pacheco

About Me

- ❑ Cat's Father
- ❑ Principal Software Architect
- ❑ Agile Coach
- ❑ SOA/Microservices Expert
- ❑ DevOps Practitioner
- ❑ Speaker
- ❑ Author

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Diego Pacheco

Building Applications with Scala

Write modern, scalable, and reactive applications with the power of Scala

Packt>

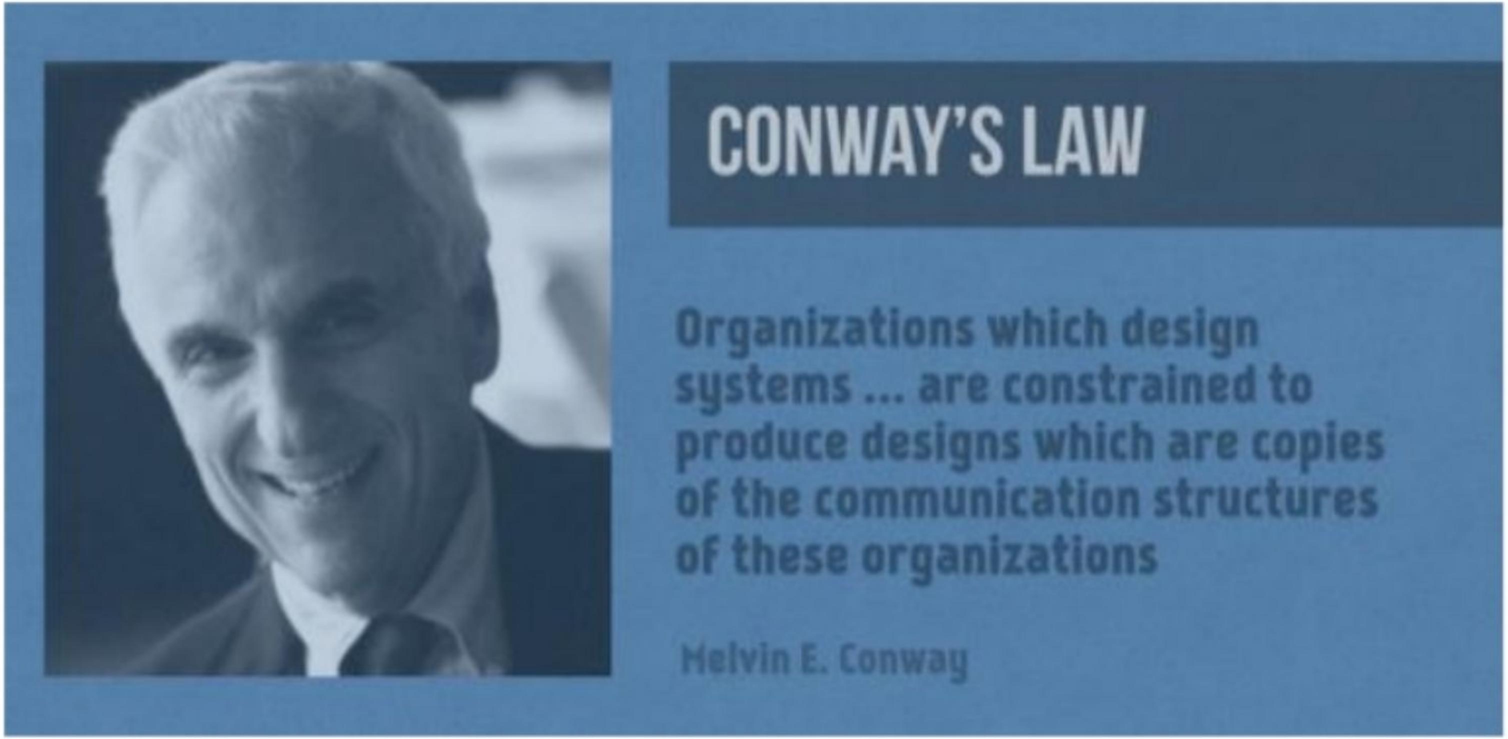
Diego Pacheco

Building Effective Microservices

Explore microservices and their implementation hands-on

Packt>

