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Cloud Native Workshop

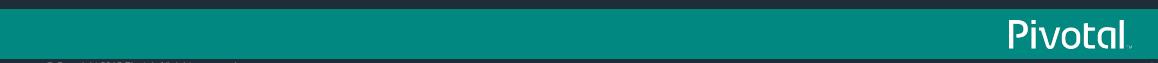
Cloud Native Architectures and Frameworks

Pivotal Cloud Foundry

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Agenda

- Why?
- What?
- How?



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WHY?

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3

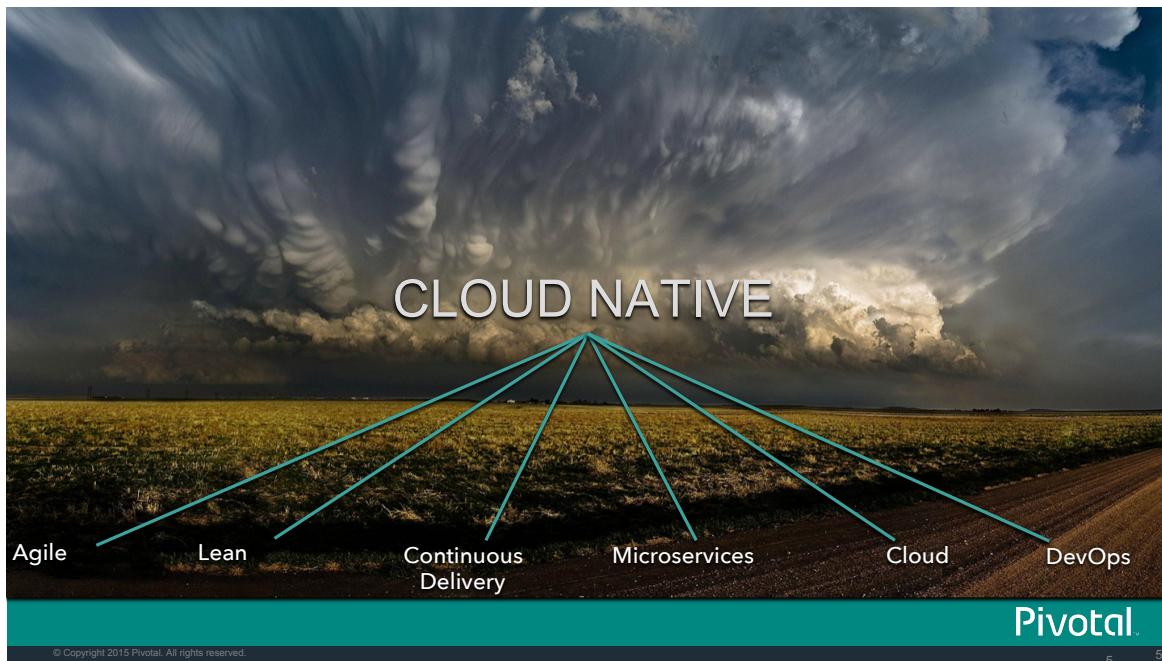
Software is changing industries



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The promise of Cloud Native

- Deploy new features daily to production
- Automate middleware
- Free/Cheap horizontal scaling
- Contract between App & Platform that creates Promises

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WHAT?

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Characteristics of Cloud Native Architectures

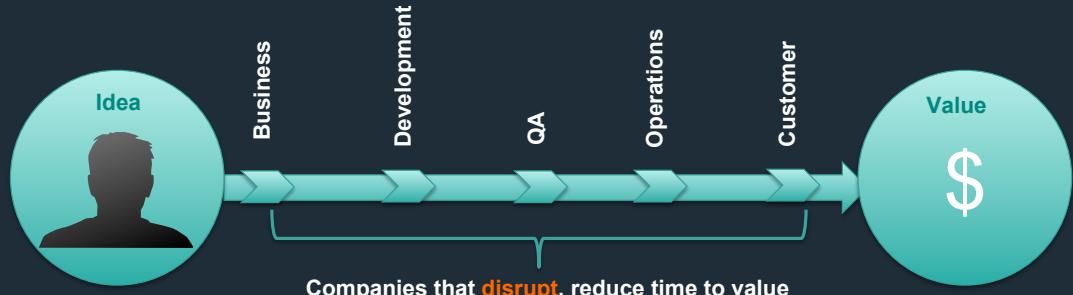
- **Continuously Delivered**
- *Twelve Factor Apps (<http://12factor.net/>)*
- *Microservices*
- Self-Service agile infrastructure
- API-based collaboration
- Anti-fragility

