

Pivotal Cloud-Native Application Platform

NFJS Software Symposium Workshop

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Senior Product Manager



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What is Pivotal?

- **New Independent Venture:** Spun out & jointly owned by EMC & VMware
- **Proven Leadership:** Paul Maritz, CEO
- **Global Customer Validation:**
+1000 Tier-1 Enterprise Customers
- **Strategic Backing:** \$105M investment by GE
- **Bold Vision:** Focused on delivering The Third Platform

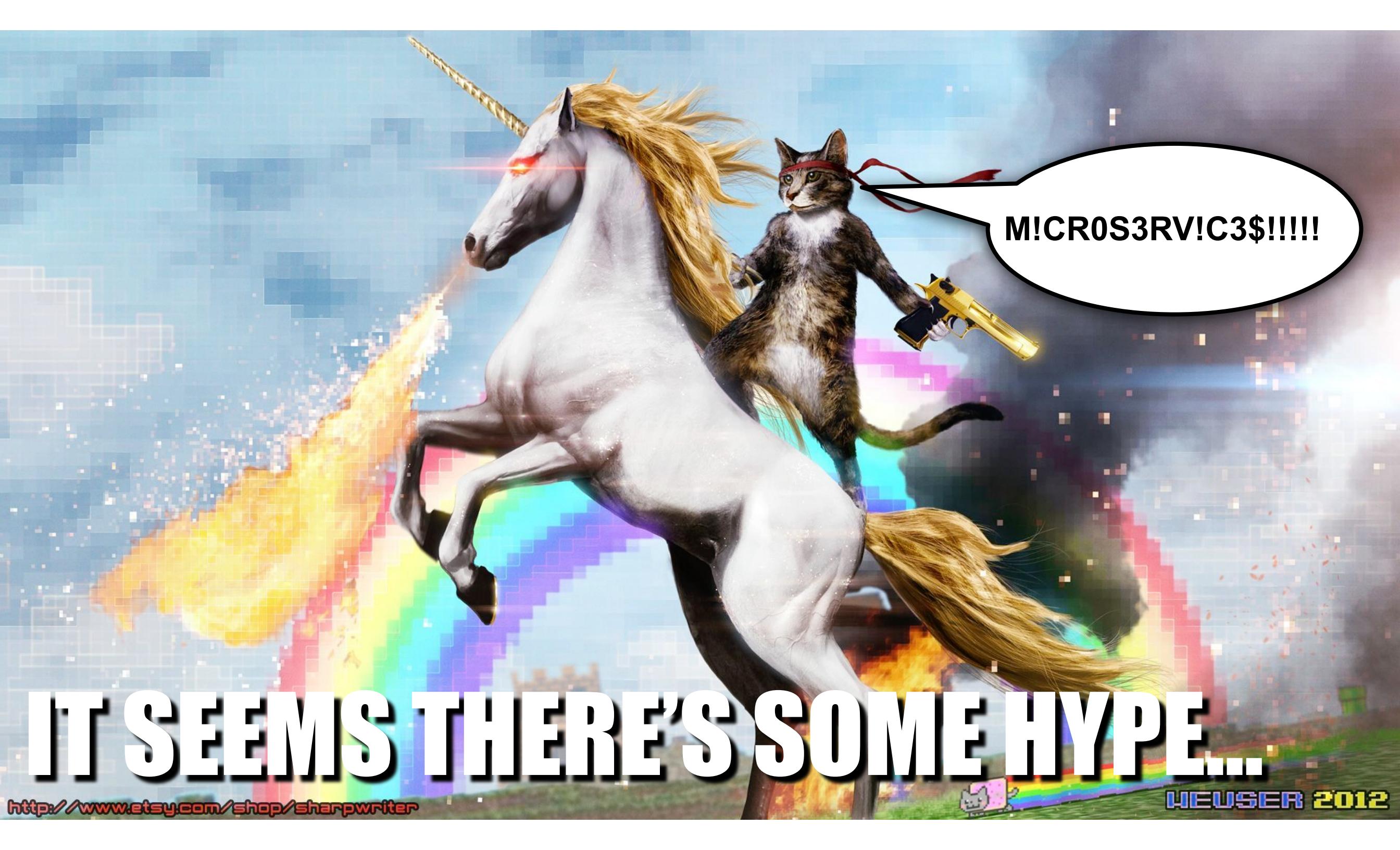
How Might You Know Us?



redis



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IT SEEMS THERE'S SOME HYPE....



DEFINE: Microservice

*Loosely coupled service oriented
architecture with bounded contexts*

Adrian Cockcroft

Technology Fellow, Battery Ventures

Former Netflix Chief Cloud Architect

DEFINE: Microservice

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

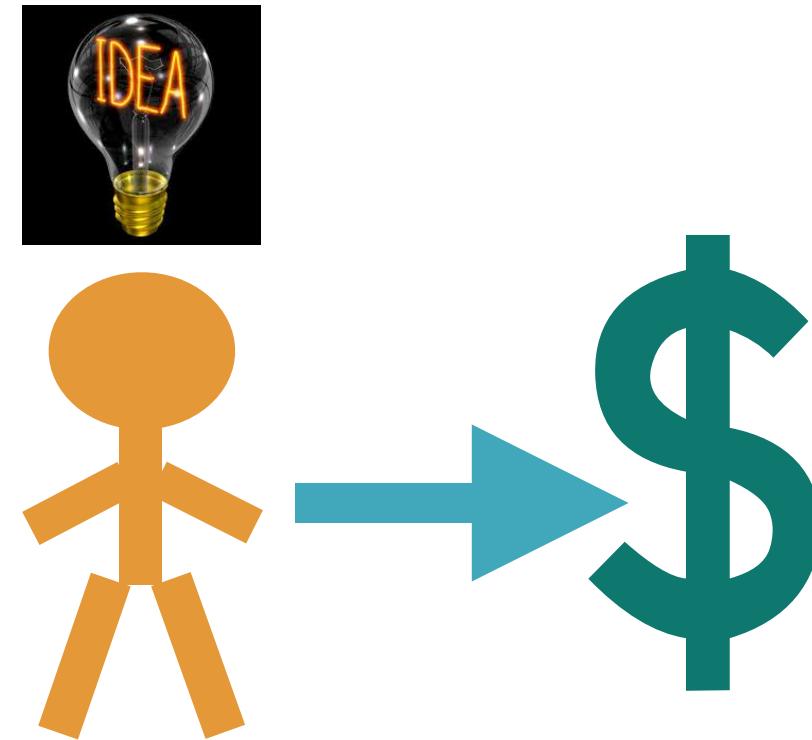
Loosely coupled service oriented architecture with bounded contexts