Architecture == Biz

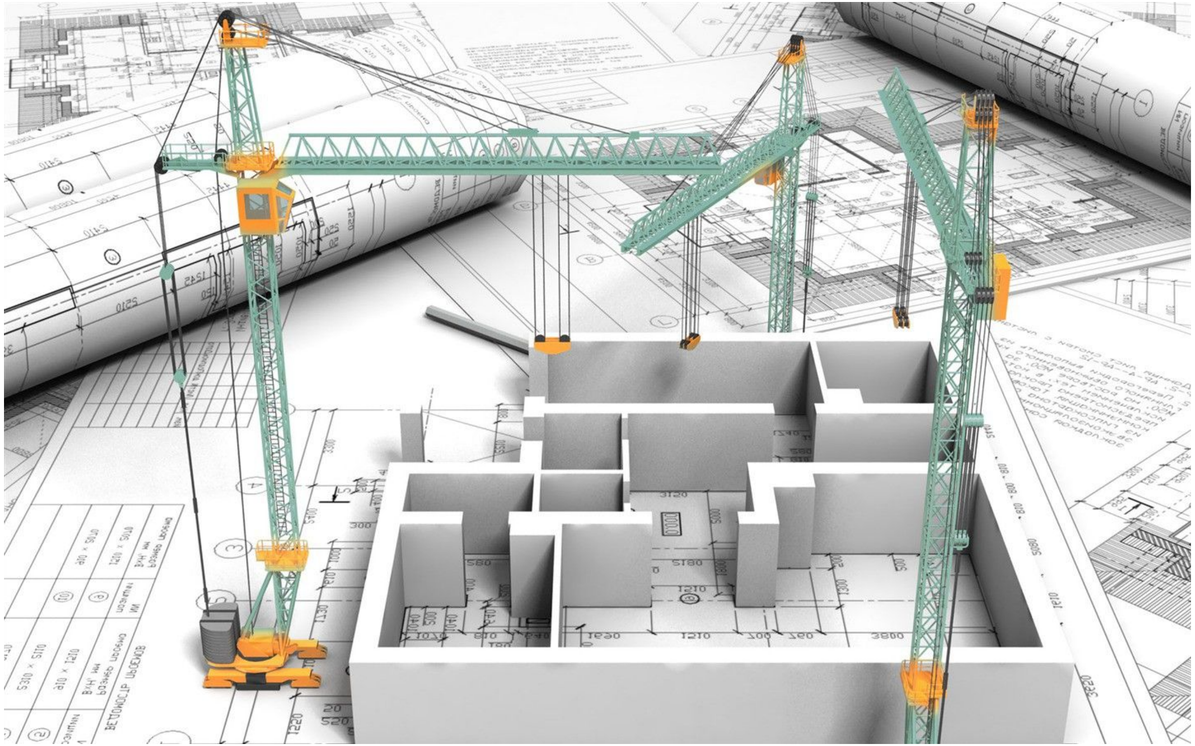


CONWAY'S LAW

Organizations which design systems ... are constrained to produce designs which are copies of the communication structures of these organizations

Melvin E. Conway

Architecture

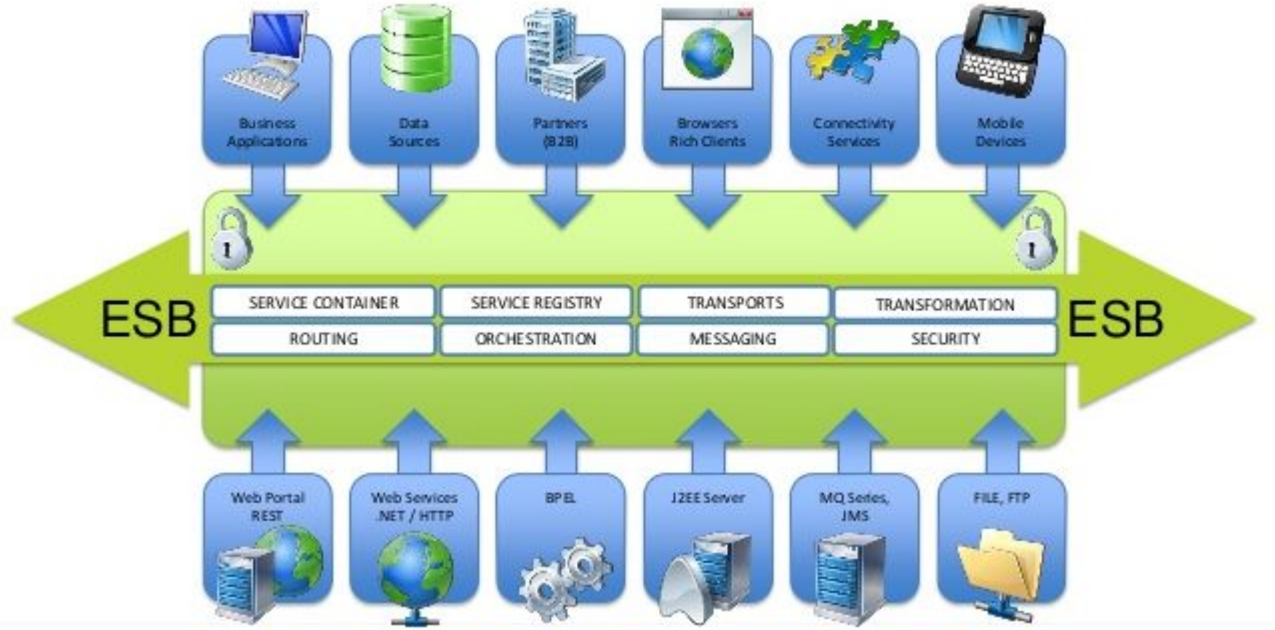


- Requirements
- Shape, Form, Function
- Scale:
  - Users
  - Developers
- Non-Functional Req
  - Performance
  - Scalability
  - Testability
  - Reliability
  - Availability
- Trade offs | Decisions

