CMPE 282 Cloud Services
Microservices

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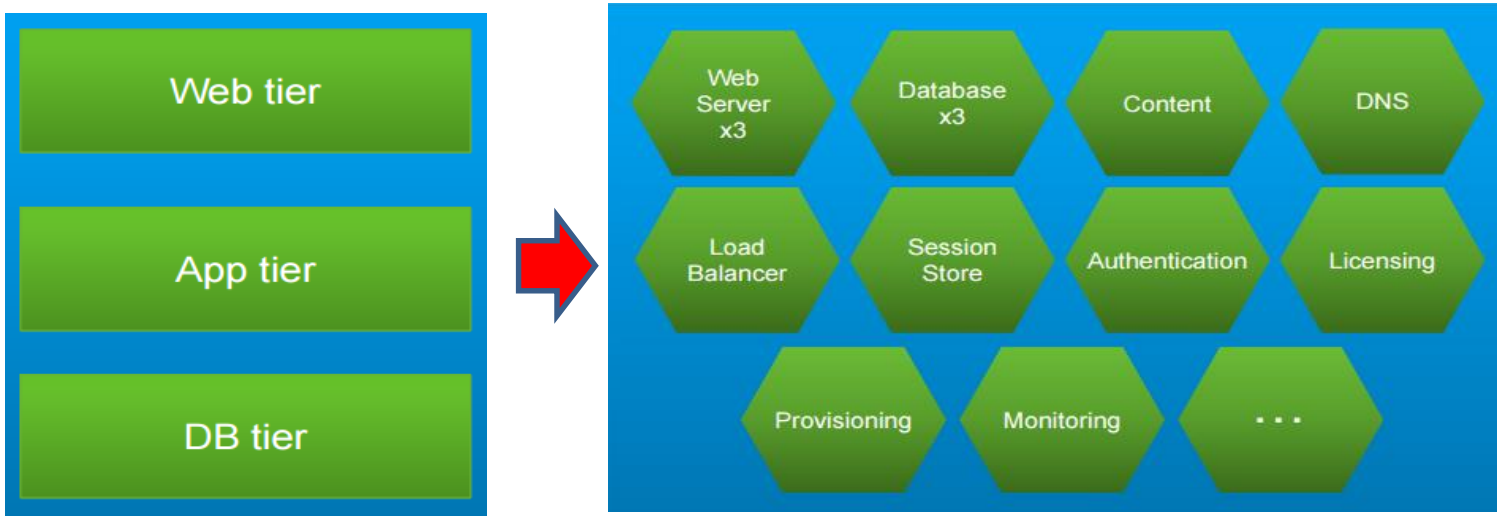
Content

- What is Microservices
- Characteristics
- Potential Concerns

Microservices

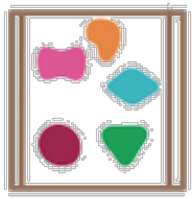
http://martinfowler.com/articles/microservices.html

- a single app == a suite of small services
  - each running in its own proc and communicating with lightweight mechanisms, often an HTTP resource API
  - Services built around business capabilities and independently deployable by fully automated deployment machinery
  - bare minimum of centralized management of these services, which may be written in different programming languages and use different data storage technologies