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

Enabling Continuous Delivery

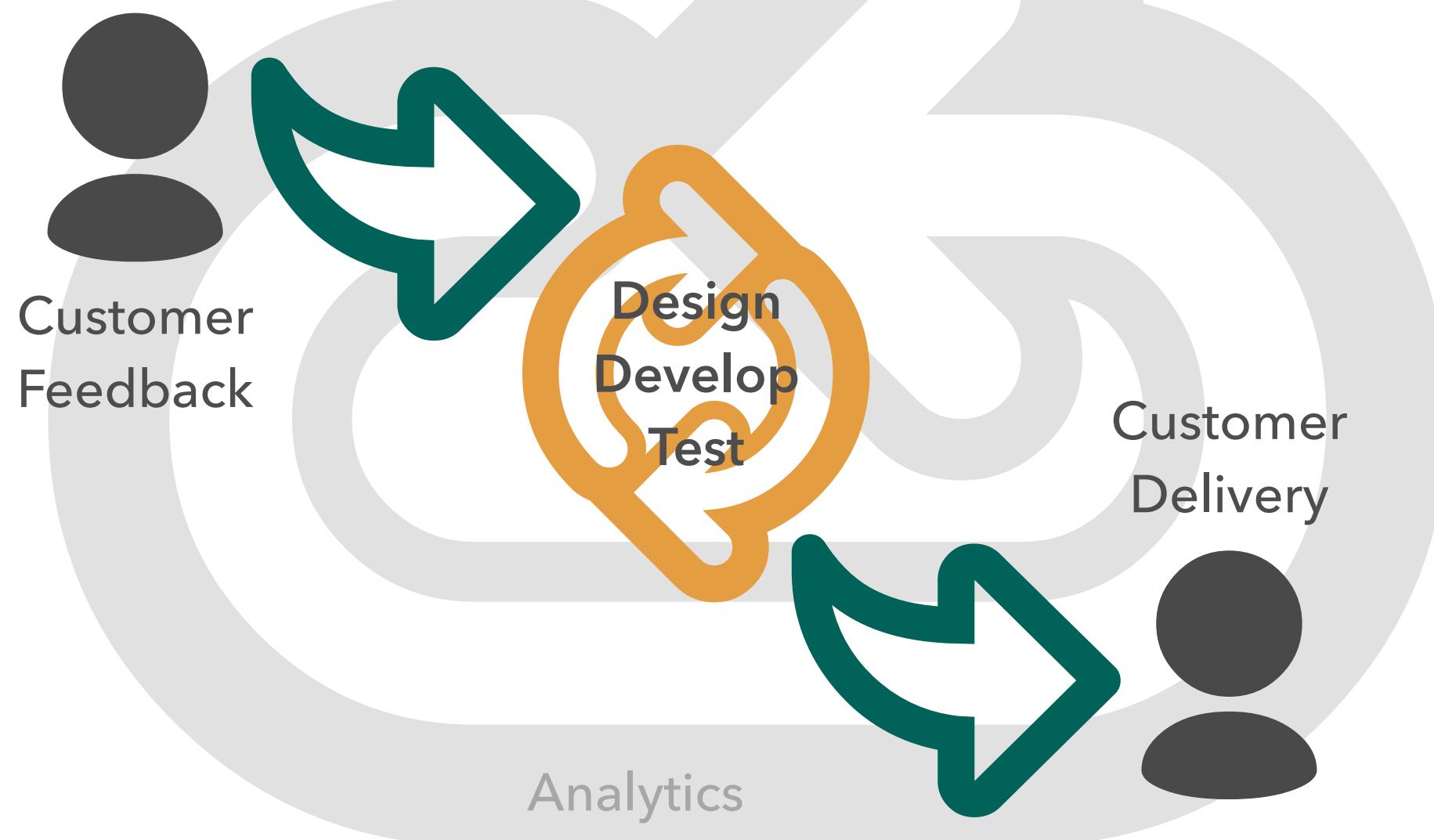


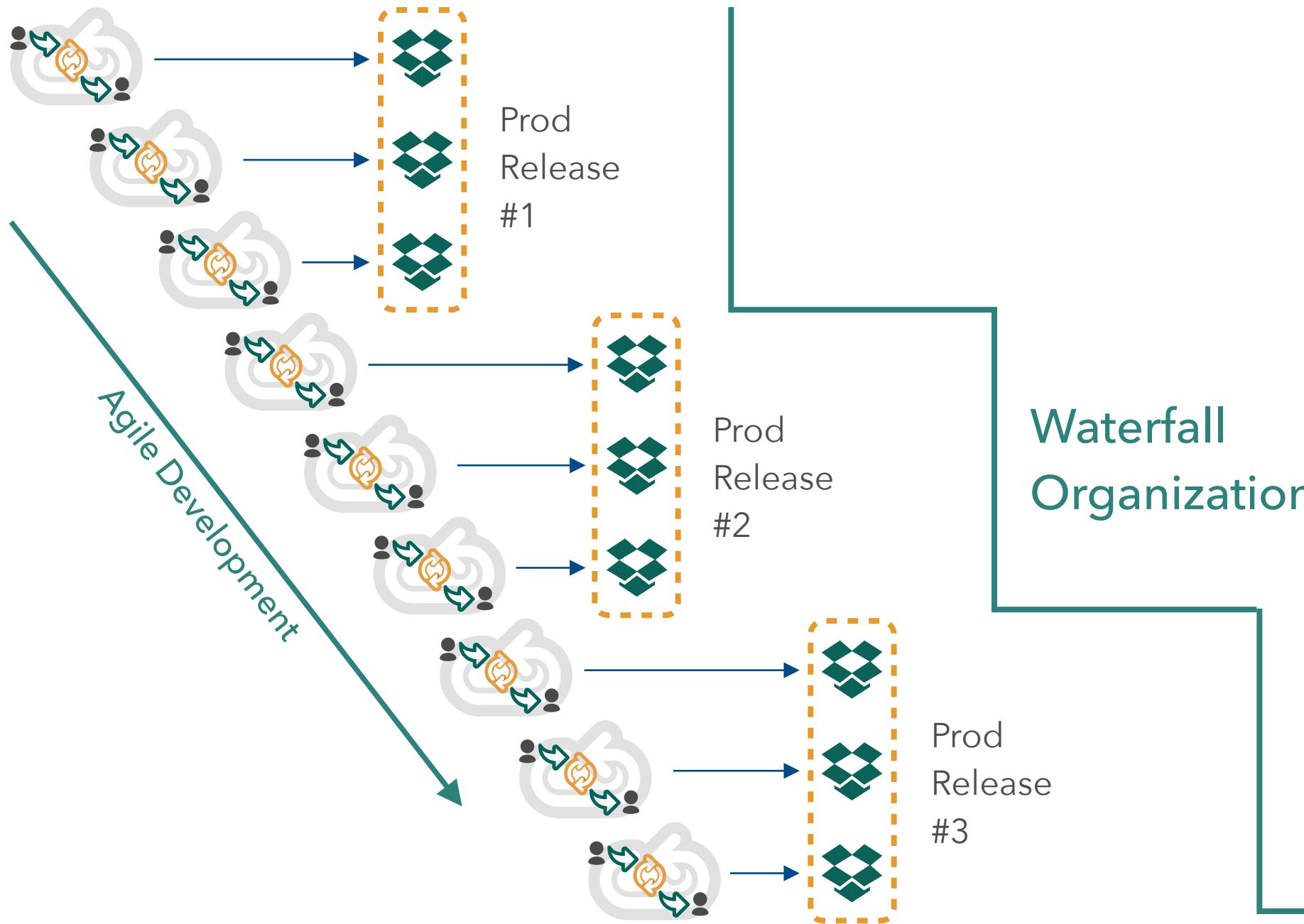
Enabling Continuous Delivery



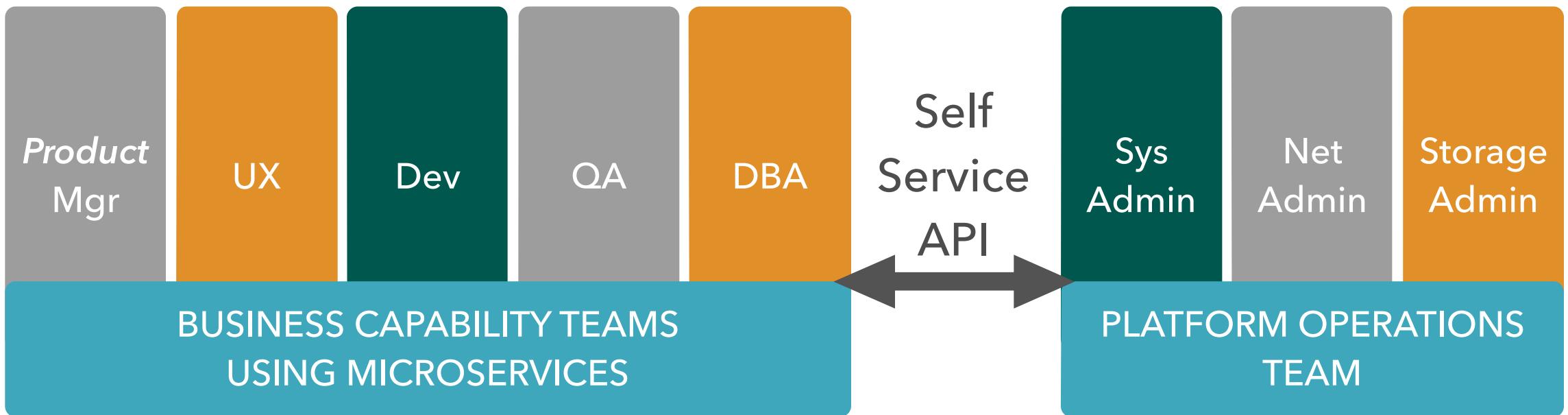
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Keep the Wheel Spinning!





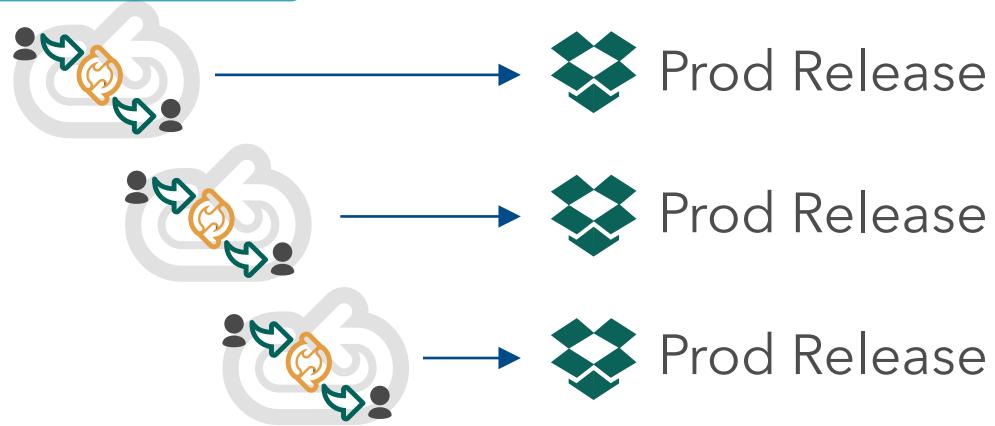
Continuous Delivery



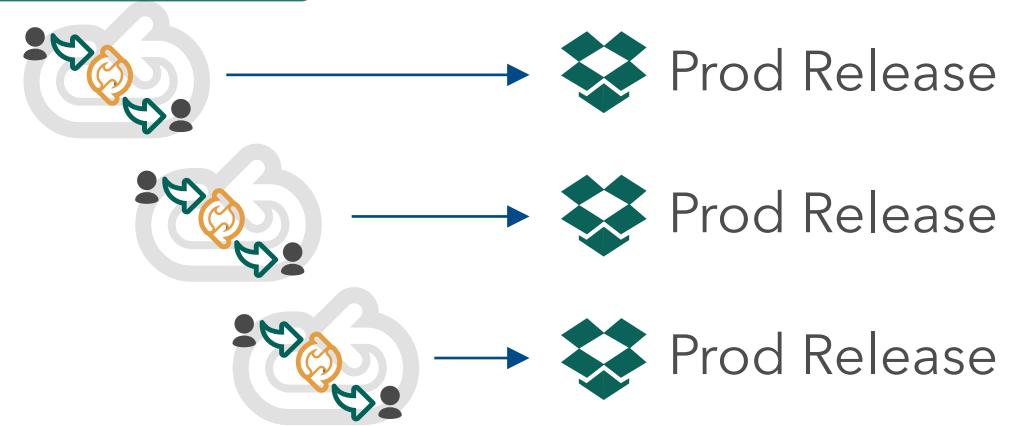
Adapted from: <http://www.slideshare.net/adriancockcroft/goto-berlin>

