Microservices

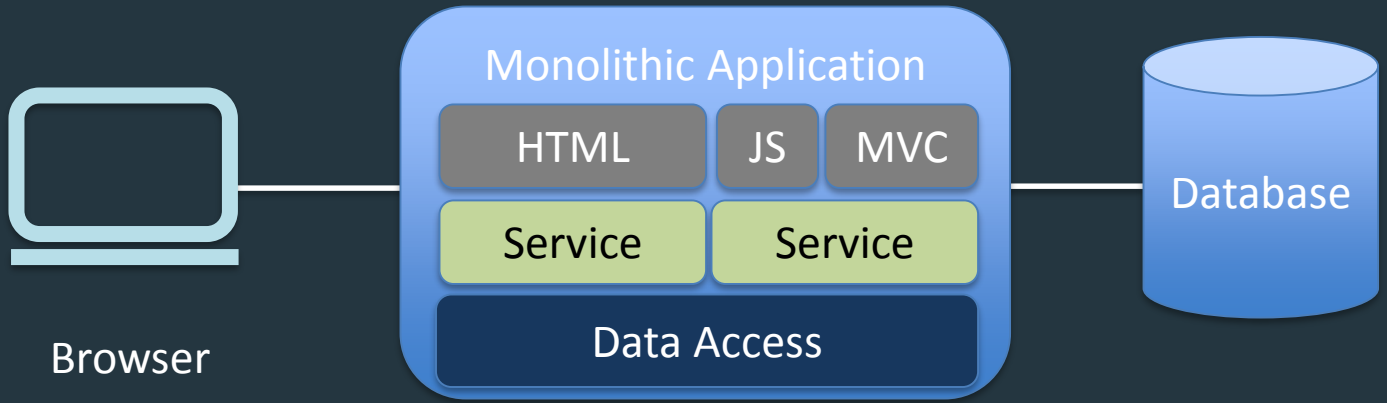
An introduction.

Agenda

1. The Monolith
2. Microservices
3. Microservices and Pivotal Cloud Foundry

Monolith

A three tiered monolith.



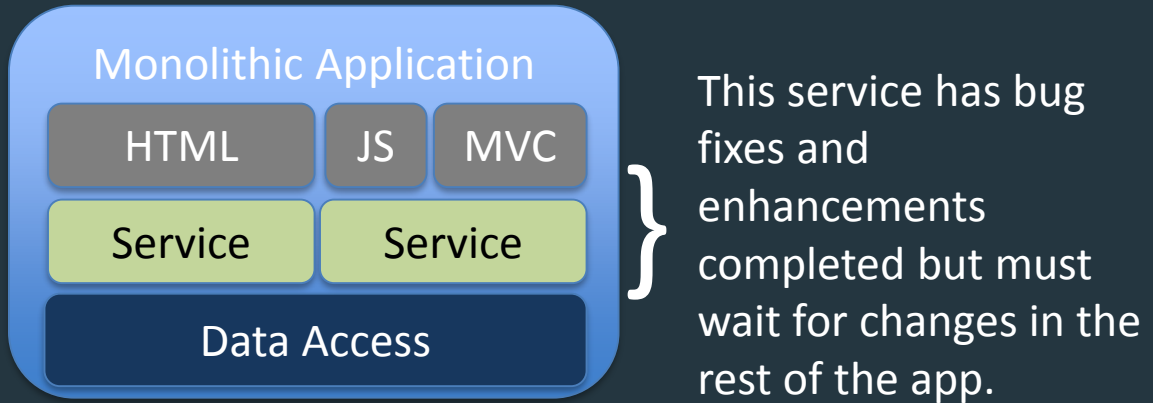
MONOLITH CHALLENGES

Monolith Design Patterns

Traditional monolithic design patterns are not appropriate for the cloud.