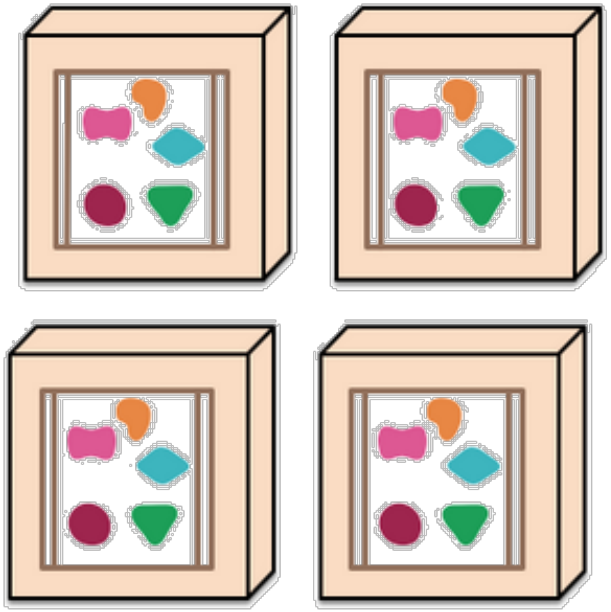


Monoliths vs Microservices

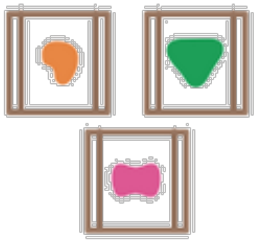
A monolithic application puts all its functionality into a single process...



... and scales by replicating the monolith on multiple servers



A microservices architecture puts each element of functionality into a separate service...



... and scales by distributing these services across servers, replicating as needed.

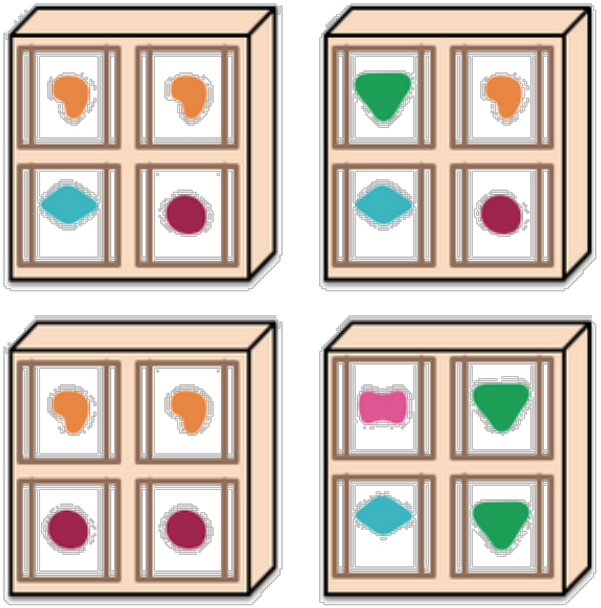
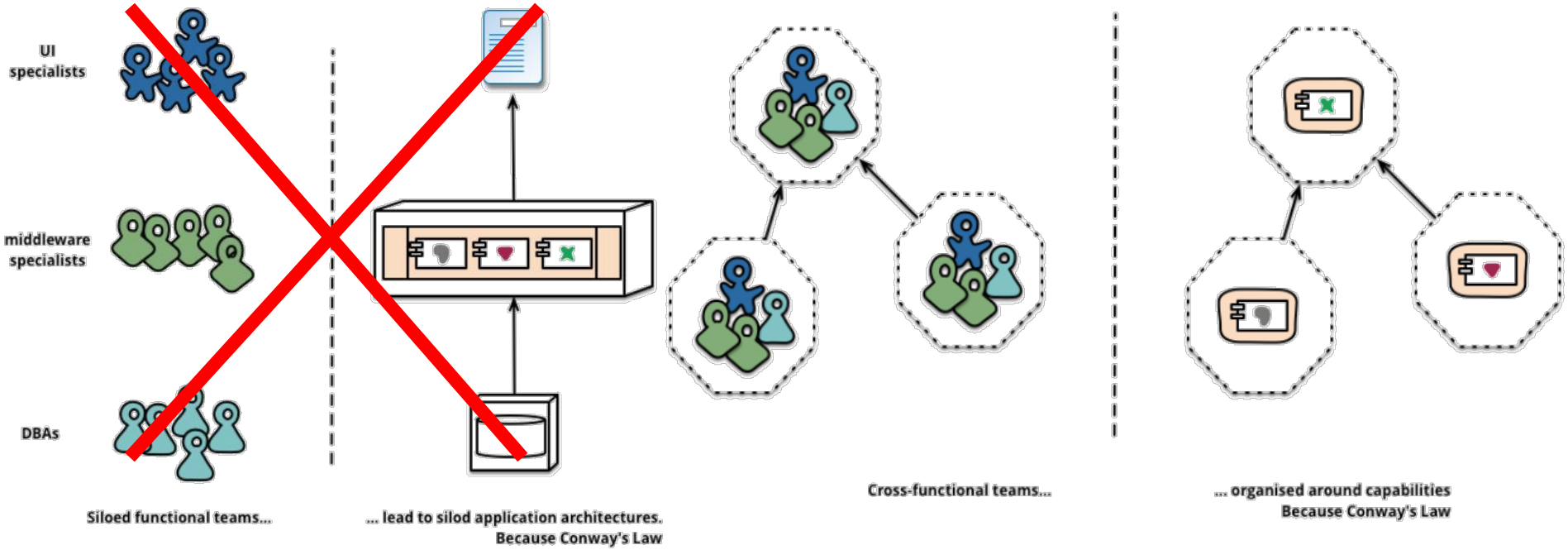