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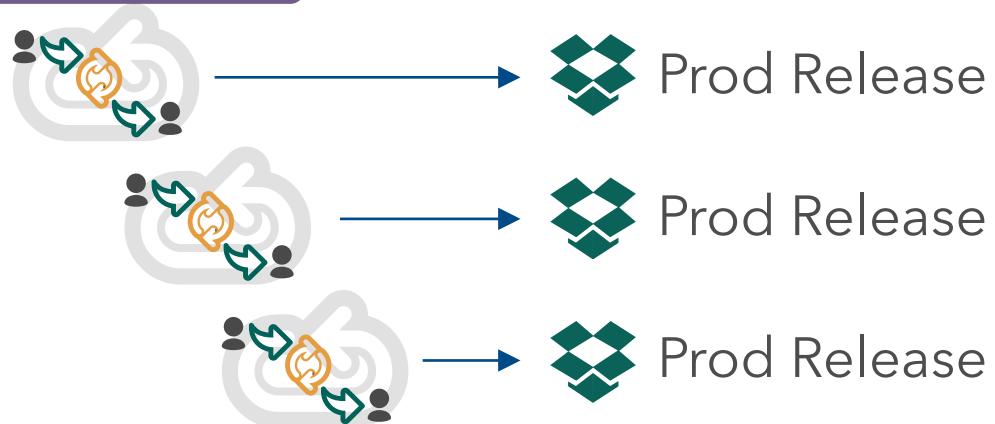
CATALOG



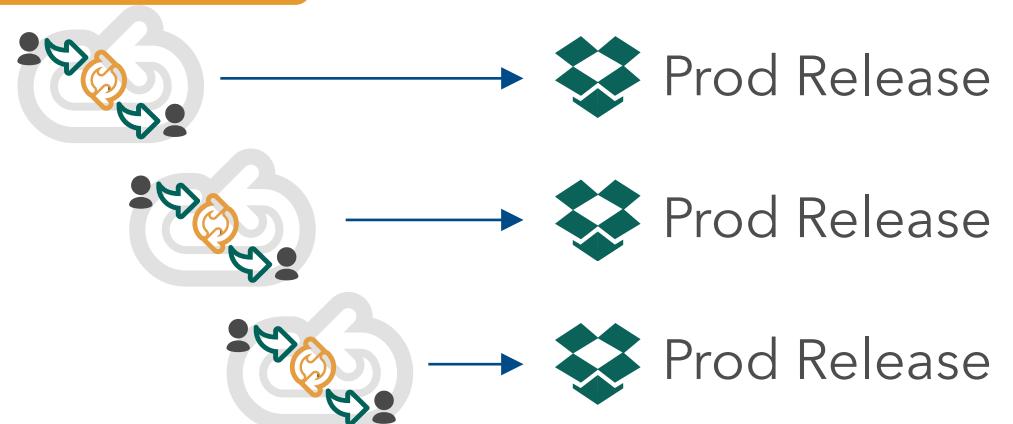
INVENTORY



REVIEWS



SHIPPING



Microservices Enabling Continuous Delivery

- Decoupling Capabilities -> Decoupling Change Cycles
- Product Ownership: Tip to Tail
- We Build and Operate What We Understand BEST
- We Collaborate via API Contracts
 - Microservice to Microservice
 - Microservice to Platform