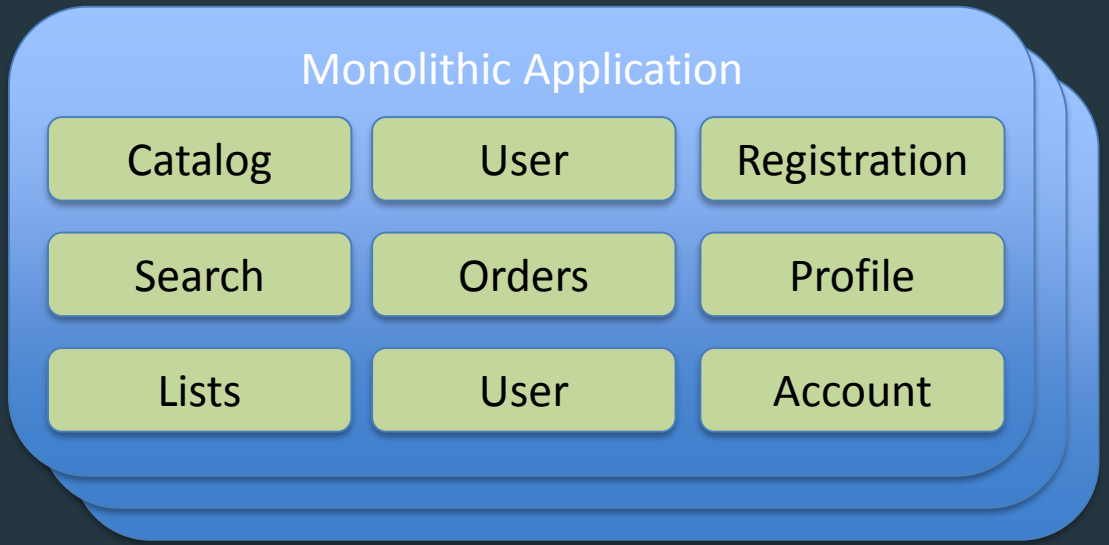
Monolith Change Cycle

Monoliths couple change cycles together.



Monolith Scaling

Monoliths services can’t be scaled independently.



Monolith Coordination

Too many developers in one code base.

Monolith Knowledge

Developers struggle to understand a large codebase.

Monolith Commitment

Long term commitment to the tech stack.

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The Importance of APIs

All teams will henceforth expose their data and functionality through service interfaces.