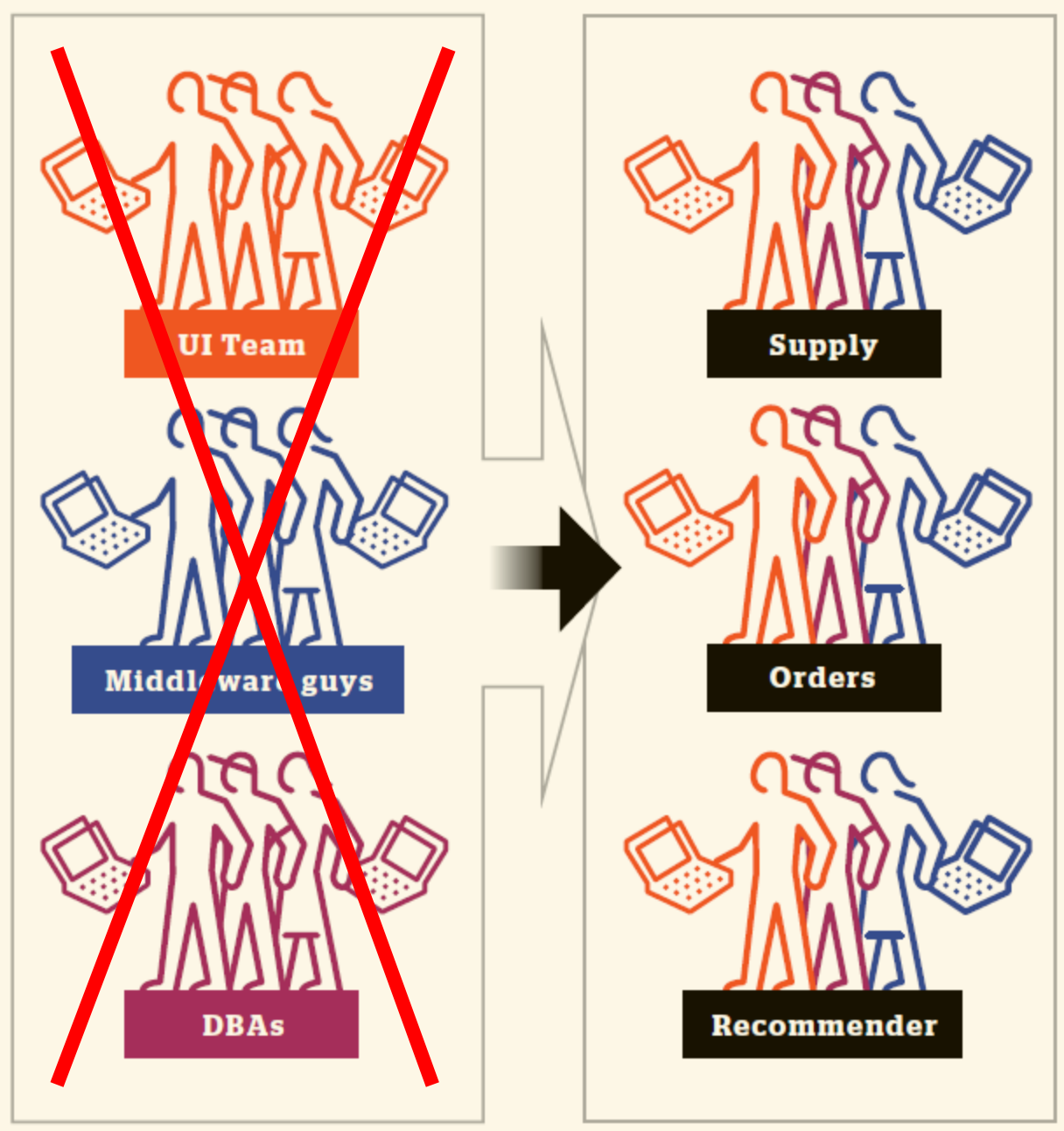
Figure 1: Monoliths and Microservices

Microservice characteristics

- Componentization via Services
- Organized around Business Capabilities

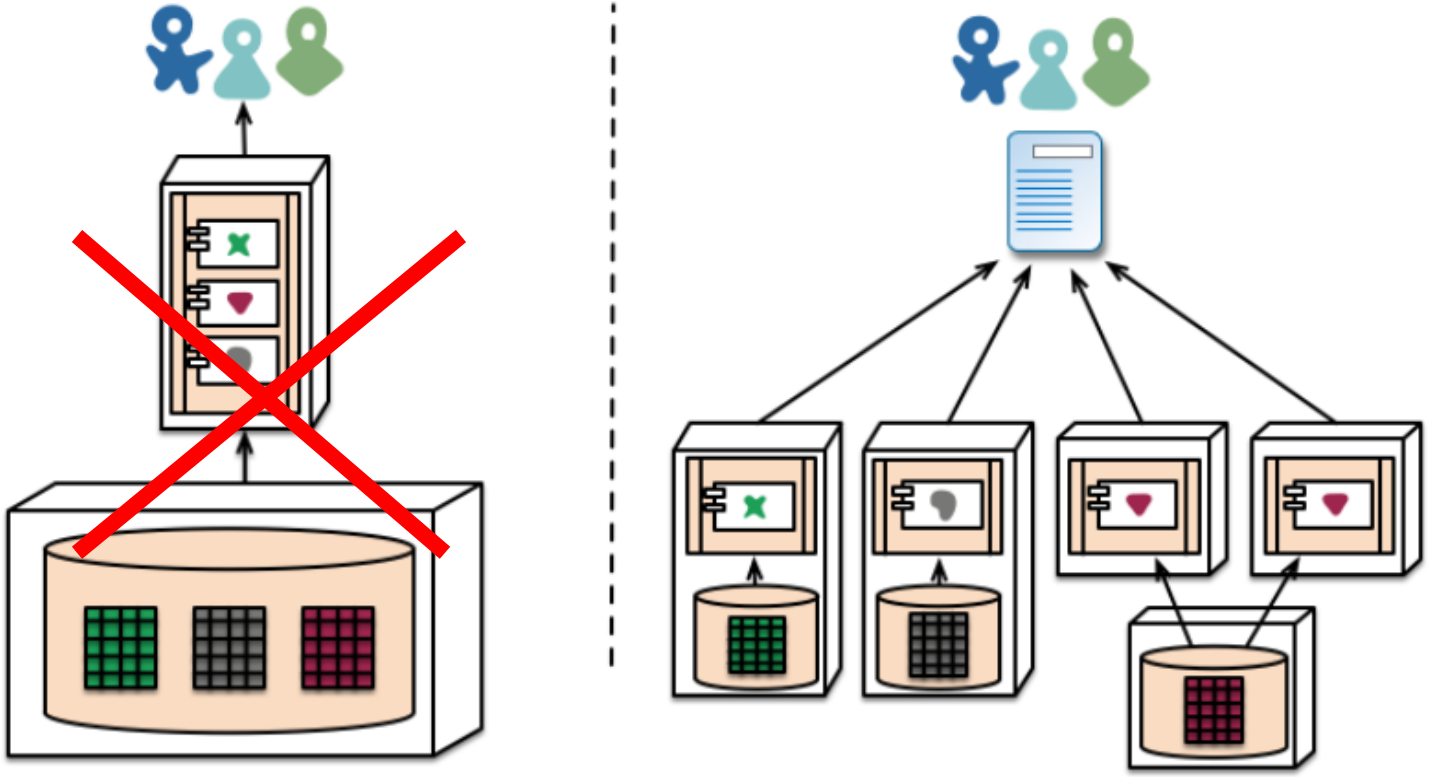


- Products not Projects


UI Team
Middl ware guys
DBAs
Supply
Orders
Recommender

Microservice characteristics (cont'd)

- Smart endpoints and dumb pipes
- Decentralized Governance
- Decentralized Data Management: multiple app DBs