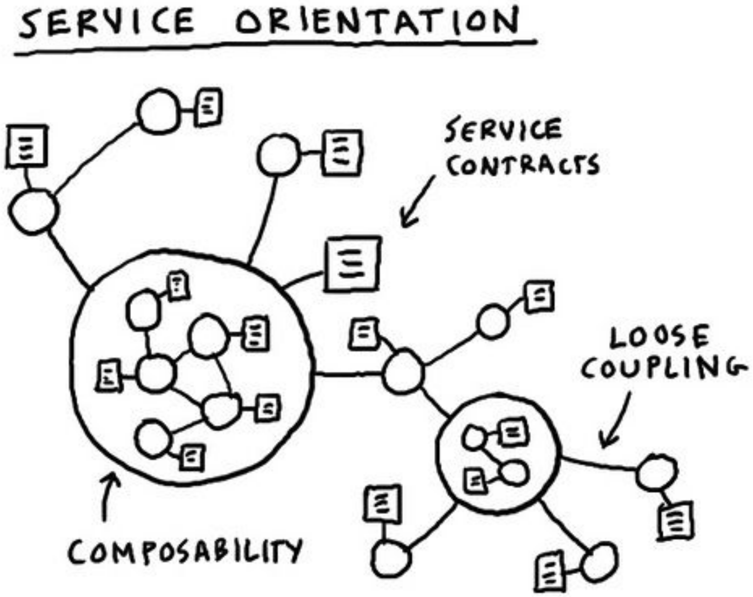
Bare Metal

- There are some issues:
  - Hardware Failures
  - Up-to-front-cost
  - Often is hard to get hardware due corp policies
  - Often people don't do hardware upgrades as much frequent
  - Can get very complex deal with directly hw/sw
- Virtualization was one of the first steps towards improvement
- Software was created and design consider hw/sw reality
- Bare Metal and Cloud are different worlds
- You can port some App to the Cloud "As-IS"

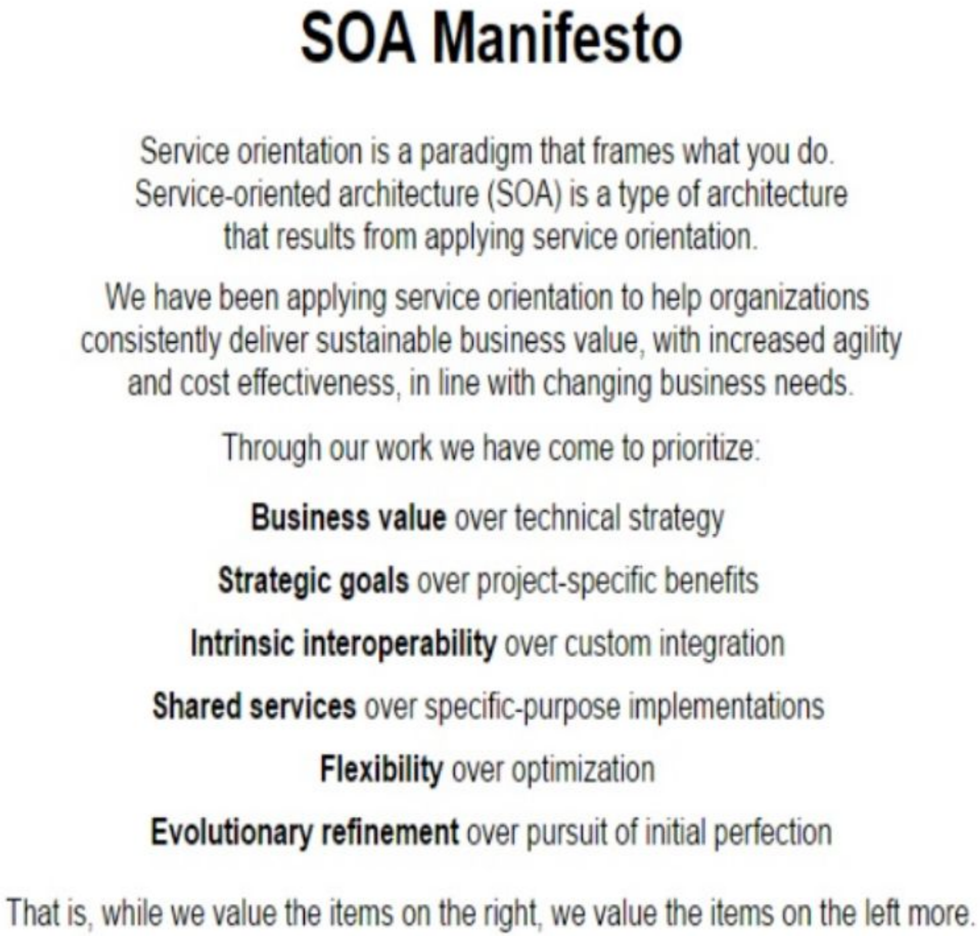
SOA is not about ESB



SOA - Service Oriented Architecture



- ❑ Bigger than:
  - ❑ Web Services (SOAP, REST)
  - ❑ Exposure
- ❑ Services
- ❑ Biz Function
- ❑ Contracts
- ❑ Versioning
- ❑ Backward Compatibility
- ❑ Governance not process
- ❑ Reuse by Design not accident
- ❑ It's about Principles



SOA Manifesto

Service orientation is a paradigm that frames what you do.
Service-oriented architecture (SOA) is a type of architecture
that results from applying service orientation.

We have been applying service orientation to help organizations
consistently deliver sustainable business value, with increased agility
and cost effectiveness, in line with changing business needs.

