Migrating A Monolith Application to *Cloud Native*

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Agenda – Day 1

- 9:00 AM - 10:30 AM - **Session 1:** *Cloud-Native Architecture Overview and Building Twelve-Factor Apps with Spring Boot*
- 10:30 AM - 10:45 AM - Morning Break
- 10:45 AM - 12:30 PM - **Session 2:** *Operating Twelve-Factor Apps with Cloud Foundry*
- 12:30 PM - 1:30 PM - Lunch
- 1:30 PM - 2:30 PM - **Session 3:** *Spring Data JPA*
- 2:30 PM - 3:30 PM - **Session 4:** *Splitting the Monolith: Part One*
- 3:30 PM - 3:45 PM - Afternoon Break
- 3:45 PM - 5:00 PM - **Session 5:** *Microservices with Polyglot Persistence*

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Agenda – Day 2

- 9:00 AM - 10:30 AM - **Session 6:** *Cloud-Native Architecture Patterns: Part One*
- 10:30 AM - 10:45 AM - Morning Break
- 10:45 AM - 12:30 AM - **Session 7:** *Cloud-Native Architecture Patterns: Part Two*
- 12:30 PM - 1:30 PM - Lunch
- 1:30 PM - 3:00 PM - **Session 8:** *Securing Cloud-Native Applications*
- 3:00 PM - 3:15 PM - Afternoon Break
- 3:15 PM - 5:00 PM - **Session 9:** *The API Gateway Pattern*

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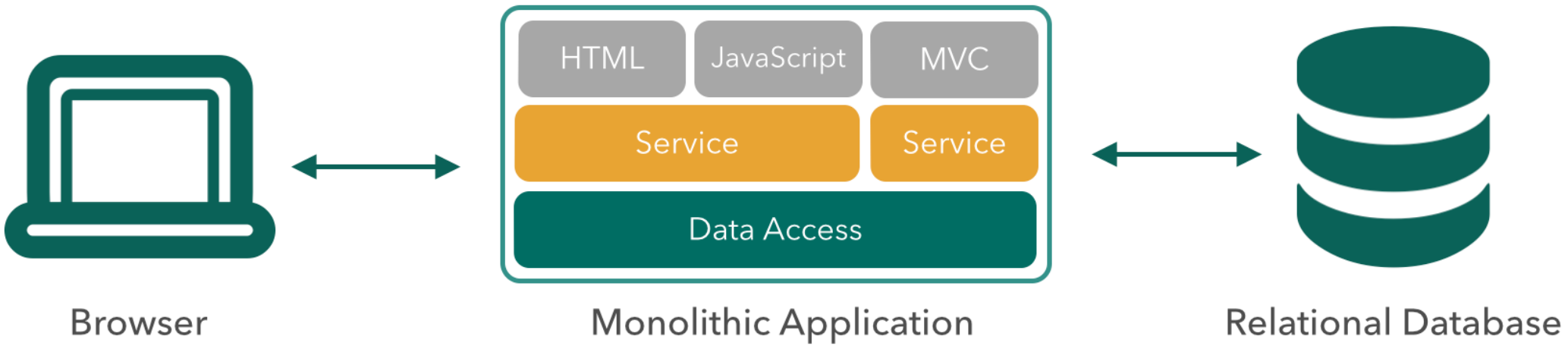
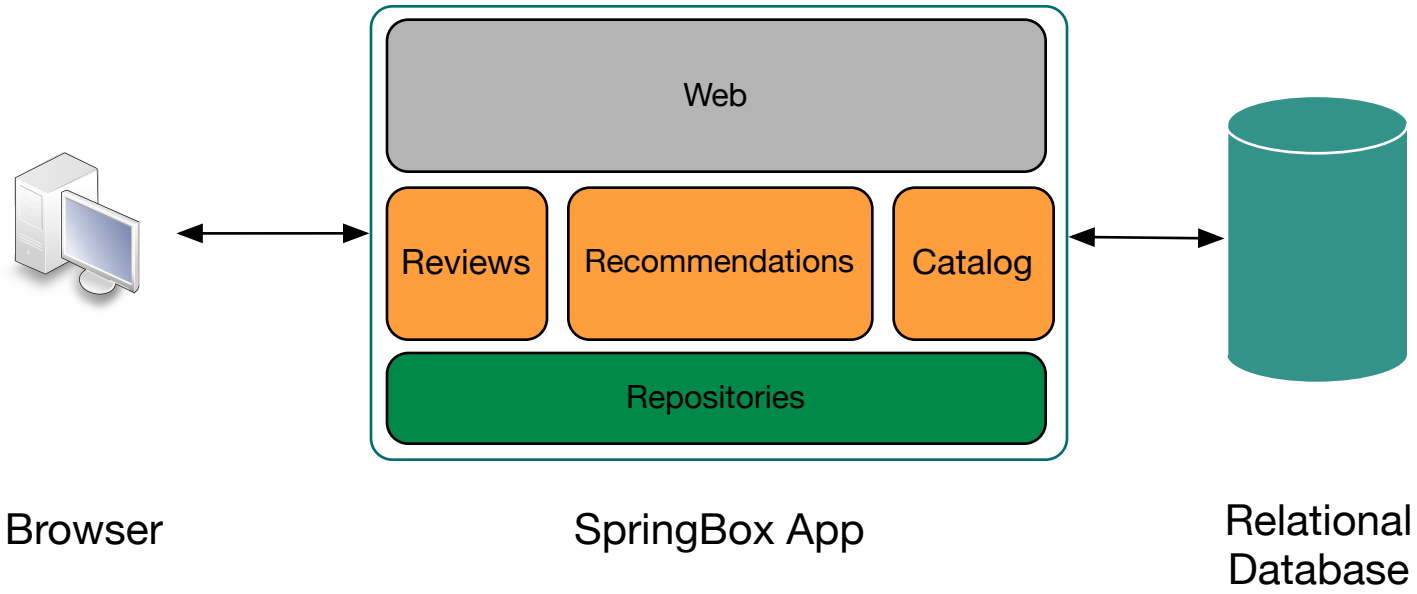
```
$ git clone https://github.com/caxqueiroz/MigratingAMonolithApplicationToCloudNative
$ git fetch --all
```