Microframeworks for Microservices



Spring Boot

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



Dropwizard

<http://dropwizard.io>

<http://12factor.net>

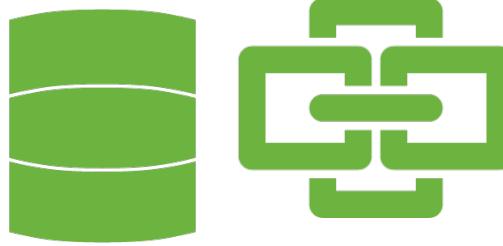
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It can get pretty small...



```
@RestController  
class ThisWillActuallyRun {  
    @RequestMapping("/")  
    String home() {  
        "Hello World!"  
    }  
}
```

With Spring Data REST!

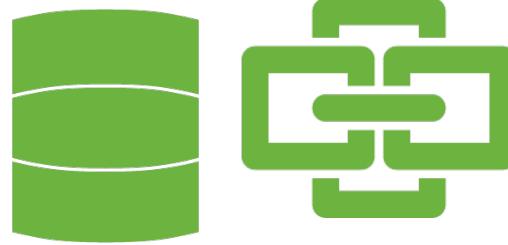


```
@Entity  
@Table(name = "city")  
public class City implements Serializable {  
  
    @Id  
    @GeneratedValue  
    private Long id;  
  
    @Column(nullable = false)  
    private String name;  
  
    @Column(nullable = false)  
    private String county;  
  
    //...  
}
```

<http://projects.spring.io/spring-data-rest>

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With Spring Data REST!

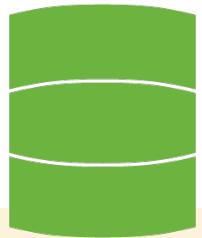


```
@RepositoryRestResource(collectionResourceRel = "cities", path = "cities")
public interface CityRepository extends PagingAndSortingRepository<City, Long> {}
```

```
@Configuration
@ComponentScan
@EnableAutoConfiguration
@EnableJpaRepositories
@Import(RepositoryRestMvcConfiguration.class)
public class Application {

    public static void main(String[] args) {
        SpringApplication.run(Application.class, args);
    }
}
```

With Spring Data REST!

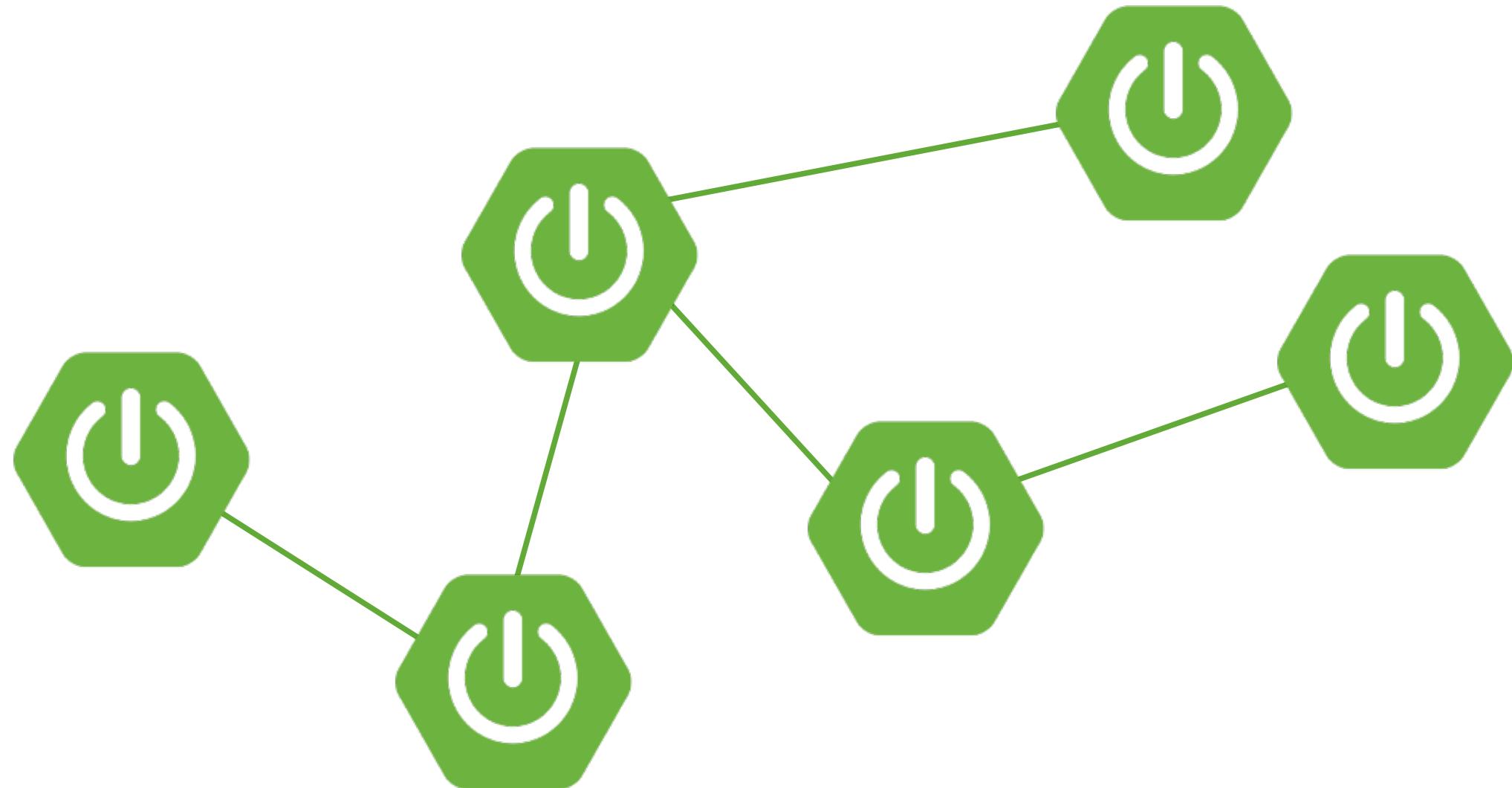


```
{  
  "_links" : {  
    "next" : {  
      "href" : "http://localhost:8080/cities?page=1&size=20"  
    },  
    "self" : {  
      "href" : "http://localhost:8080/cities{?page,size,sort}",  
      "templated" : true  
    }  
  },  
  "_embedded" : {  
    "cities" : [ {  
      "name" : "HOLTSVILLE",  
      "county" : "SUFFOLK",  
      "stateCode" : "NY",  
      "postalCode" : "00501",  
      "latitude" : "+40.922326",  
      "longitude" : "-072.637078",  
      "id" : "1"  
    }]  
  }  
}
```