Through our work we have come to prioritize:

Business value over technical strategy

Strategic goals over project-specific benefits

Intrinsic interoperability over custom integration

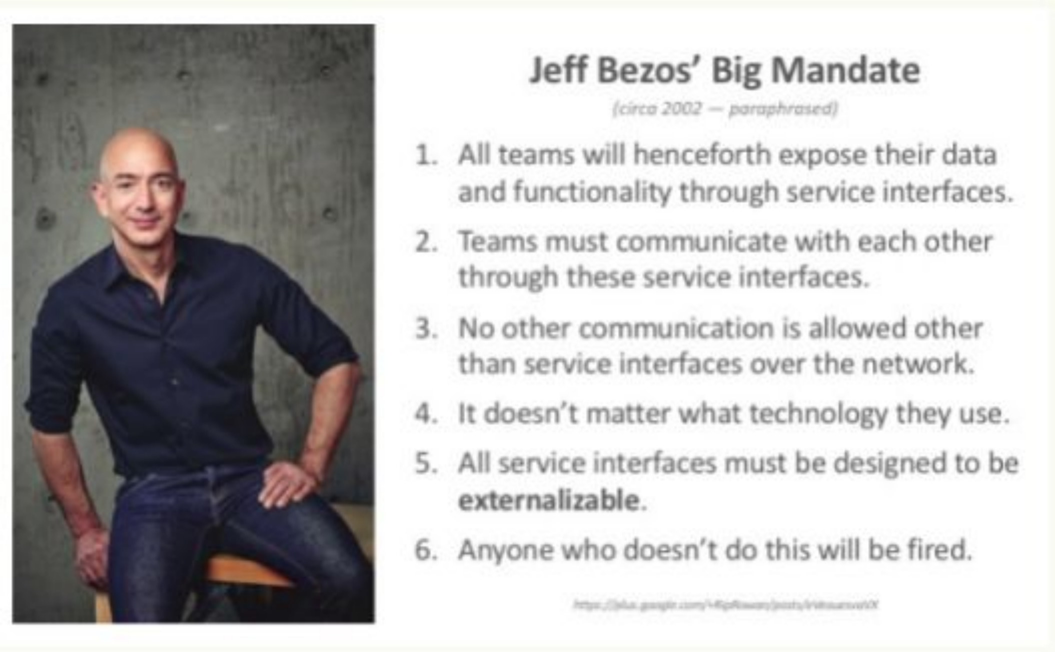
Shared services over specific-purpose implementations

Flexibility over optimization

Evolutionary refinement over pursuit of initial perfection

That is, while we value the items on the right, we value the items on the left more.

SOA or DIE!



Jeff Bezos' Big Mandate

(circa 2002 — paraphrased)

1. All teams will henceforth expose their data and functionality through service interfaces.
2. Teams must communicate with each other through these service interfaces.
3. No other communication is allowed other than service interfaces over the network.
4. It doesn't matter what technology they use.
5. All service interfaces must be designed to be **externalizable**.
6. Anyone who doesn't do this will be fired.