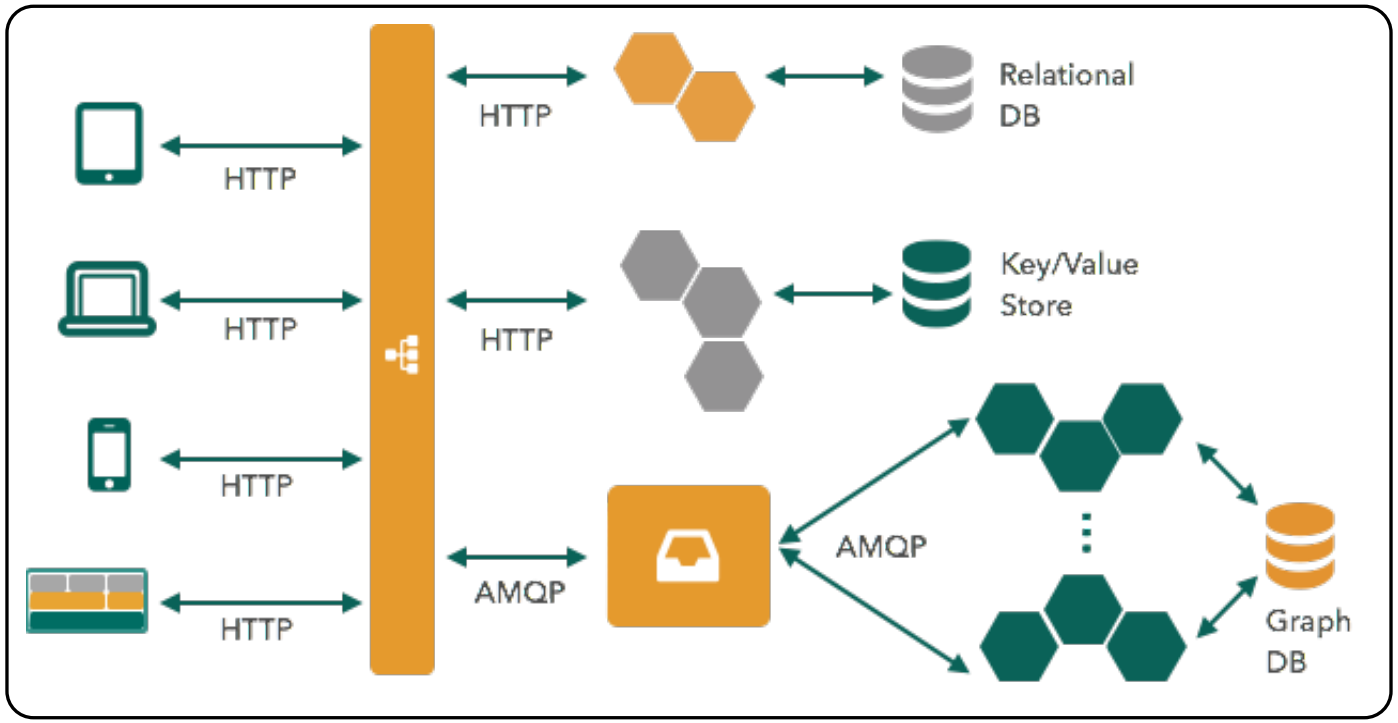
A Monolith Application



SpringBox Application

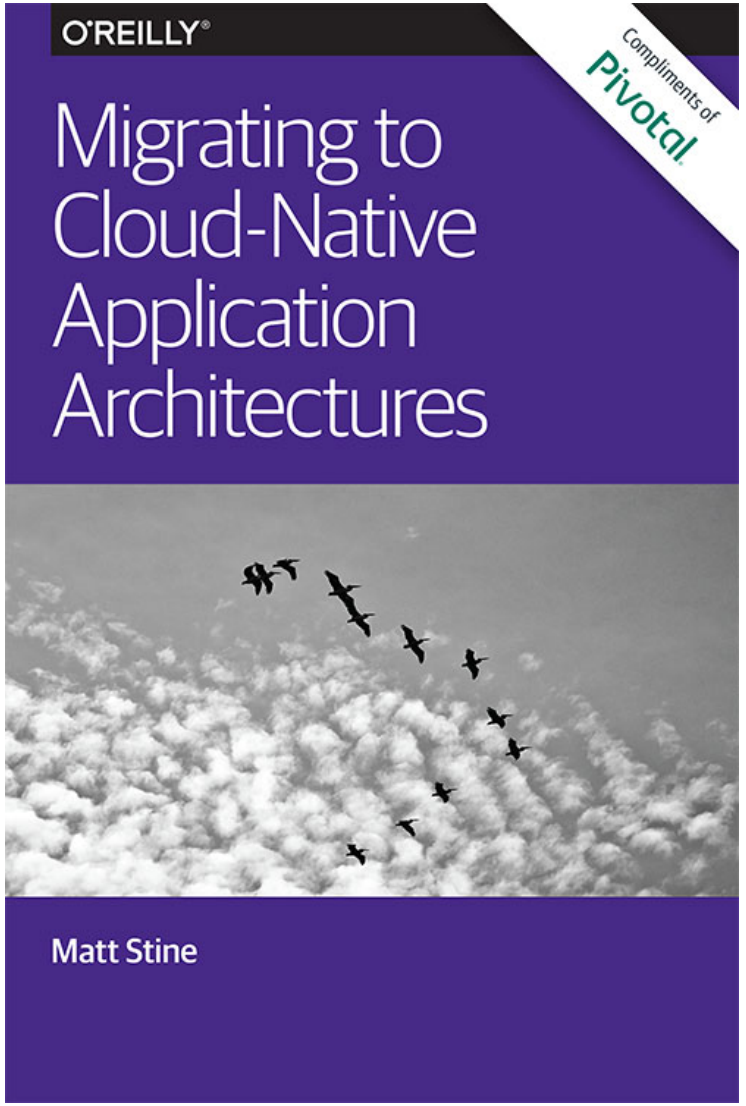


Goal



How?

Cloud Native Applications



Why?

- SPEED
- SAFETY
- SCALE
- MOBILITY

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