Jeff Bezos

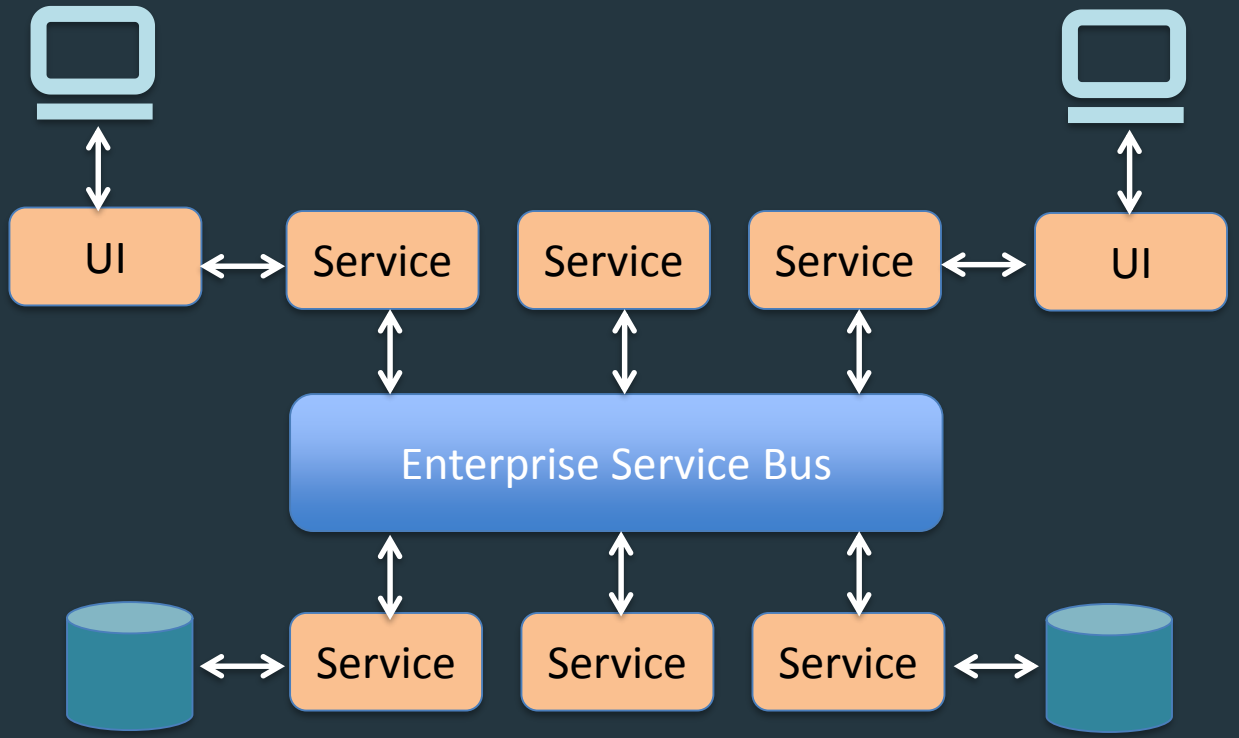
Amazon - 2002

Microservices Defined

Microservices are a loosely coupled Service-Oriented Architecture (SOA) with bounded contexts.

Adrian Cockcroft

Traditional ESB / SOA



Orchestration vs Choreography

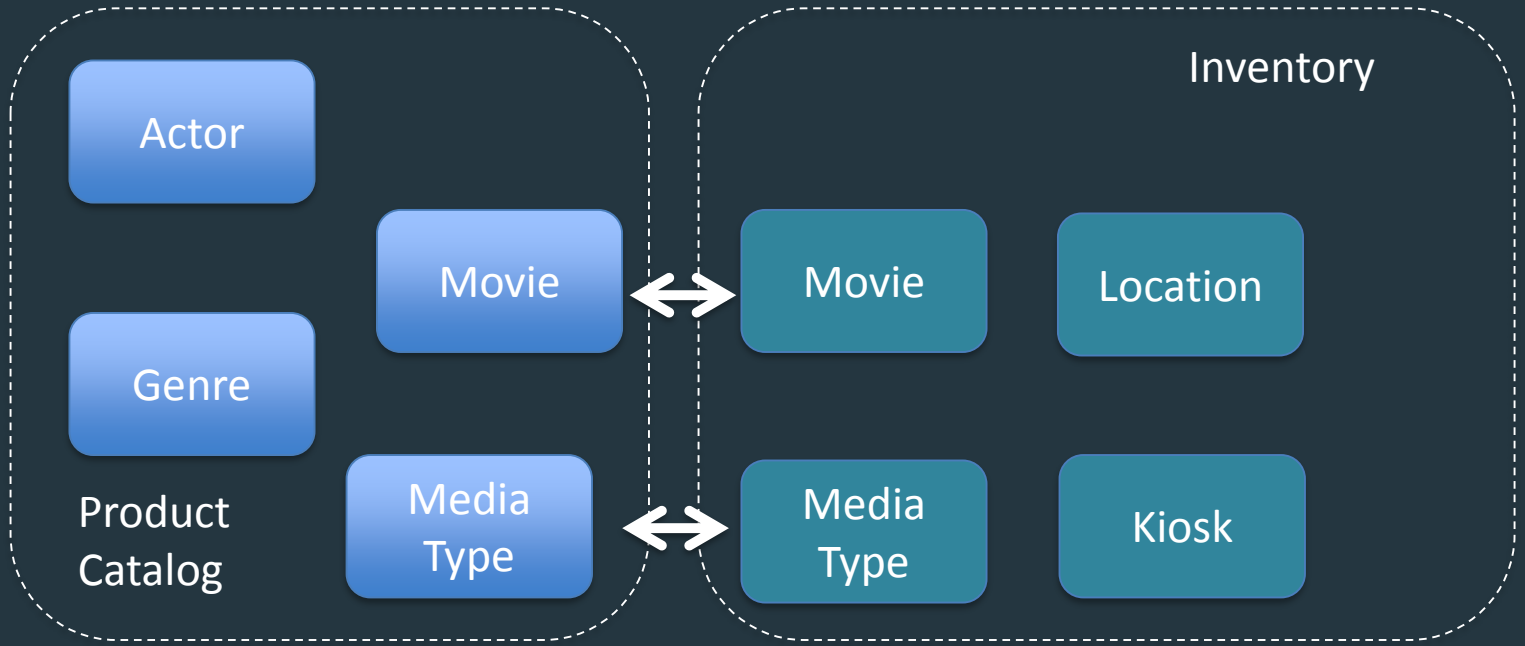
Unix Pipes and Filters

A microservice has a single responsibility.

```
cut -d" " -f1 < access.log | sort | uniq -c | sort -rn | less
```

Bounded Context

Microservices use a bounded context.