https://plus.google.com/+RipRowan/posts/eVeouesvaVX

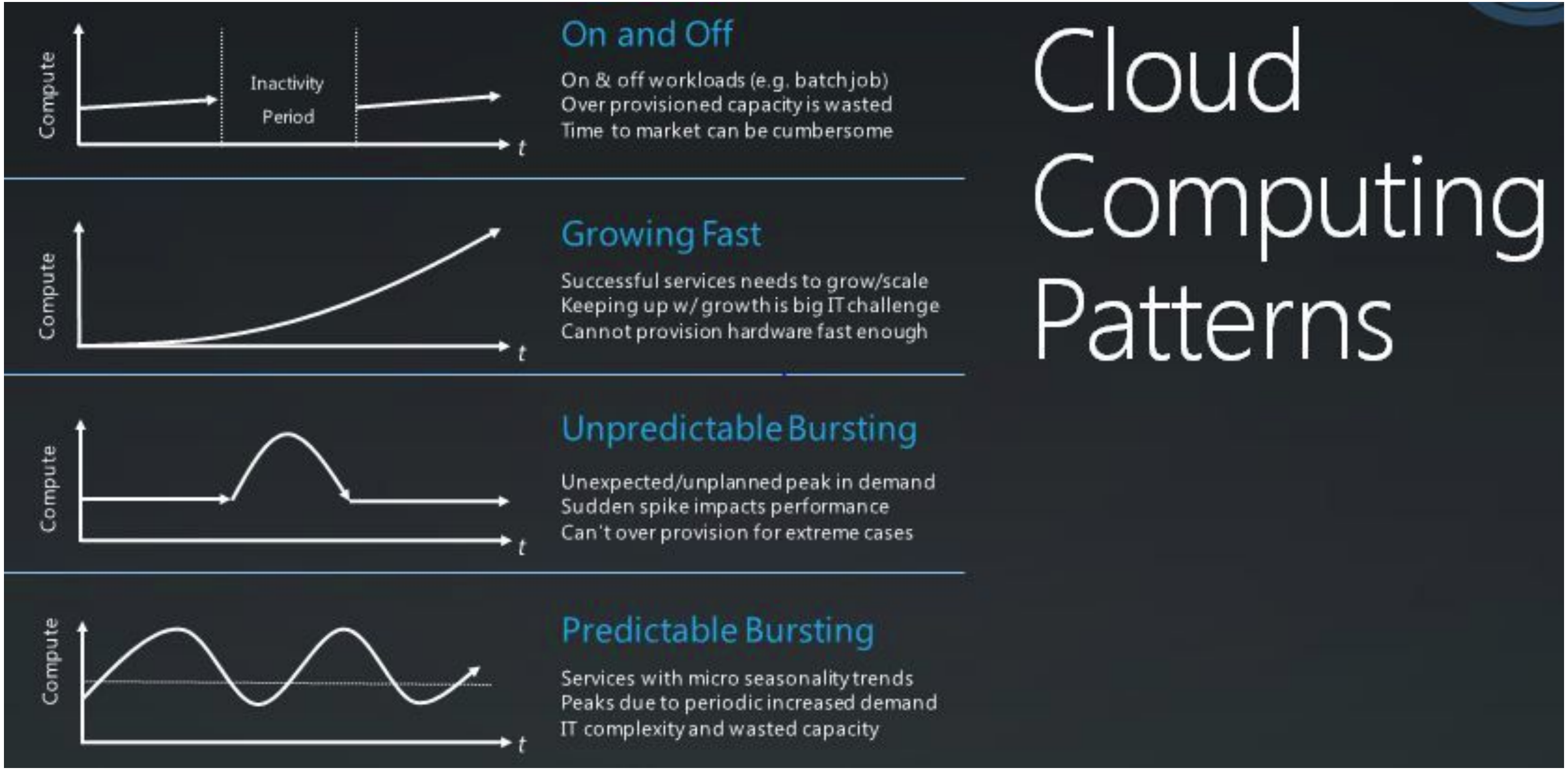
Monolith

- ❏ Everywhere!
- ❏ All the sw in 1 place
- ❏ Big Problems:
  - ❏ Hard to Maintain
  - ❏ Hard to Scale
  - ❏ Reliability Issues
- ❏ Pros:
  - ❏ Easy to Understand
  - ❏ Less Infrastructure work

Cloud

- ❏ Spacial Space (Credit Card)
- ❏ Elastic
- ❏ Auto-Scaling
- ❏ Distributed
- ❏ Hardware become sw via API

Handle the Load



Cloud Computing Patterns

On and Off

On & off workloads (e.g. batch job)
Over provisioned capacity is wasted
Time to market can be cumbersome

Growing Fast

Successful services needs to grow/scale
Keeping up w/ growth is big IT challenge
Cannot provision hardware fast enough

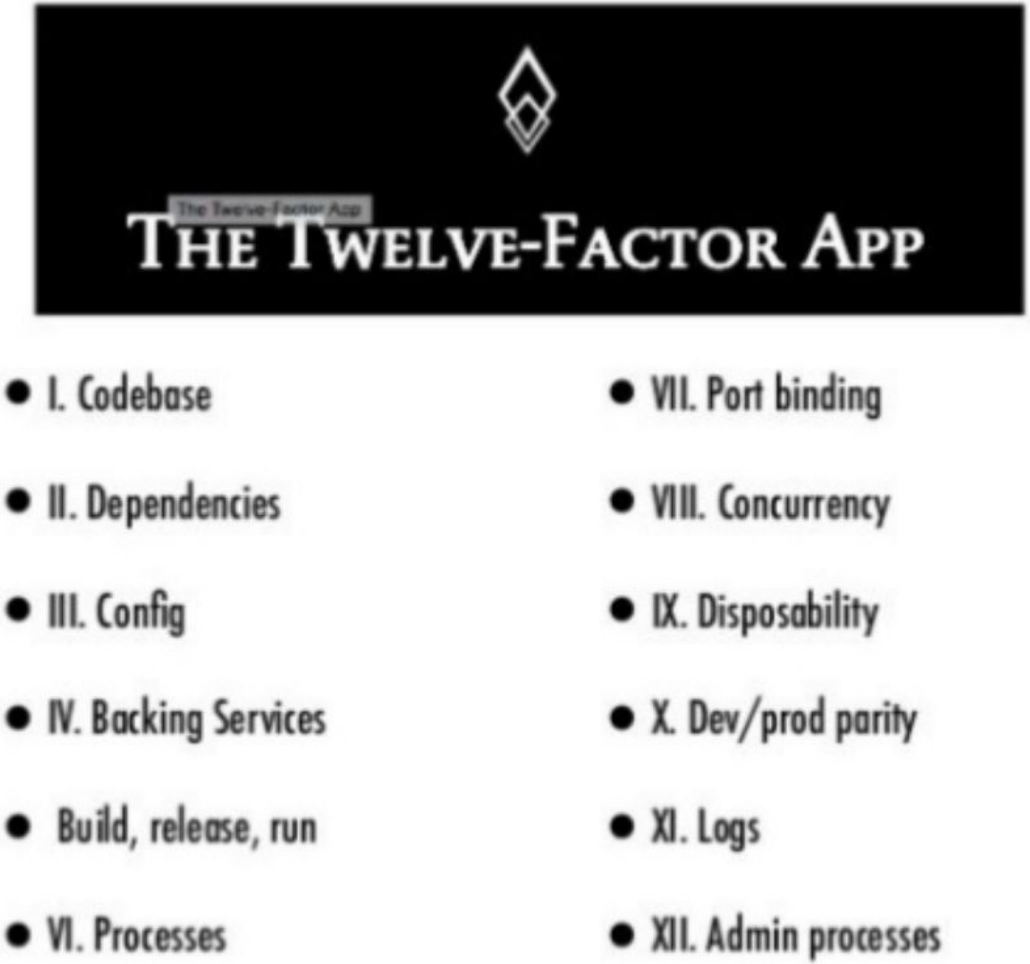
Unpredictable Bursting

Unexpected/unplanned peak in demand
Sudden spike impacts performance
Can't over provision for extreme cases

Predictable Bursting

Services with micro seasonality trends
Peaks due to periodic increased demand
IT complexity and wasted capacity

12 Factor



THE TWELVE-FACTOR APP

- I. Codebase
- II. Dependencies
- III. Config
- IV. Backing Services
- Build, release, run
- VI. Processes
- VII. Port binding
- VIII. Concurrency
- IX. Disposability
- X. Dev/prod parity
- XI. Logs
- XII. Admin processes

Microservices Are SOA!