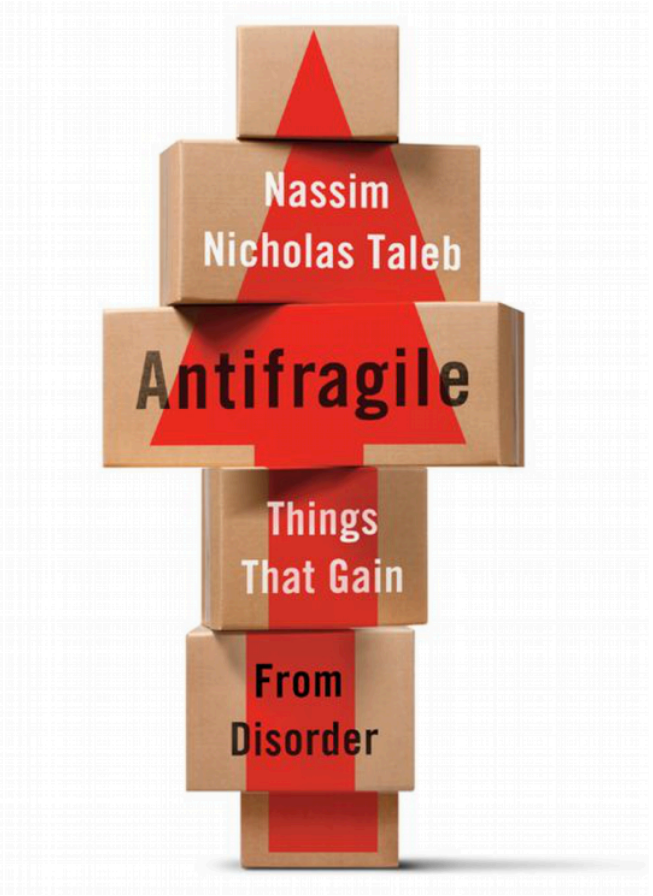
Cloud Native Applications

- Twelve Factor Apps
- **Microservices**
- Self-Service Agile Infrastructure
- API-Based Collaboration
- Antifragility



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Hype????