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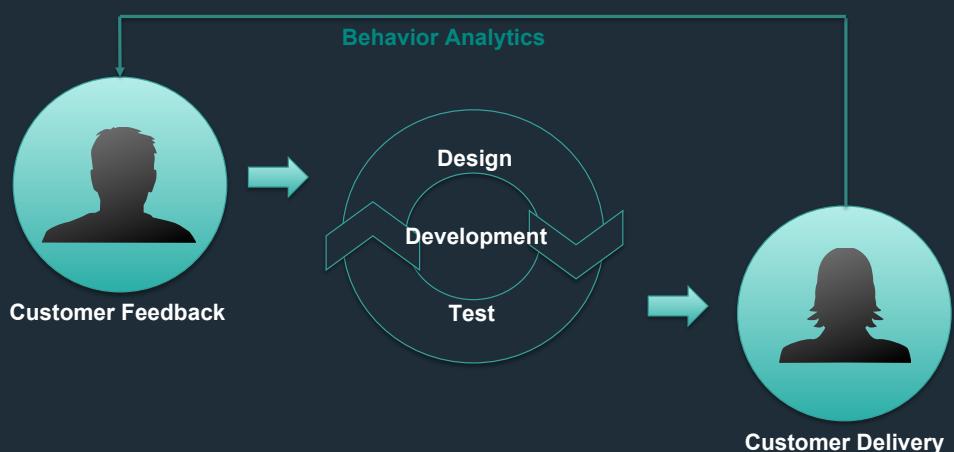
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Enabling Continuous Delivery

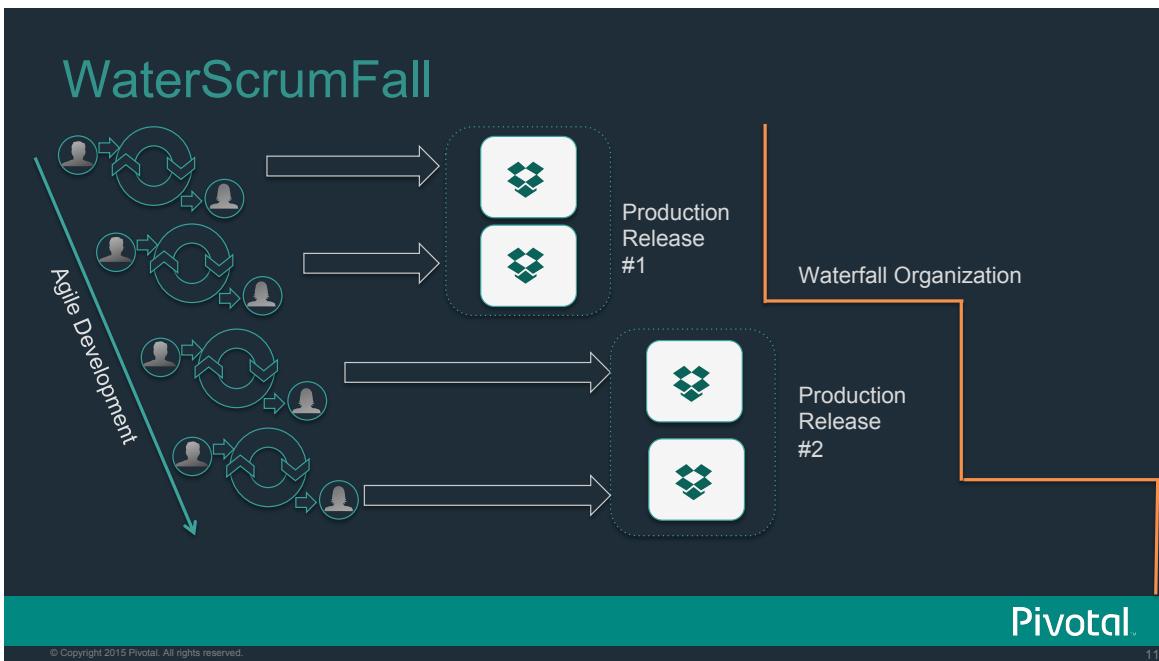


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Enabling Agile Delivery



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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.”