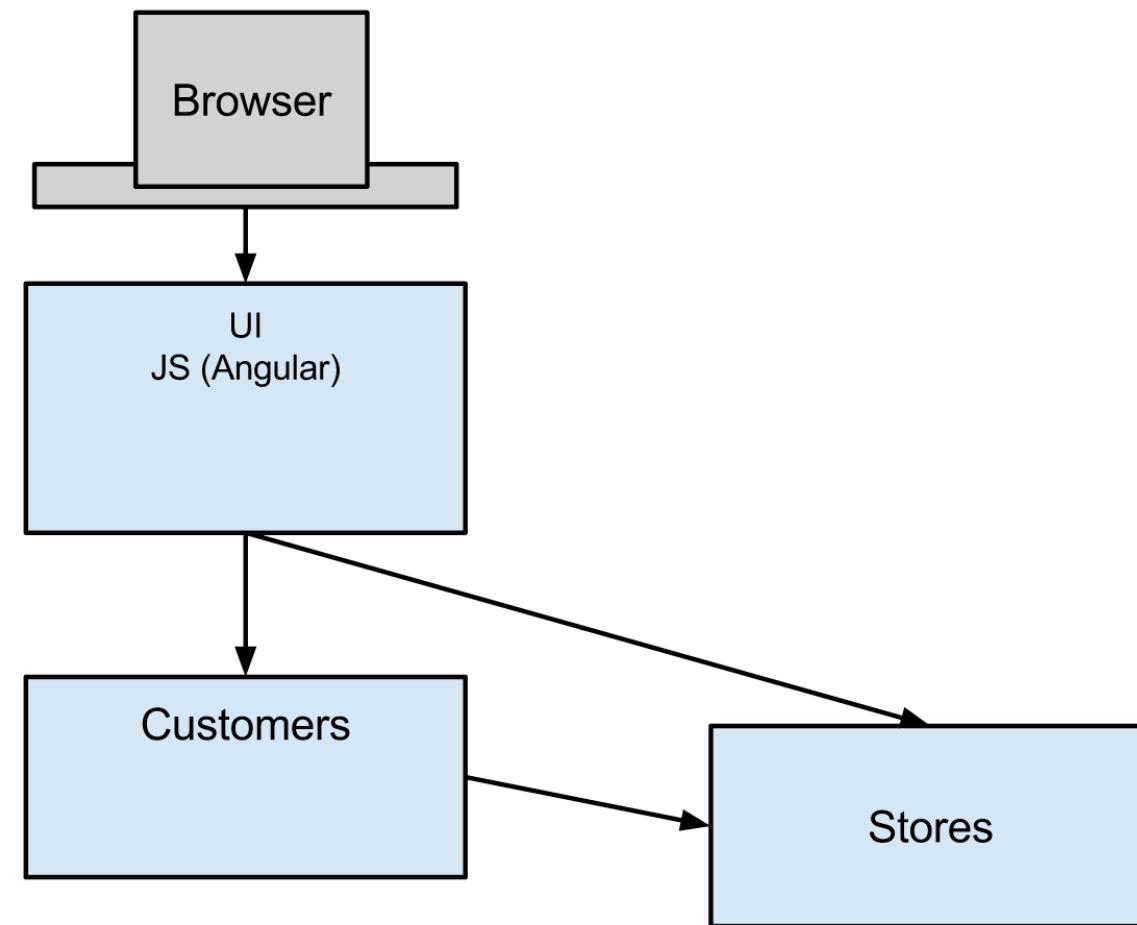
<http://projects.spring.io/spring-data-rest>

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But No Microservice is an Island...



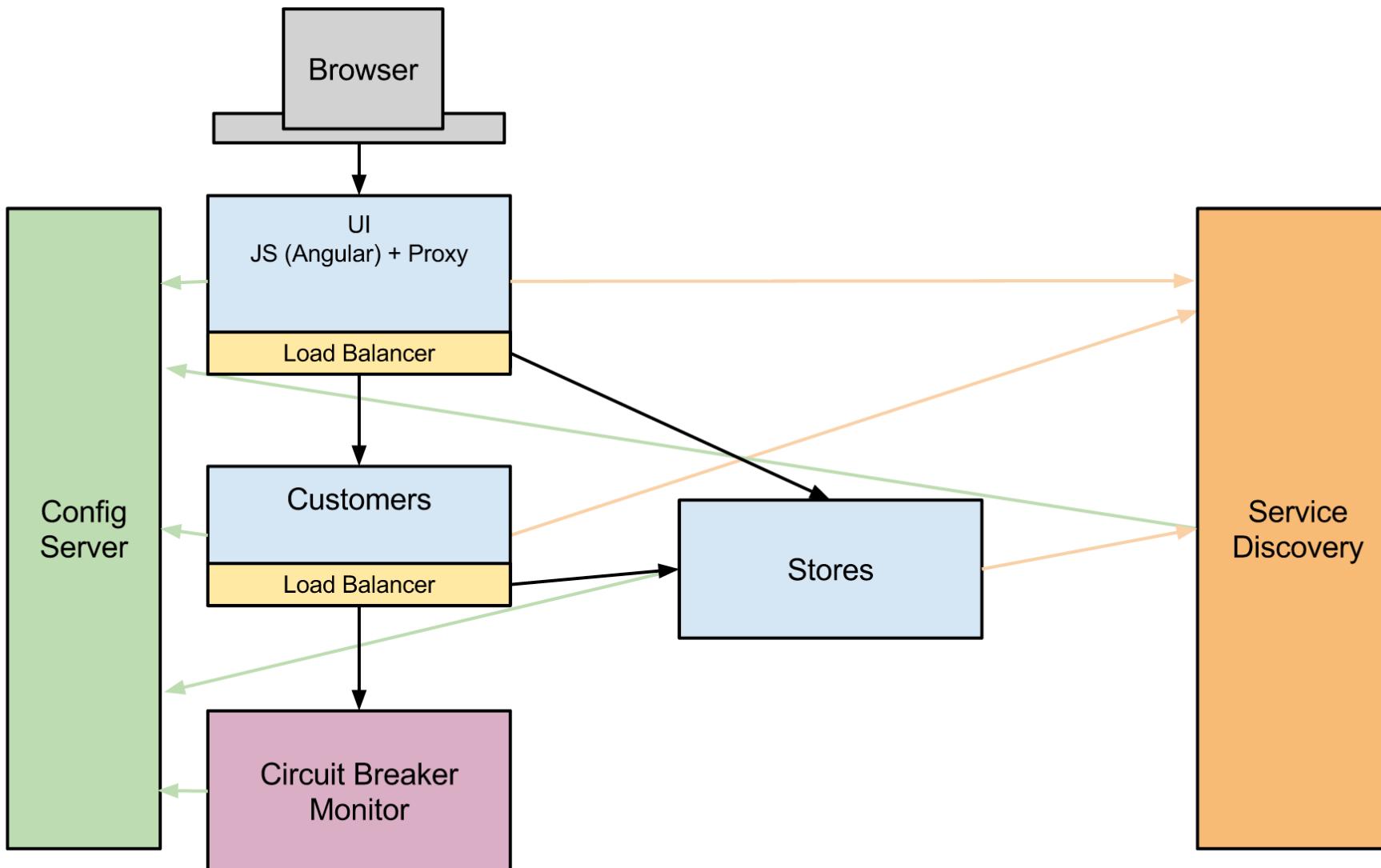
Example Distributed System: Minified



Some emergent challenges of microservices systems...