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Microservice

"*Loosely coupled service oriented architecture with bounded contexts...*"

-- Adrian Cockcroft

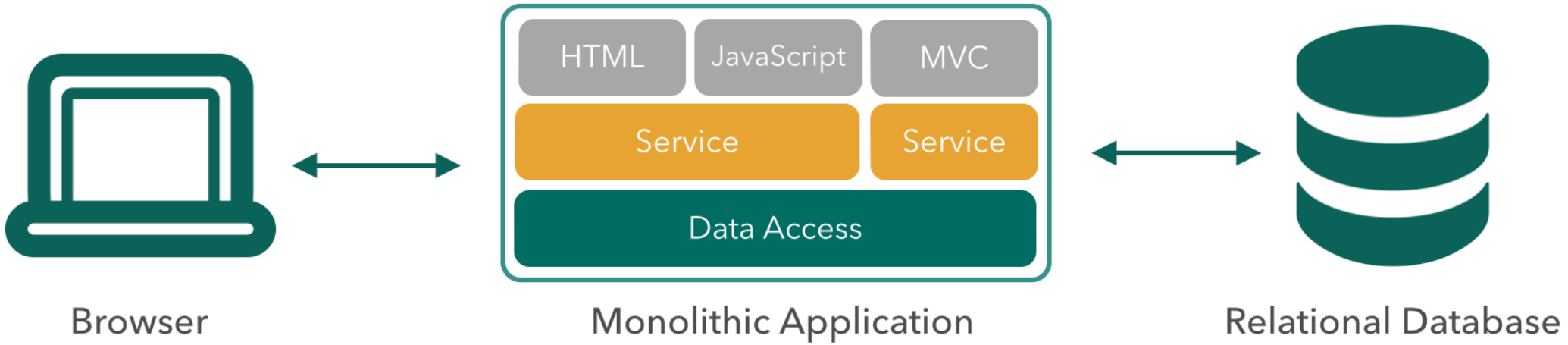
Loosely Coupled

If every service has to be updated in concert, it's not loosely coupled!