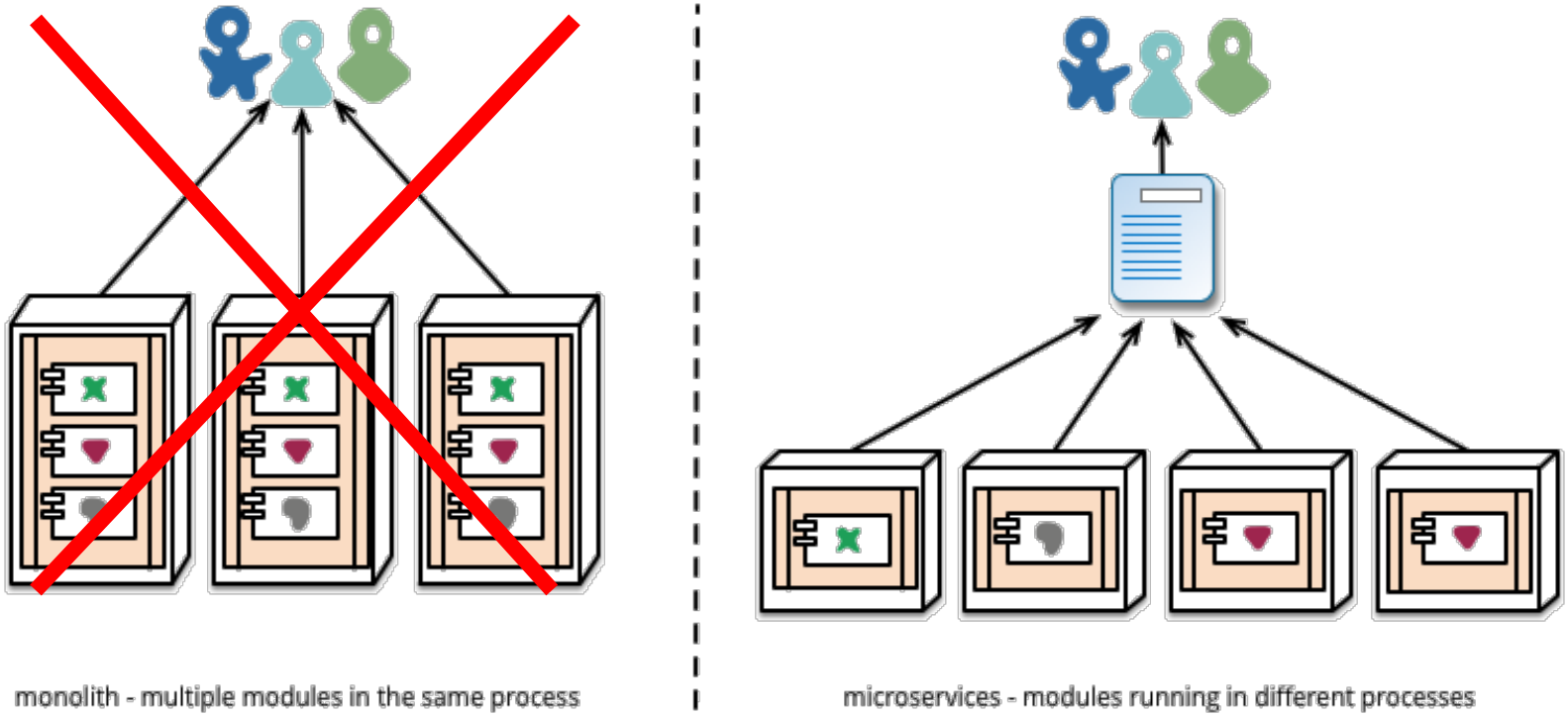


monolith - single database

microservices - application databases

Microservice characteristics (cont'd)

- Infrastructure Automation
  - Continuous Delivery, Continuous Integration



monolith - multiple modules in the same process

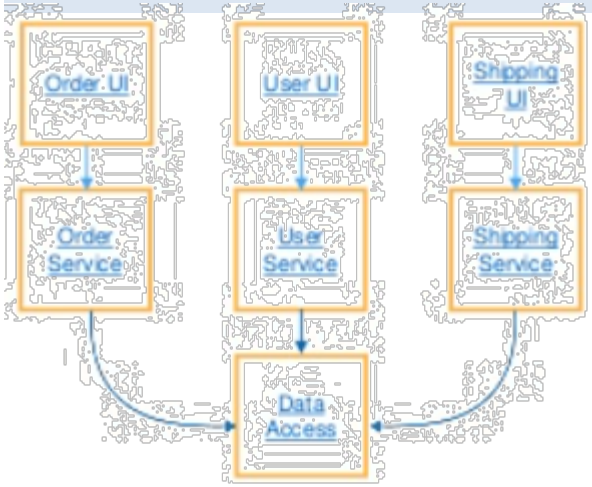
microservices - modules running in different processes