MICRO SERVICES VS SOA

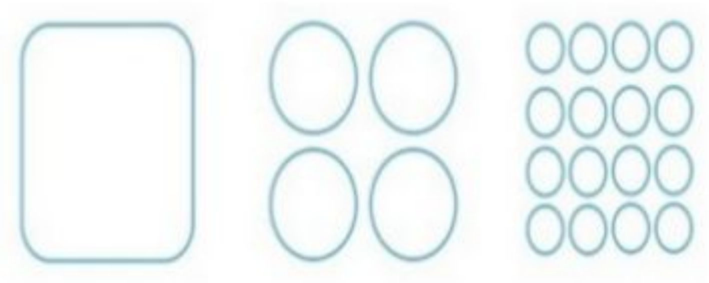
Micro services is a specific flavour of SOA. Due to unique features, it deserves a name.

Martin Fowler

http://martinfowler.com/articles/microservices.html

Microservices Are SOA!

Monolithic -> SOA -> MicorServices



- ❑ Small Granularity
- ❑ ISOLATION

Microservices: Cases - Benchmark

NETFLIX

~600 microservices

amazon.com

~150 microservices para uma página

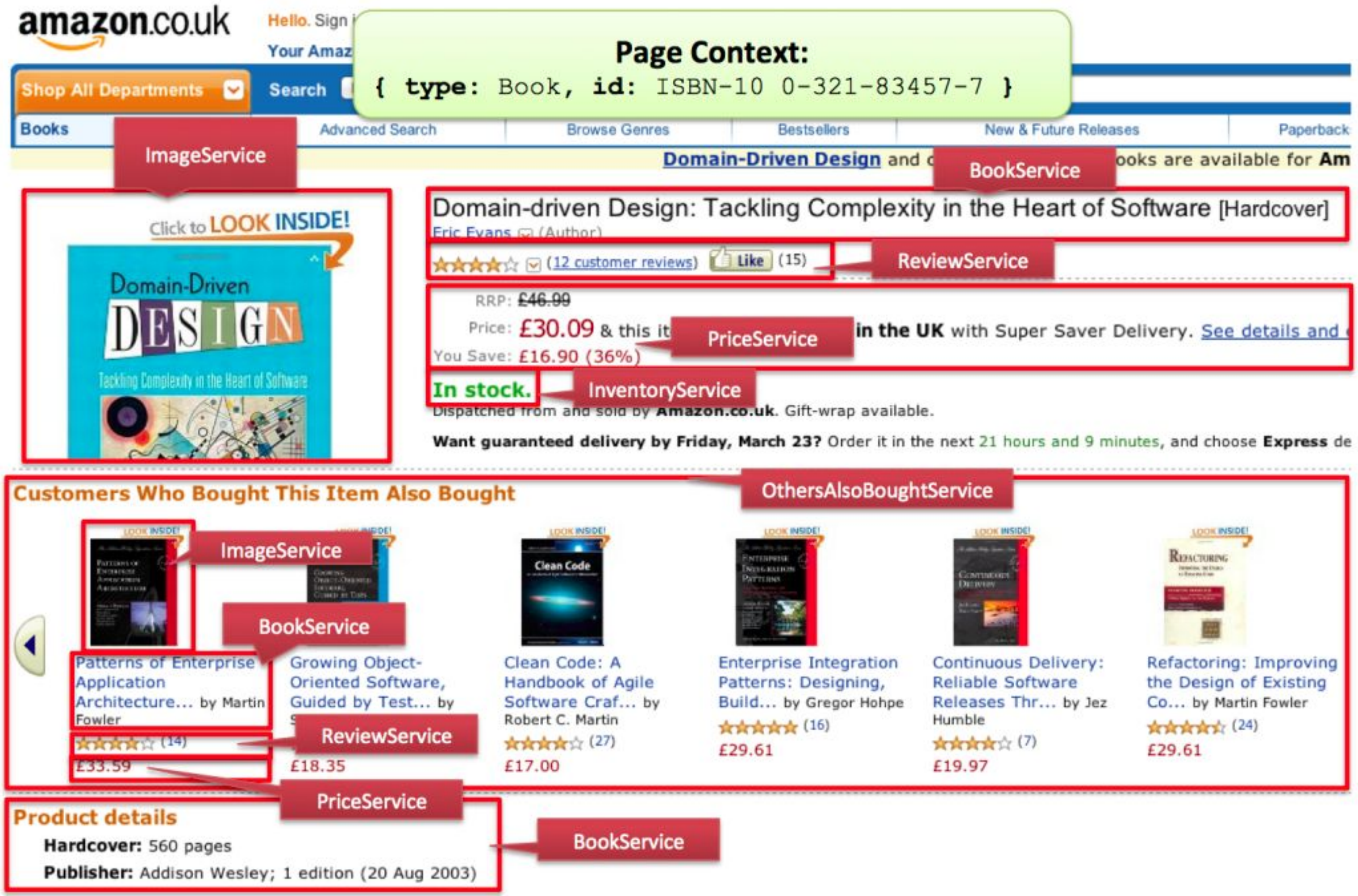
GROUPON

twitter

ebay

HAIL O

GILT



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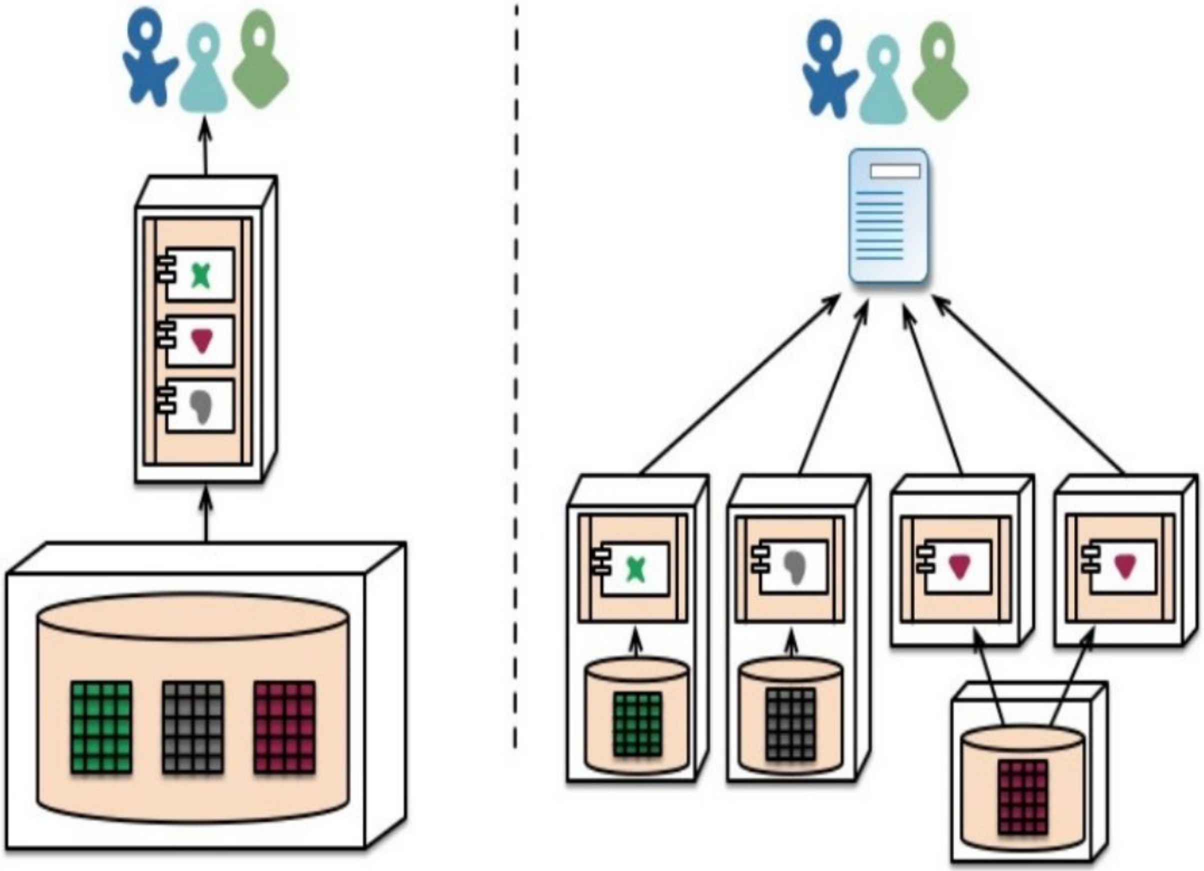
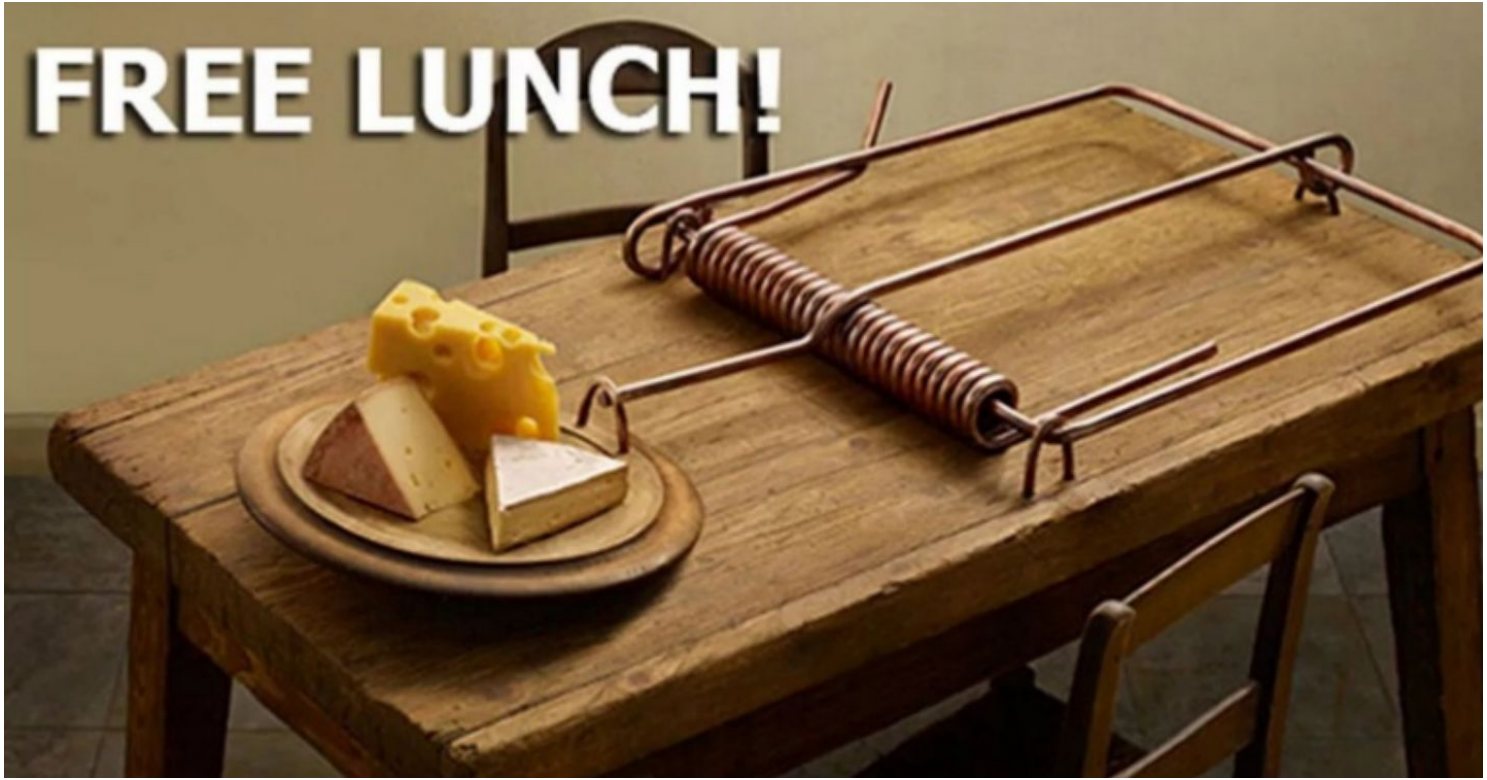