- Configuration Management
- Service Registration & Discovery
- Routing & Load Balancing
- Fault Tolerance (Circuit Breakers!)
- Monitoring

Example: Coordination Boiler Plate





- Eureka
- Hystrix + Turbine
- Ribbon
- Feign
- Zuul

PROJECTS

Spring Cloud



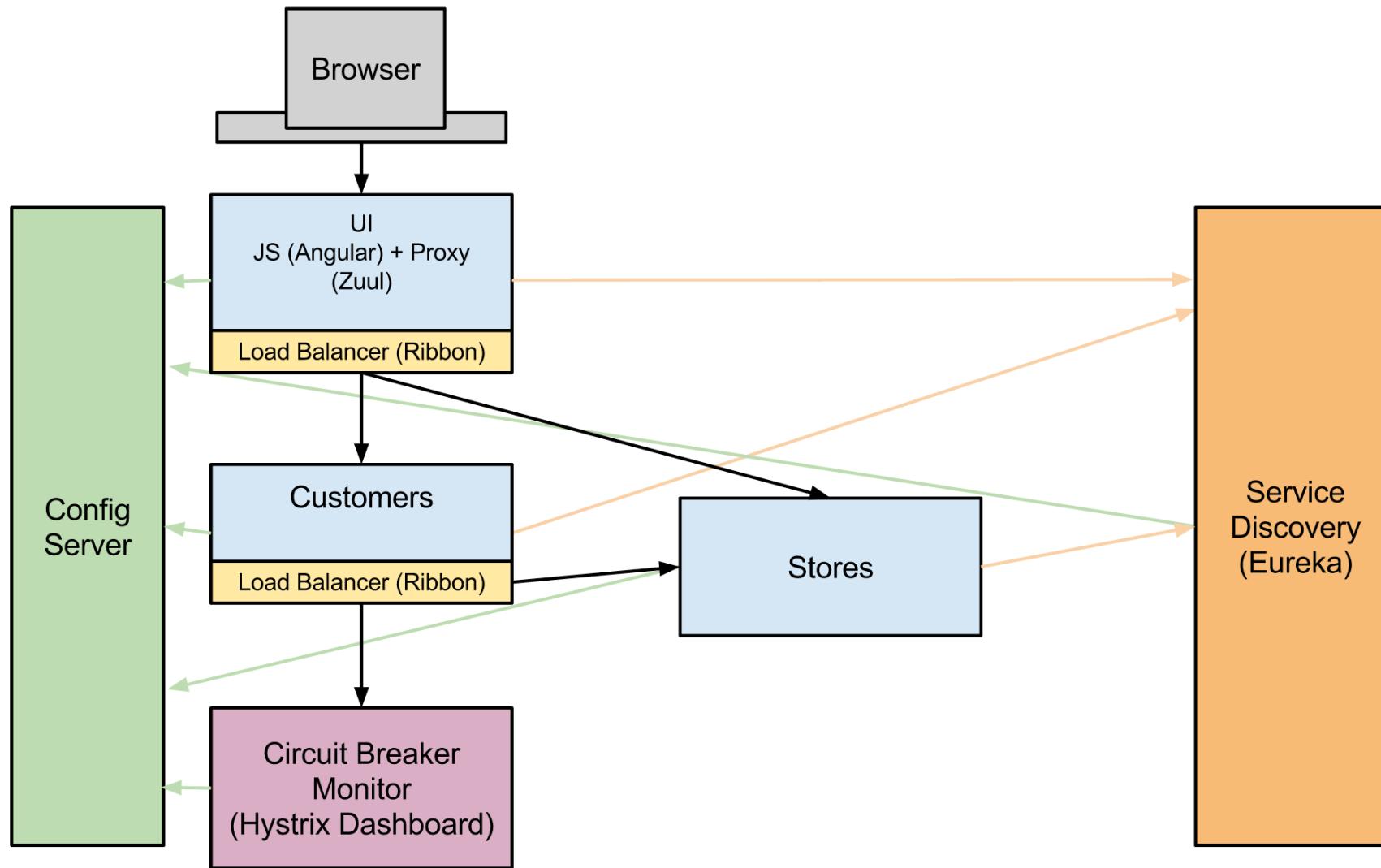
Spring Cloud provides tools for developers to quickly build some of the common patterns in distributed systems (e.g. configuration management, service discovery, circuit breakers, intelligent routing, micro-proxy, control bus, one-time tokens, global locks, leadership election, distributed sessions, cluster state). Coordination of distributed systems leads to boiler plate patterns, and using Spring Cloud developers can quickly stand up services and applications that implement those patterns. They will work well in any distributed environment, including the developer's own laptop, bare metal data centres, and managed platforms such as Pivotal CloudFoundry.

[QUICK START](#)

<http://projects.spring.io/spring-cloud>

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Example: Spring Cloud + Netflix OSS



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| [Google Finds: Centralized Control, Distributed Data Architectures Work Better than Fully Decentralized Architectures »](#)

Microservices - Not A Free Lunch!

TUESDAY, APRIL 8, 2014 AT 8:54AM

This is a guest post by [Benjamin Wootton](#), CTO of [Contino](#), a London based consultancy specialising in applying DevOps and Continuous Delivery to software delivery projects.

Microservices are a style of software architecture that involves delivering systems as a set of very small, granular, independent collaborating services.



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Site24x7.com

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

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You must be this tall to use Microservices...