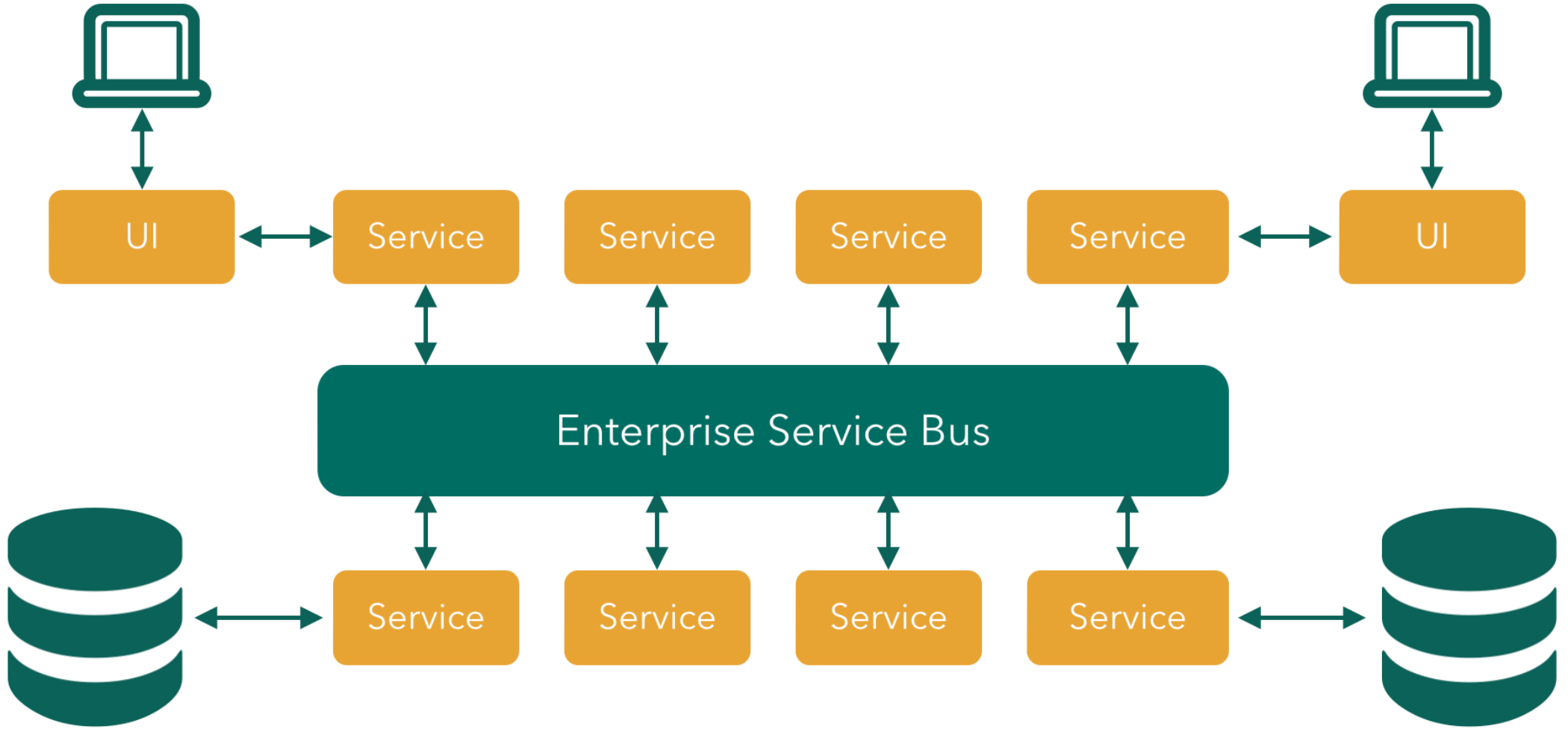
Bounded Contexts

If you have to know about surrounding services you don't have a bounded context.

Not monoliths…



Not traditional SOA (esb-centric)



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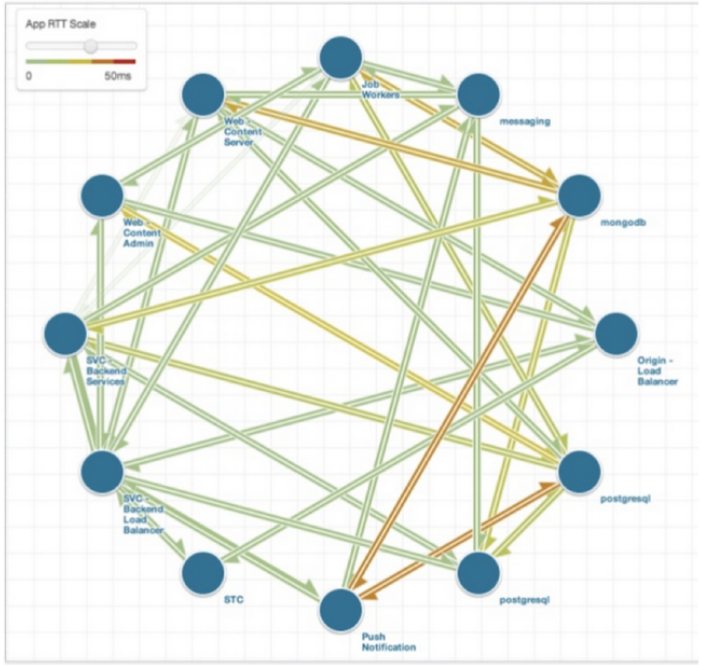
But Microservices…