- Melvin Conway, 1967

http://www.melconway.com/Home/Committees_Paper.html

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Inverse Conway Maneuver

Enable Continuous Delivery



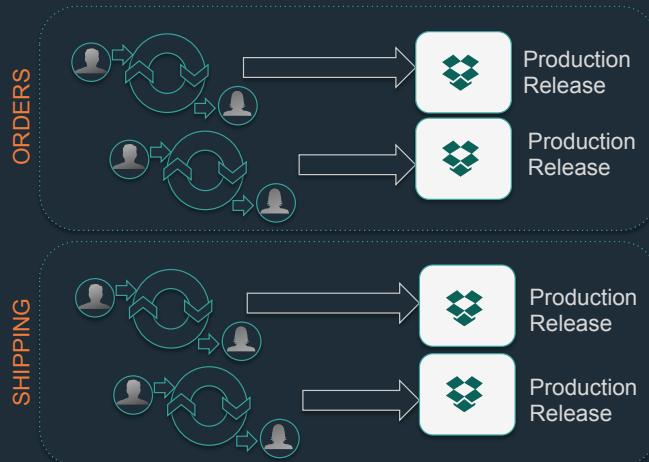
<http://jonnyleroy.com/2011/02/03/dealing-with-creaky-legacy-platforms/>
<http://www.slideshare.net/adriancockcroft/microservices-the-good-bad-and-the-ugly>

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Enabling Continuous Delivery



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14

Characteristics of Cloud Native Architectures

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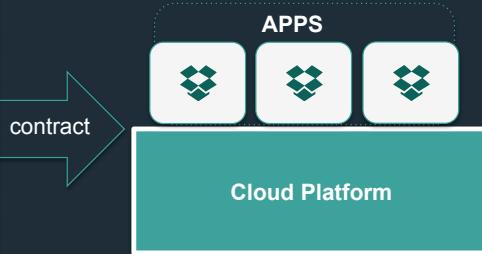
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Twelve-Factor Apps

1. Codebase
2. Dependencies
3. Configuration
4. Backing Services
5. Build, release, run
6. Processes
7. Port binding
8. Concurrency
9. Disposability
10. Dev/prod parity
11. Logs
12. Admin processes



Architectural and development practices – <http://12factor.net>

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16

Characteristics of Cloud Native Architectures

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Microservice: Definition

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

"Loosely coupled service oriented architecture with bounded contexts"