Organize Around Business Capabilities

Siloed Functional Teams

UI Specialists

Middleware Specialists

DBA

Business Capability

Business Capability

Business Capability

Cross-functional Teams

Monolithic Application

HTML

JS

MVC

Service

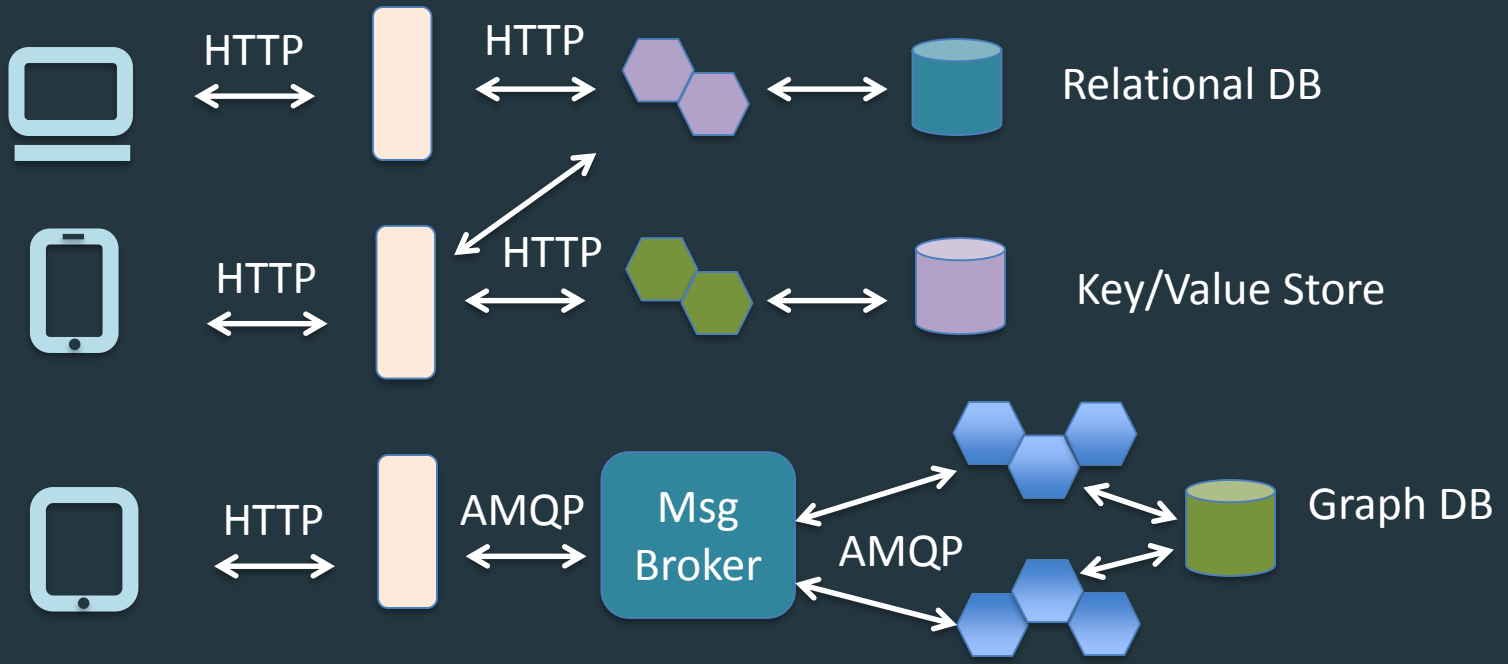
Service

Data Access

Siloed Application Architectures

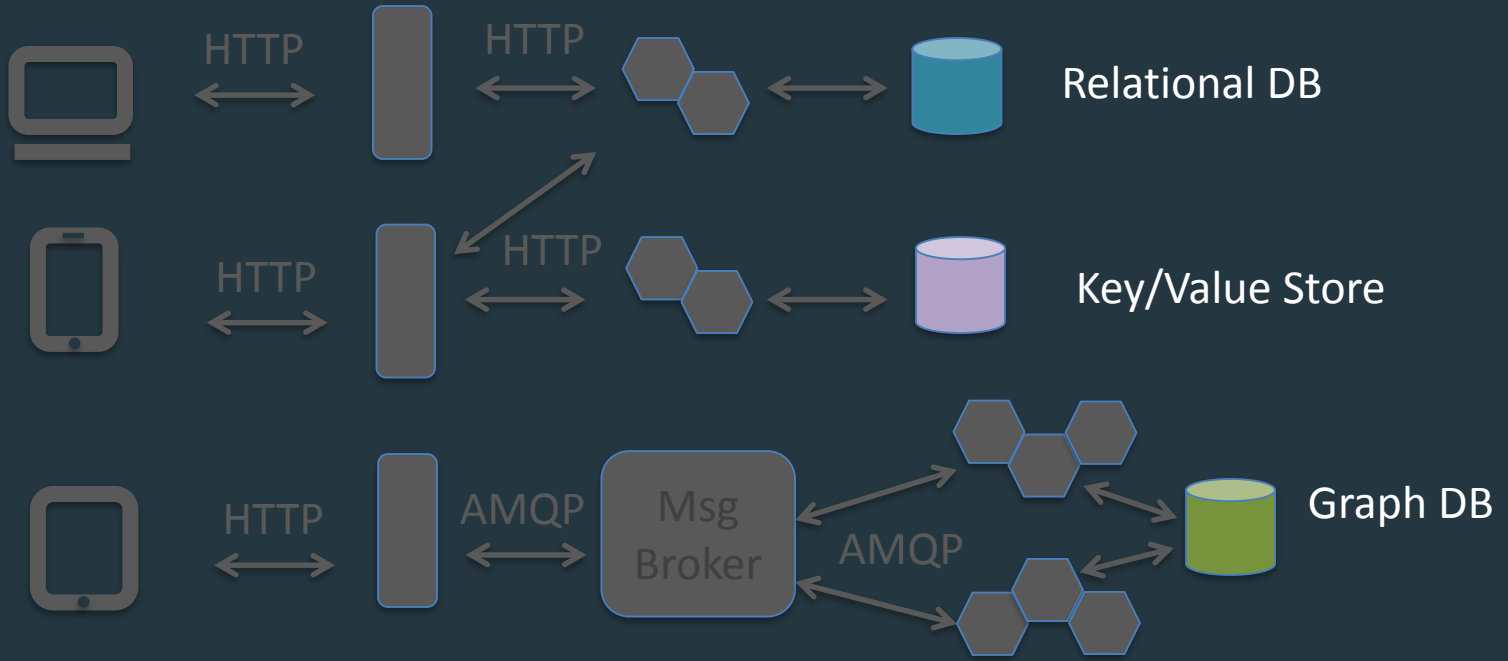
Microservice Architectures

Microservice Architecture (Simplified)