monolith - single database

microservices - application databases

Microservices require DevOps Engineering

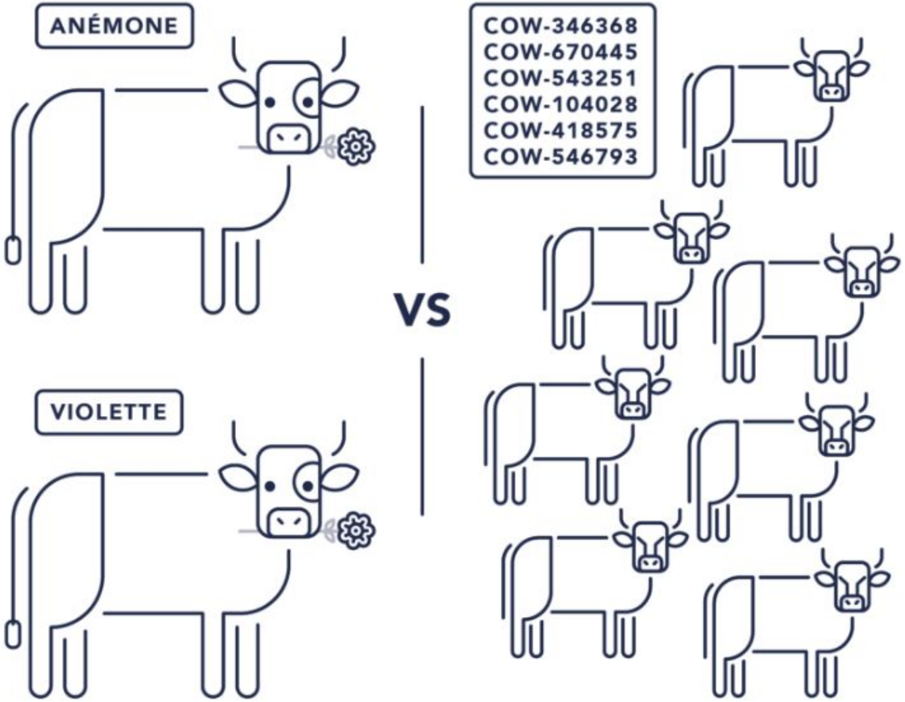


Monolith, Lifts-n-Shift don’t take the best from the cloud - You need go Natively!

Everything fails, all the time.

— Werner Vogels —

Cloud-Native: New Thinking!



Discoverability

etcd

DNS
Domain Name System

NSQ
BILLIONS AND BILLIONS OF MESSAGES SERVED

nsqlookupd

ConfD

NETFLIX

Eureka

JGroups

Curator

Consul

SERF

airbnb
Travel like a human.

Synapse

Nerve

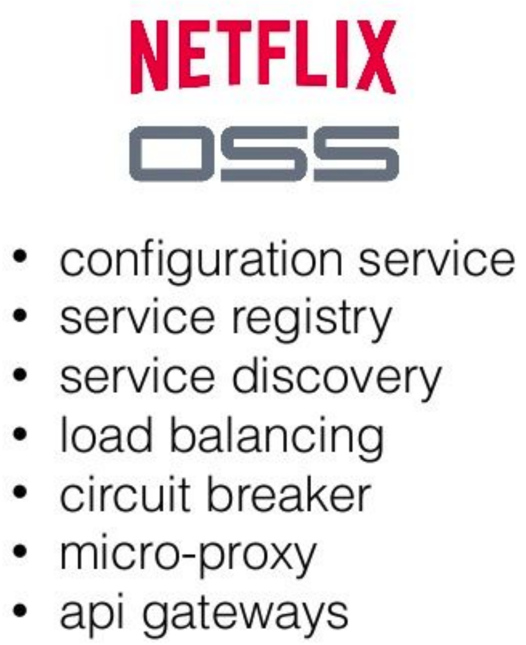
DoozerD

Cloud-Native Stacks

cloud

NETFLIX

OSS



NETFLIX

OSS

- configuration service
- service registry
- service discovery
- load balancing
- circuit breaker
- micro-proxy
- api gateways

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