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

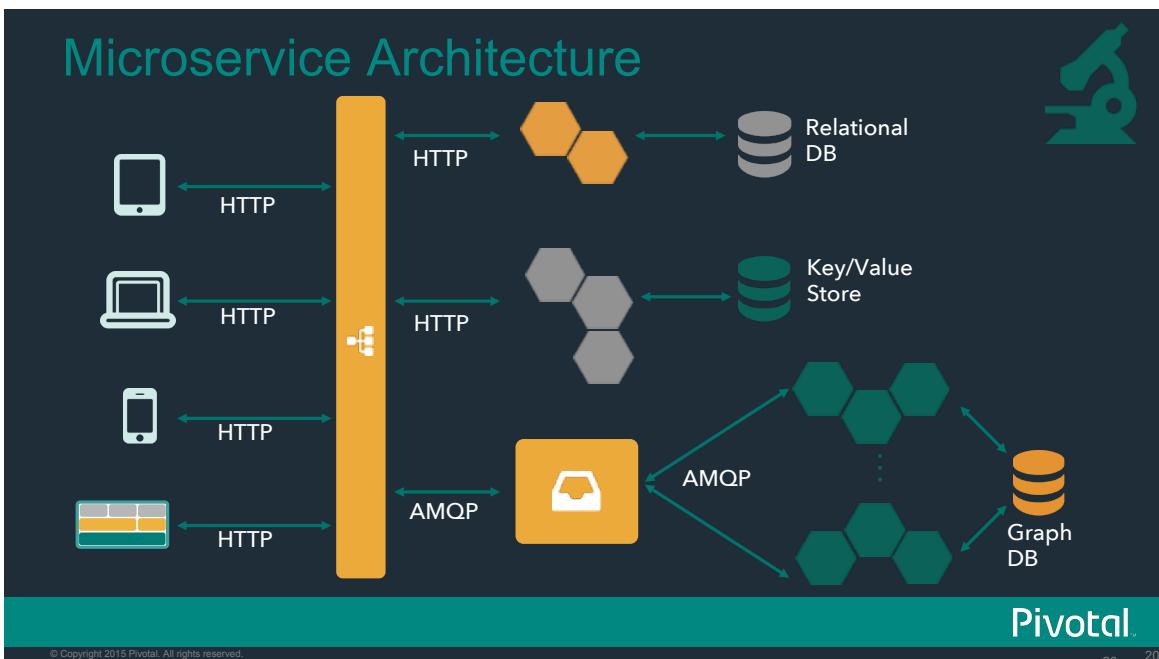
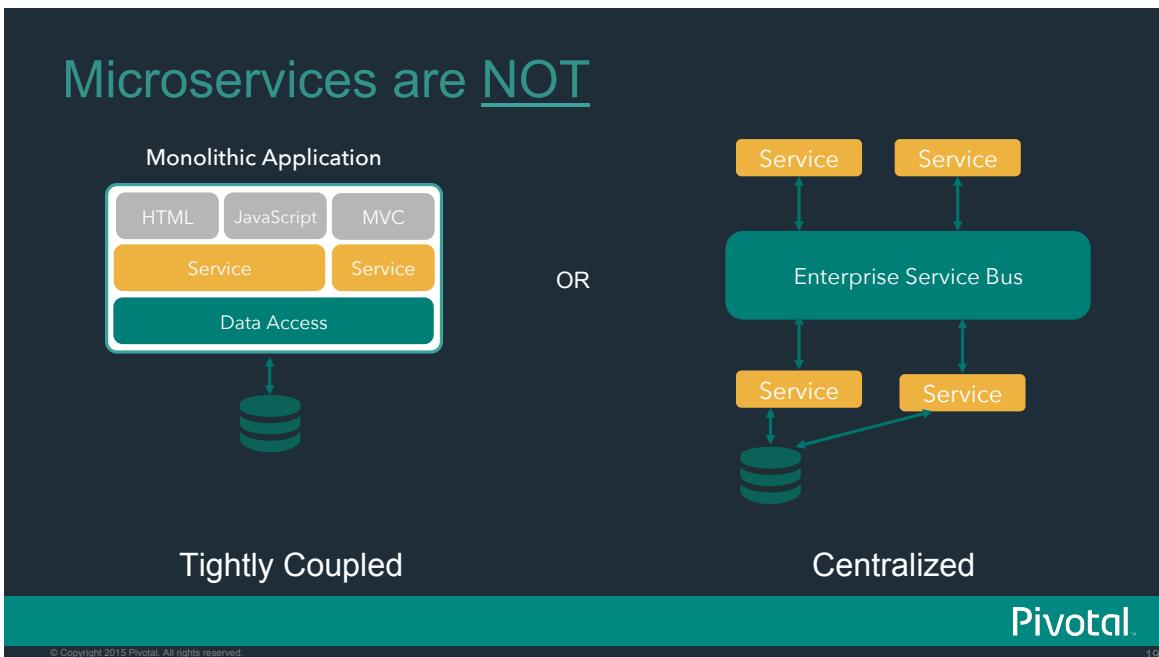
- Adrian Cockcroft

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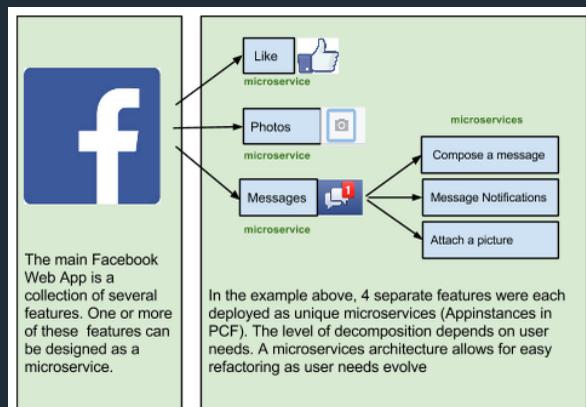
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Microservices are NOT



A familiar Microservice example



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Microservices are hard



NETFLIX



twitter

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Challenges of distributed systems

- Configuration Management
- Service Registration & Discovery
- Routing & Load Balancing
- Fault Tolerance (Circuit Breakers)
- Monitoring
- Concurrent API Aggregation & Transformation

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HOW?