- RAPID PROVISIONING
- BASIC MONITORING
- RAPID APPLICATION DEPLOYMENT
- DEVOPS CULTURE

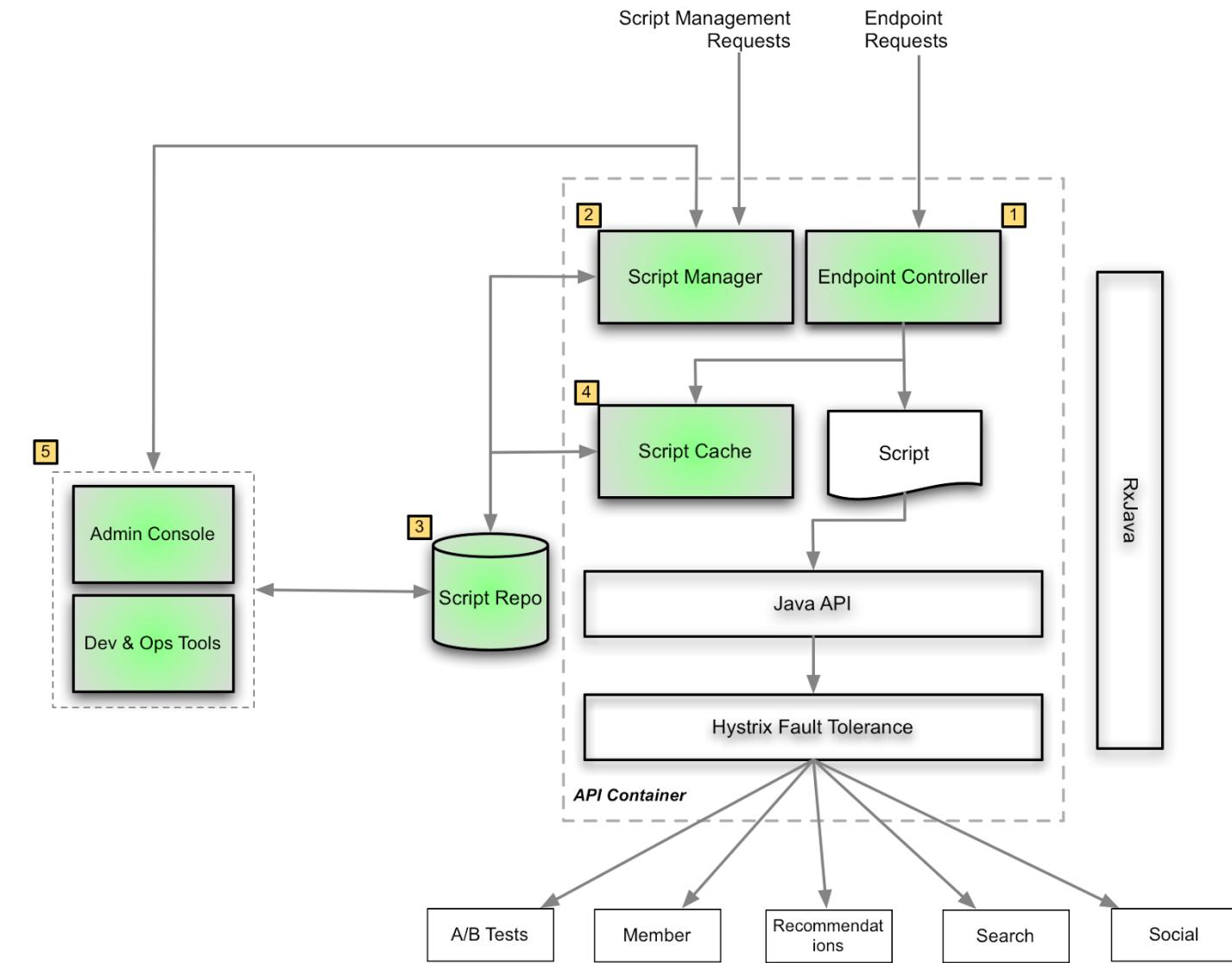
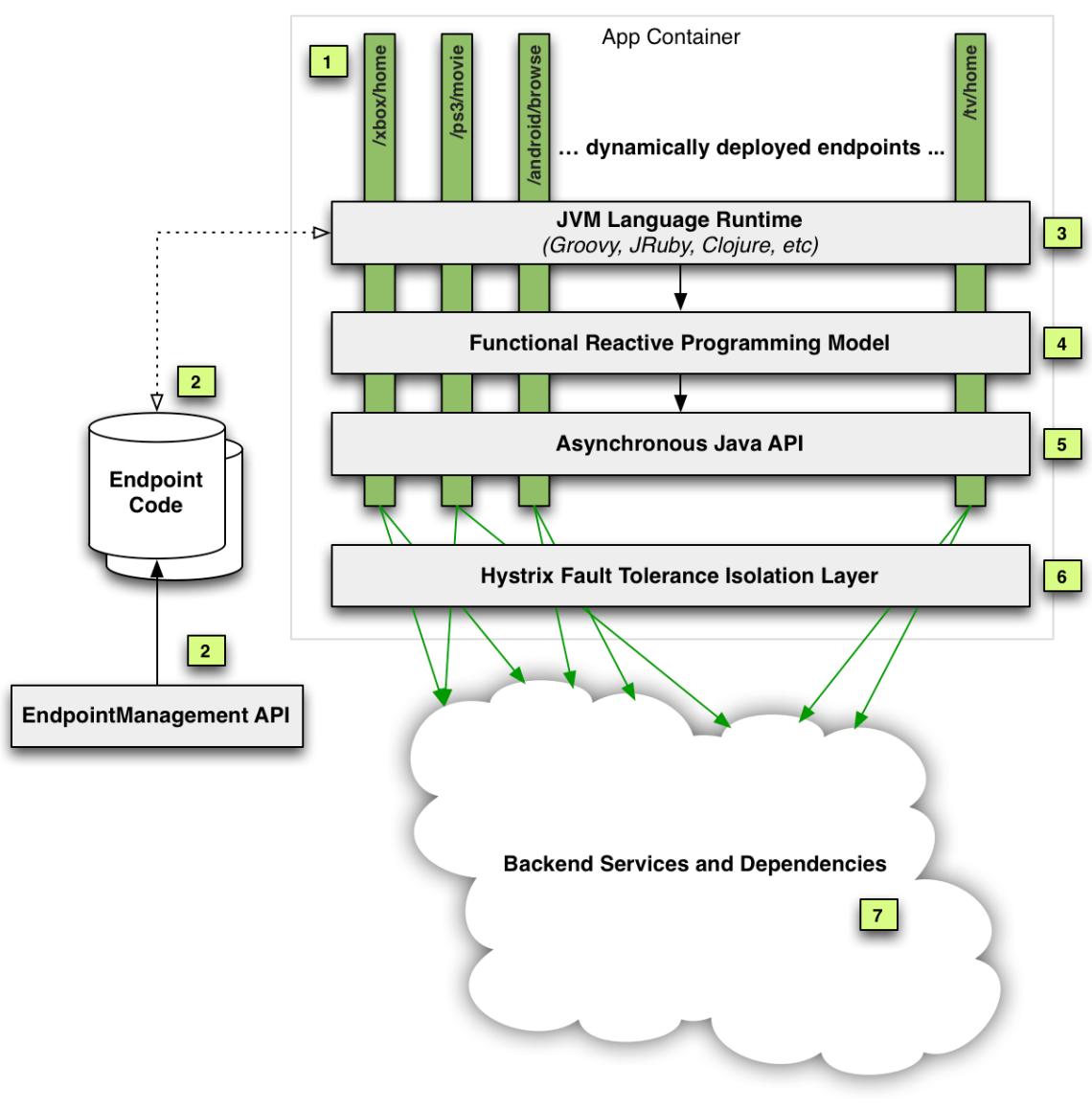


<http://martinfowler.com/bliki/MicroservicePrerequisites.html>

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It takes a platform...