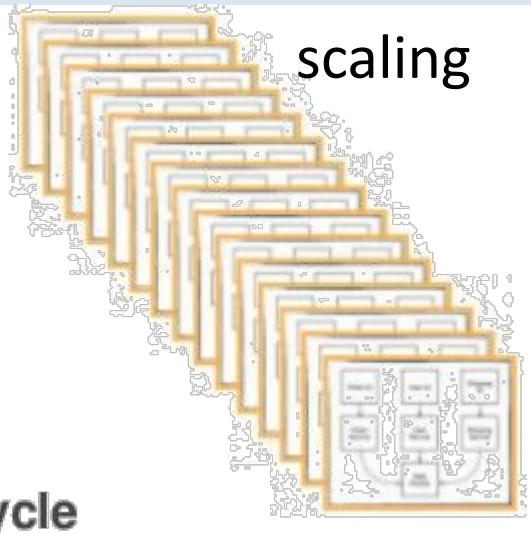
- Design for failure

Architecture Styles: Monolithic vs SOA vs Microservices

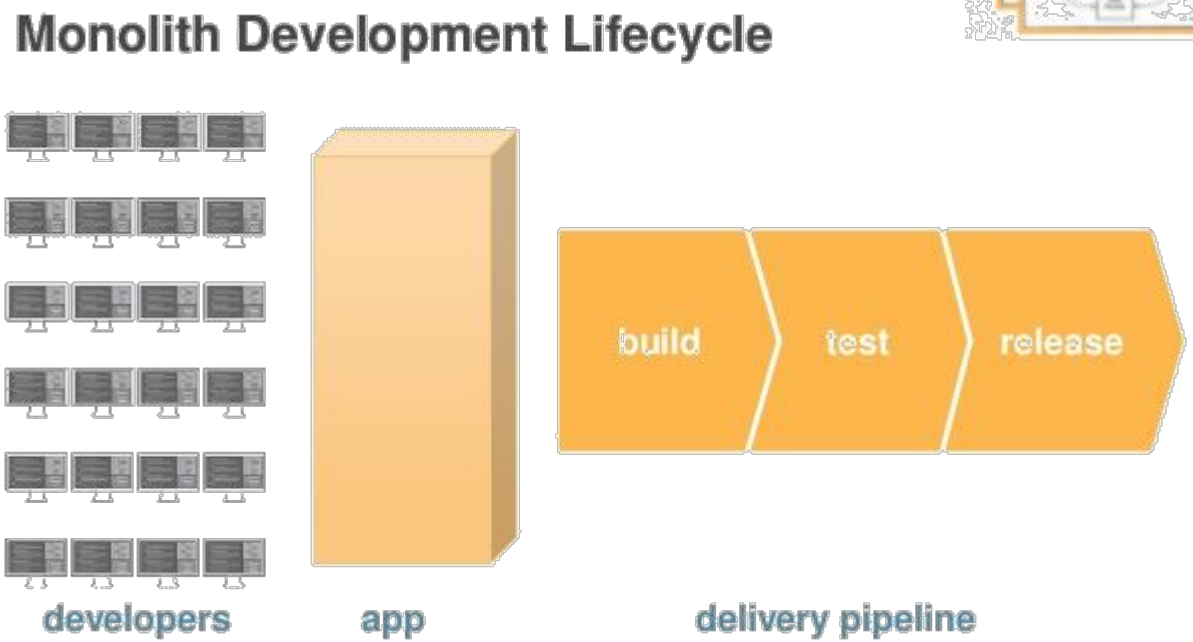
- microservices must be independently deployable whereas SOA services are often implemented in deployment monoliths