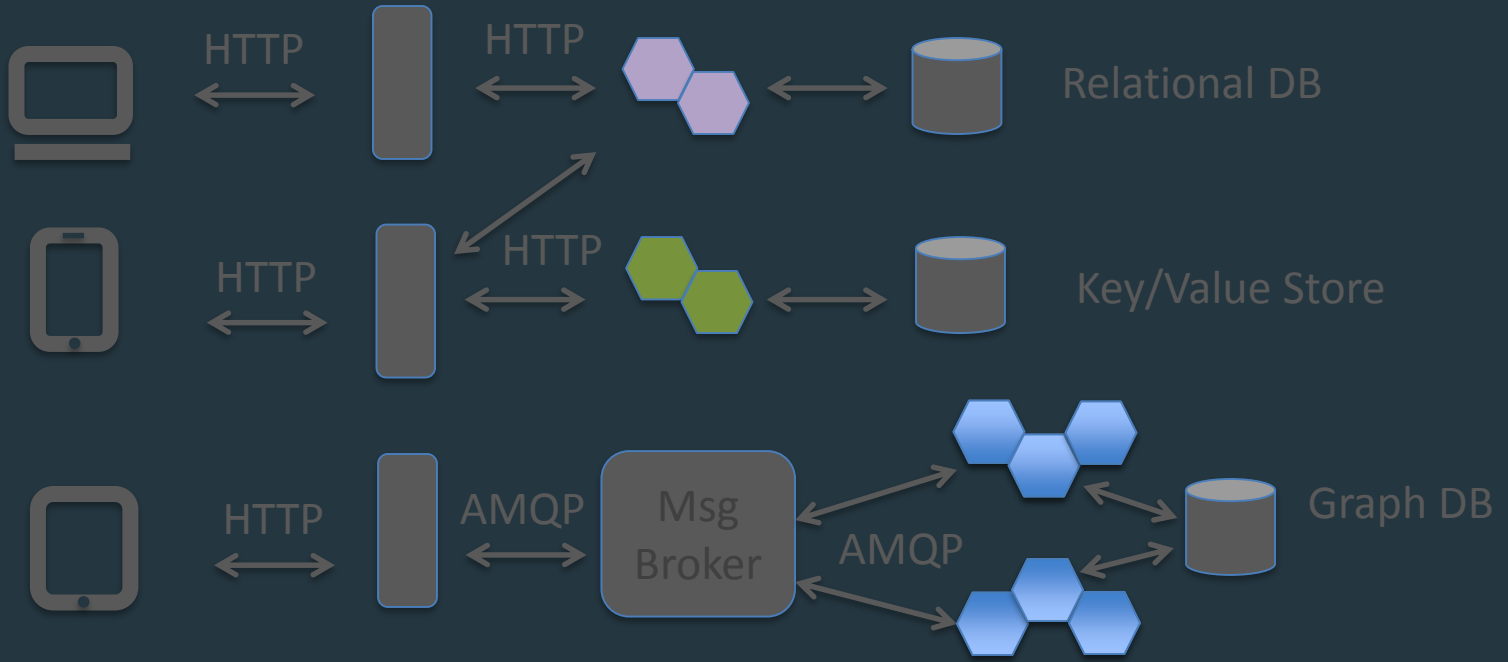
Polyglot Persistence

Freedom to pick the persistence solution.

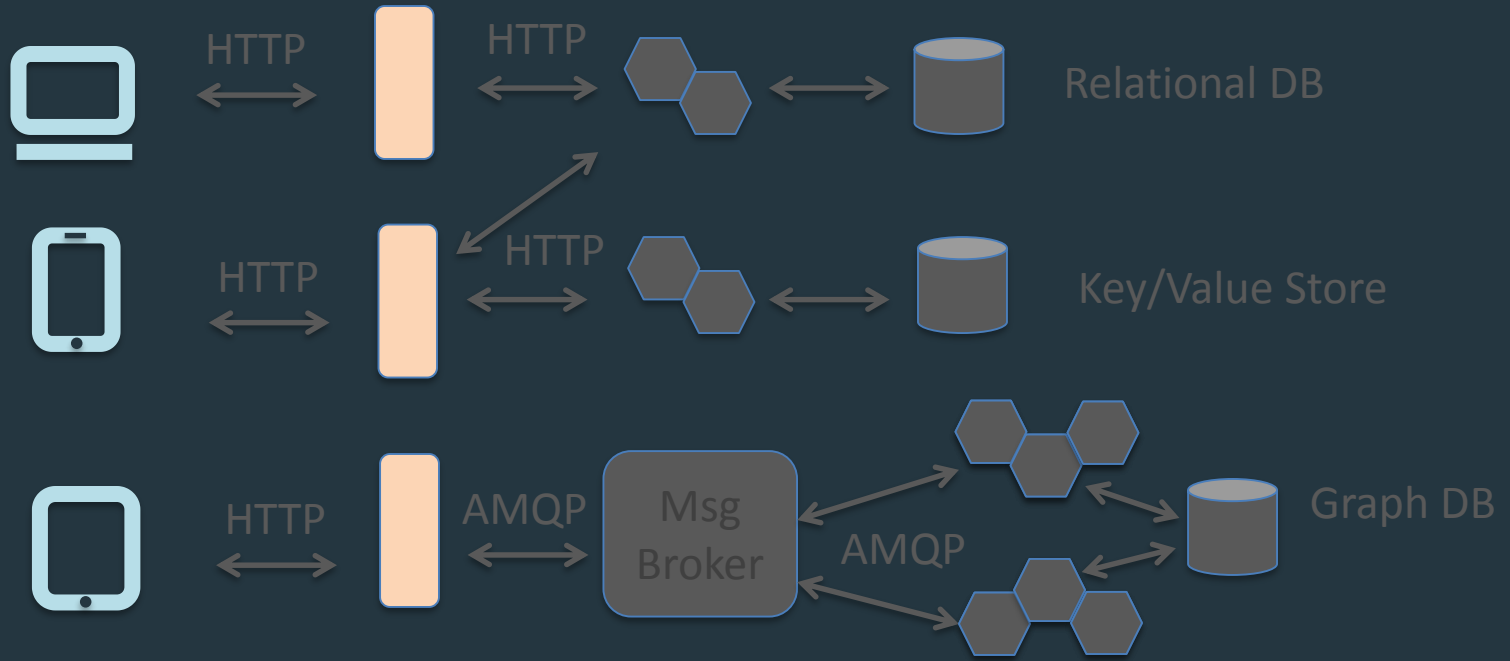


Polyglot Apps

Choice of language when developing apps.