Netflix

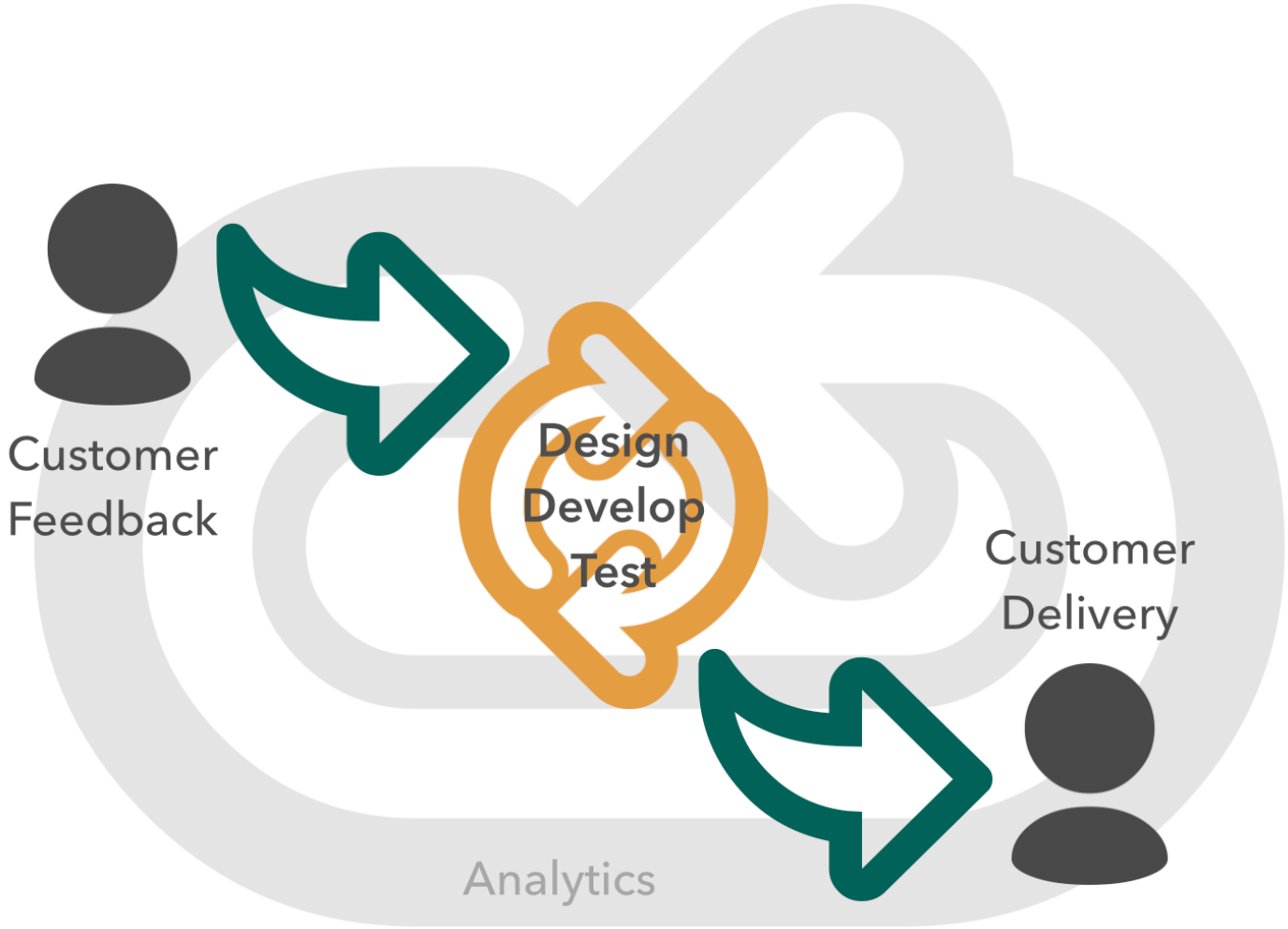


Gilt Groupe (12 of 450)