NETFLIX

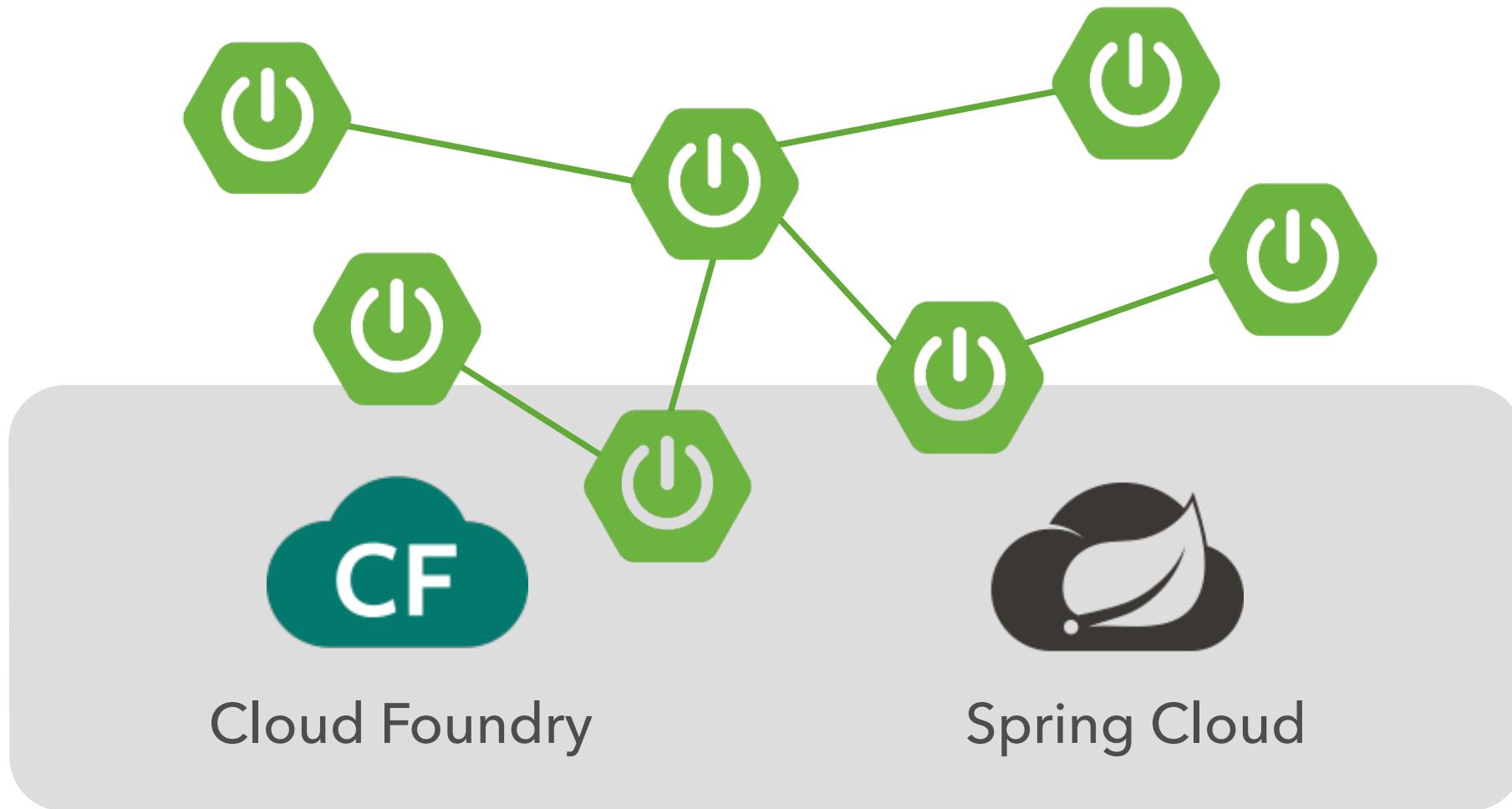


<http://techblog.netflix.com/2013/01/optimizing-netflix-api.html>

<http://techblog.netflix.com/2014/03/the-netflix-dynamic-scripting-platform.html>

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It takes a platform...



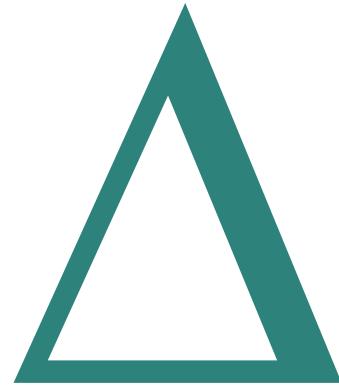
Platform Features



- Environment Provisioning
- On-Demand/Automatic Scaling
- Failover/Resilience
- Routing/Load Balancing
- Data Service Operations
- Monitoring

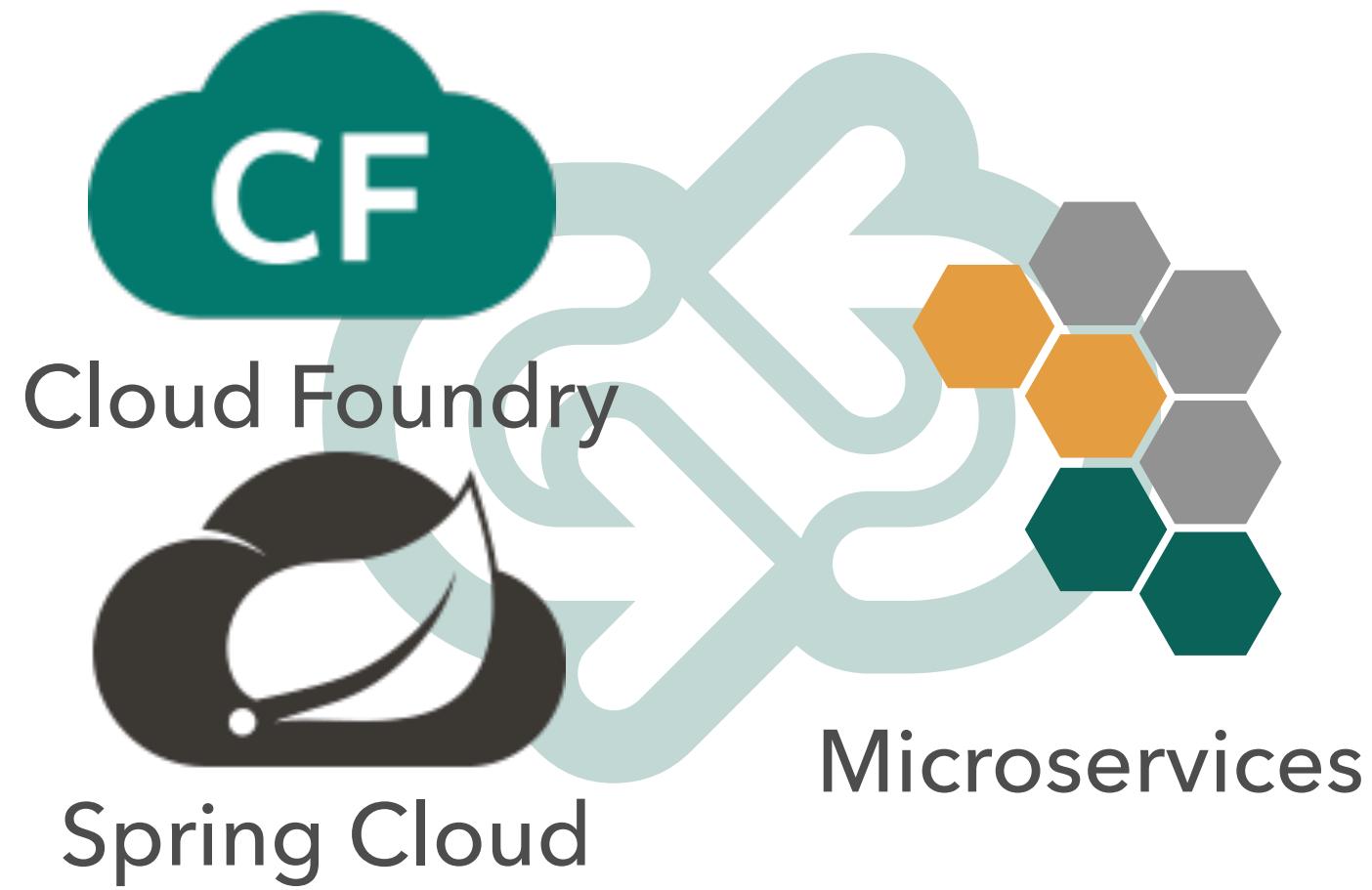
Supporting Rapid Change

Microservices is the first architectural style developed:



POST Continuous Delivery
&
POST DevOps

OPERATIONALIZED ARCHITECTURE



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A NEW PLATFORM FOR A NEW ERA