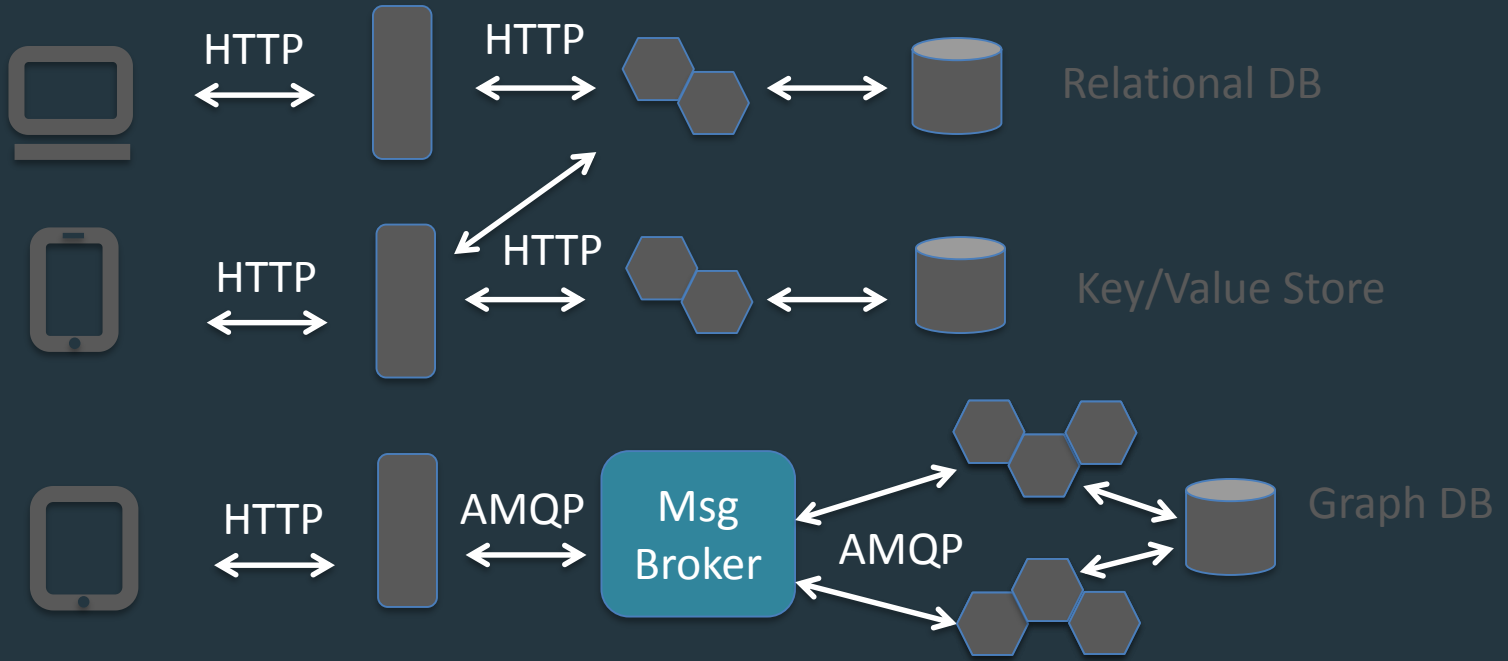


Device specific gateways.



Cloud Protocols

Use cloud friendly protocols.