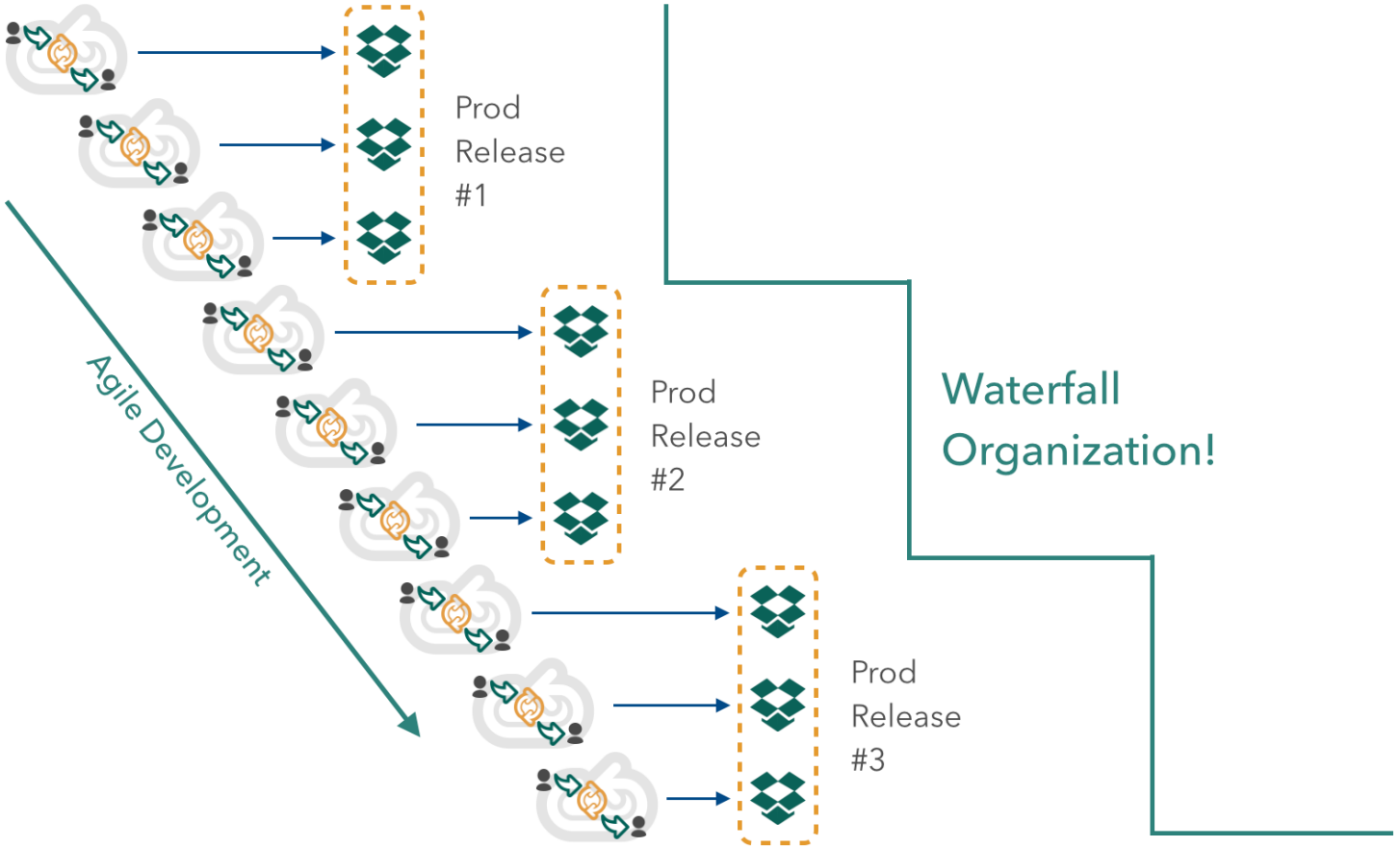
Twitter

Enabling Continuous Delivery

Agile - Iterative Feedback loops



Waterscrumfall

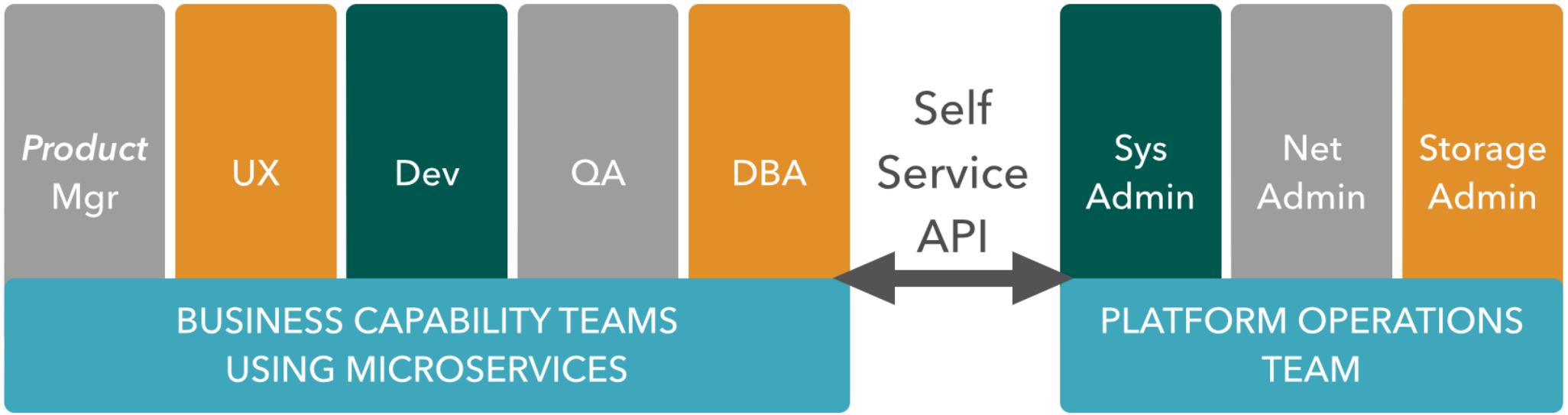


Conway's Law

"*Any organization that designs a system (defined broadly) will produce a design whose structure is a copy of the organization's communication structure.*"

-- Melvyn Conway, 1967

The Inverse Conway Manoeuvre



Continuous Delivery

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Building Twelve-Factor Apps with Spring Boot

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The Twelve-Factor App

Introduction

In the modern era, software is commonly delivered as a service: called *web apps*, or *software-as-a-service*. The twelve-factor app is a methodology for building software-as-a-service apps that:

- Use **declarative** formats for setup automation, to minimize time and cost for new developers joining the project;
- Have a **clean contract** with the underlying operating system, offering **maximum portability** between execution environments;
- Are suitable for **deployment** on modern **cloud platforms**, obviating the need for servers and systems administration;
- **Minimize divergence** between development and production, enabling **continuous deployment** for maximum agility;
- And can **scale up** without significant changes to tooling, architecture, or development practices.

The twelve-factor methodology can be applied to apps written in any programming language, and which use any combination of backing services (database, queue, memory cache, etc).