Monolithic Architecture



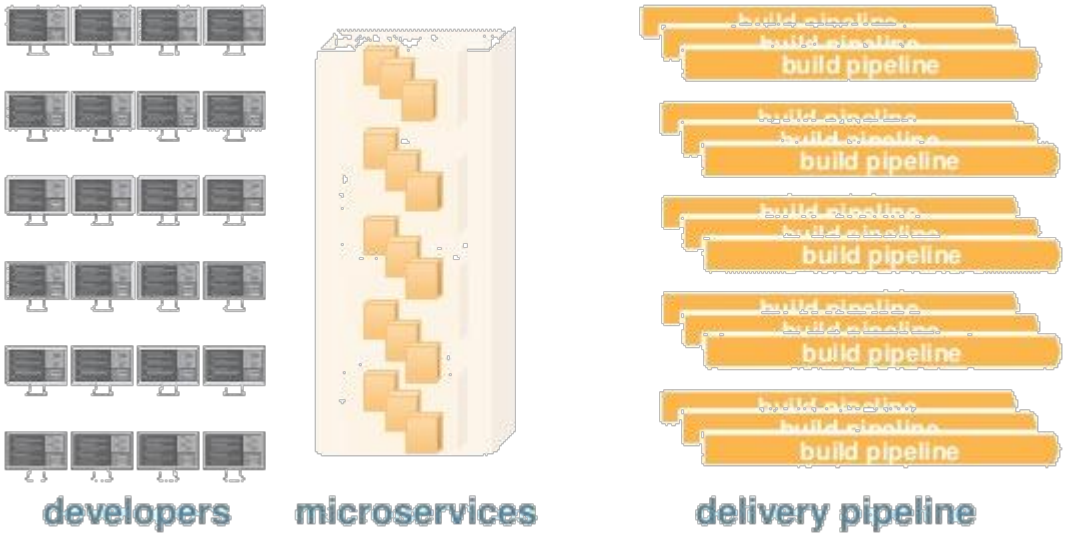


scaling



Microservices Architecture

Microservices Development Lifecycle

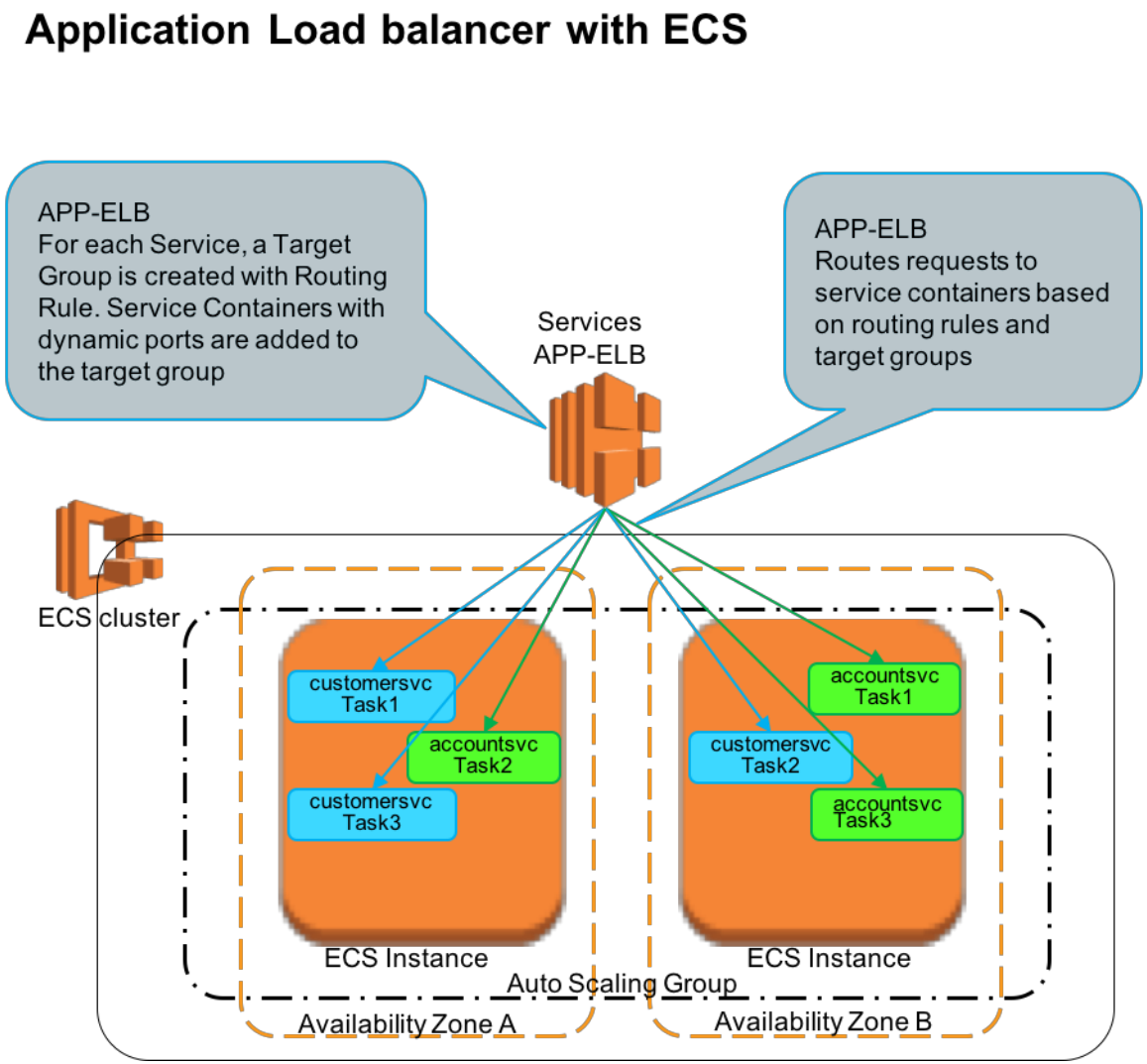


Microservices Challenges

Microservices == decentralized, loosely coupled apps

- How to associate data among multiple DBs?
  - Service-level join or app-level join
- How to resource manage and orchestrate that many microservices?
  - Kubernetes, Mesos, Swarm, Fleet, etc.
- How to monitor? Healthiness, performance, etc
- How to troubleshoot & debug?
- How to scale up/down independently?
- How to discover new instances, or announce itself?
- Each service is developed, tested, and deployed in its own timeline - How to manage this?
- How to decide which hosts to deploy a service on?

Example: Microservices on AWS ECS



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