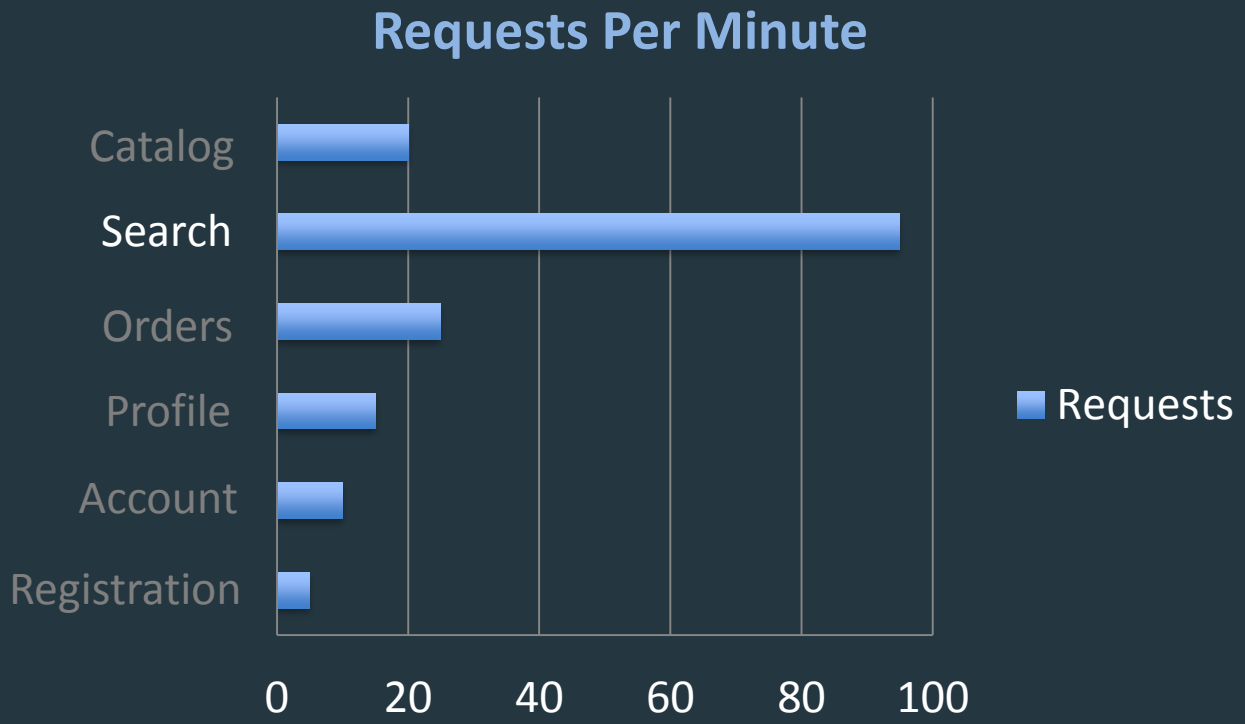
MICROSERVICE BENEFITS

Microservice Change Cycle

Change cycles are decoupled. Enabling frequent deploys.

Microservice Scale

Allow for efficient scaling.



Microservice Knowledge

Developers learn a smaller codebase faster.

Fewer developers in each code base.

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Microservice Challenges

It’s been said that microservices have some challenges too!

http://martinfowler.com/bliki/MicroservicePrerequisites.html

http://highscalability.com/blog/2014/4/8/microservices-not-a-free-lunch.html

Significant Operations Overhead

Microservices have significant operations overhead.

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Agreed, but this is mitigated with PCF.

Significant Operations Overhead

Consider: Buildpacks

Significant Operations Overhead

Consider: Health Mgmt

Buildpacks

Significant Operations Overhead

Consider: Services

Health Mgmt

Buildpacks

Significant Operations Overhead

Consider: Monitoring

Services

Health Mgmt

Buildpacks

Significant Operations Overhead

Consider: Scaling

Monitoring

Services

Health Mgmt

Buildpacks

Significant Operations Overhead

Consider: Dynamic Routing

Scaling

Monitoring

Services

Health Mgmt

Buildpacks

Substantial DevOps skills are required to run microservices.

Substantial DevOps Skills Required

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Agreed. This is a good thing.

Substantial DevOps Skills Required

Consider: Health Mgmt

Substantial DevOps Skills Required

Consider: Buildpacks

Health Mgmt

Substantial DevOps Skills Required

Consider: Space Parity & Immutable Infrastructure

Buildpacks

Health Mgmt

Substantial DevOps Skills Required

Consider: Polyglot Persistence via Service Brokers

Space Parity & Immutable Infrastructure

Buildpacks

Health Mgmt


Pivotal
Transforming How The World Builds Software