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It takes a Cloud Native Application Framework



Spring

#1 Enterprise Java App Framework

Netflix

Open Source

Spring Boot

Quick Start

Little to no config.

Opinionated View

Spring Cloud

Distributed Config
Service Registration and Discovery
Fault Tolerance
Routing/Load Balancing
Service Integration

Pivotal is the main custodian of Spring and we hire the main committers for Spring Boot and Spring Cloud. We can bring these resources to bear to help significantly accelerate a customer's journey to becoming a Cloud Native enterprise

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Spring Cloud

Application coordination patterns

- Runtimes and their client libraries for:
 - Configuration Management
 - Service Discovery
 - Routing & Load Balancing
 - Circuit Breakers
 - Reverse Proxies
 -and much more
- Security (encrypt, SSO, roles)
- Connectors for CF, Heroku, AWS

The screenshot shows the Pivotal Cloud Foundry service catalog. It displays three services:

- Circuit Breaker**: Provides aggregation and visualization of circuit breaker metrics for a distributed system deployed to Pivotal Cloud Foundry. It includes a "Documentation | Support" link.
- Service Registry**: Provides application service registration and distributed system deployed to Pivotal Cloud Foundry. It includes a "Documentation | Support" link.
- Config Server**: Config Server for Spring Cloud Applications. It provides server and client-side support for external configuration in a distributed system deployed to Pivotal Cloud Foundry. It includes a "Documentation | Support" link.

Each service page includes a "PLAN FEATURES" section with checkboxes for "Single-tenant" and "Netflix OSS Eureka". A "Select this plan" button is visible on the right side of the Config Server page.

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Companies want to be **fast** like Netflix

- Netflix needed to be faster to win / disrupt
- Pioneer & vocal proponent of microservices - the key to their speed and success
- Netflix OSS supplies parts, but it's not a solution
- Difficult for enterprises to build it themselves
- Pivotal offers the closest thing to "Netflix in a box" today



“

"Velocity on the JVM is the Killer App"
- Andy Glover (Netflix Eng) @ SpringOne2GX 2014 Keynote
<https://youtu.be/xU267-YHN5c?t=193s>

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27

It takes a Cloud Native Platform

An end-to-end platform that
makes implementing
distributed application best
practices, a **turn-key** and **first**
practice

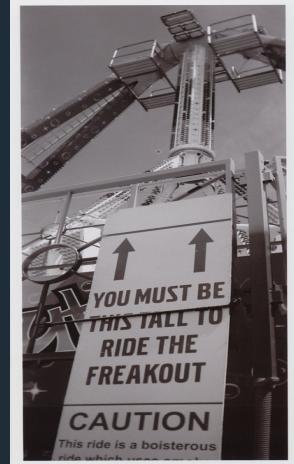
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Essential elements of a Cloud-Native Platform

- Rapid Provisioning of infrastructure components
- Rapid Application Deployment & Management
- Scales Horizontally
- Basic Monitoring, Logs & Metrics
- No-downtime platform upgrades
- Dynamic load balancing and routing
- Manage supporting services (data, messaging)
- Failure detection and health remediation



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Pivotal Cloud Foundry

A complete framework for delivering software rapidly, consistently and reliably at scale.

Application Framework



Language frameworks designed for microservice architectures with components for service discovery, metrics, circuit breakers and more.

Platform Runtime



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Application container runtime with production-ready backing services, automated build pipeline, routing, health management and logging.

Infrastructure Automation



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API-based infrastructure provisioning that delivers bit-for-bit, consistent, self-healing deployments across private and public cloud.

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Cloud Foundry Haiku

Here is my source code

Run it on the cloud for me

I do not care how

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Bosh Haiku

Here are my servers

Go make them a cloud foundry

I do not care how

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A NEW PLATFORM FOR A NEW ERA