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Patterns

- Cloud-native application architectures
- Optimized for speed, safety, & scale
- Declarative configuration
- Stateless/shared-nothing processes
- Loose coupling to application environment

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12 Factors (1/2)

- One Codebase in Version Control
- Explicit Dependencies
- Externalized Config
- Attached Backing Services
- Separate Build, Release, and Run Stages
- Stateless, Shared-Nothing Processes

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12 Factors (2/2)

- Export Services via Port binding
- Scale Out Horizontally for Concurrency
- Instances Should Be Disposable
- Dev/Prod Parity
- Logs Are Event Streams
- Admin Processes

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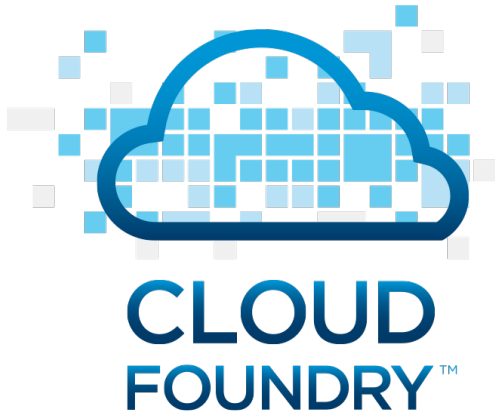
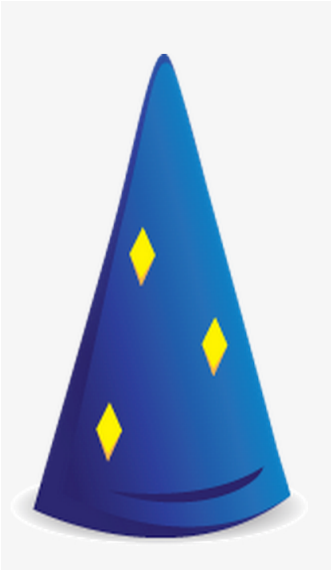
Platforms

http://heroku.com



http://cloudfoundry.org

Frameworks



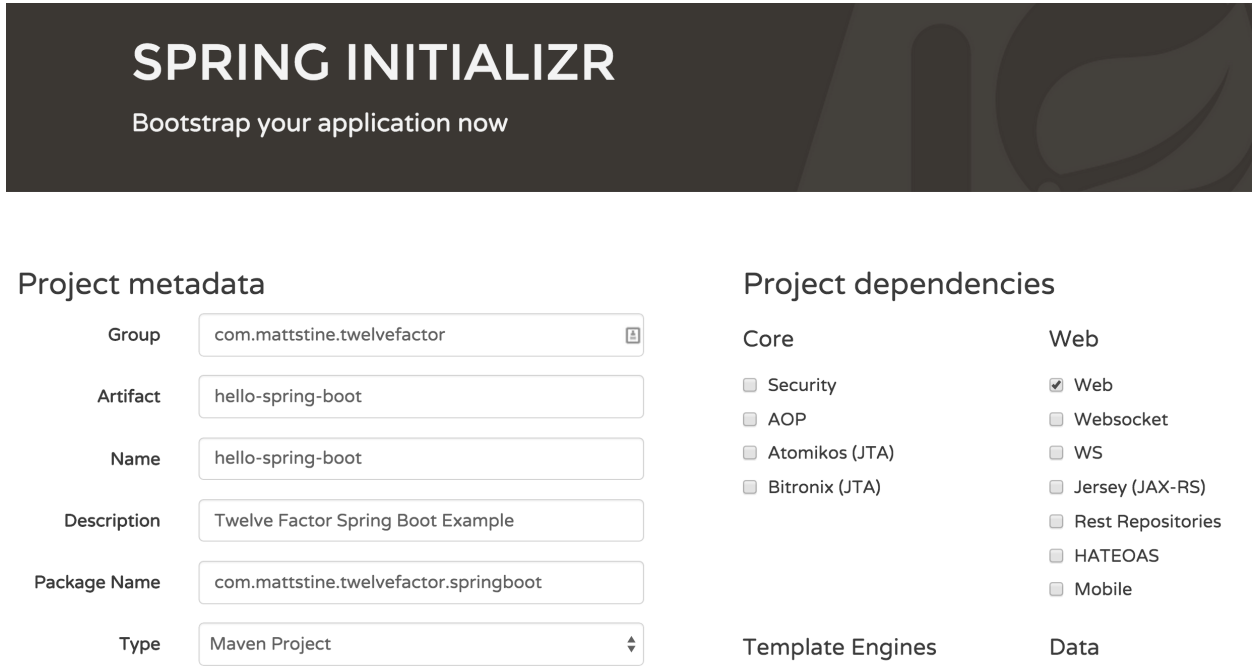
http://www.dropwizard.io

http://projects.spring.io/spring-boot

Spring Boot

- http://projects.spring.io/spring-boot
- Opinionated convention over configuration
- Production-ready Spring applications
- Embed Tomcat, Jetty or Undertow
- *STARTERS*
- Actuator: Metrics, health checks

, introspection



Labs!!