

# Spring Boot Apps on Kubernetes



Thomas Risberg

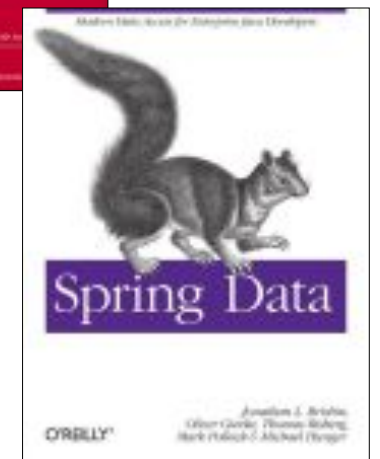
Pivotal®



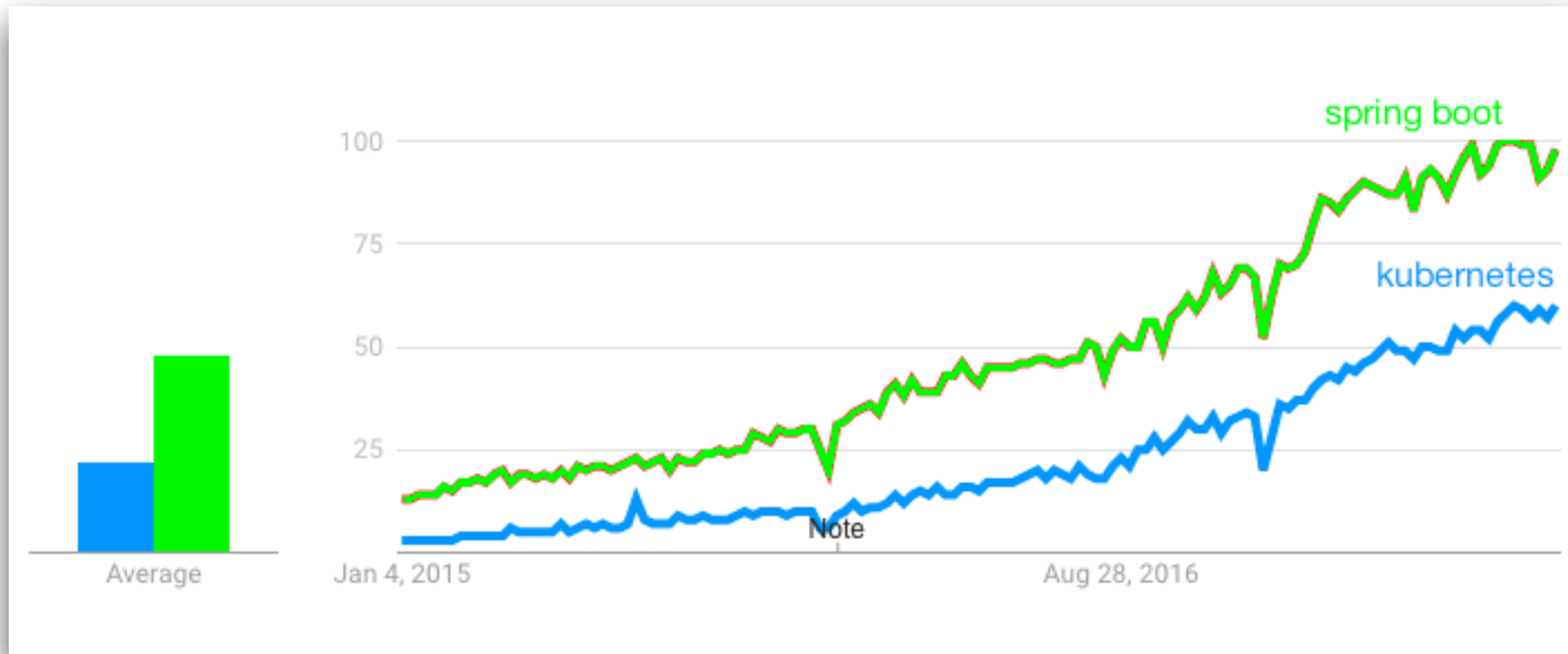
# About me

Thomas Risberg (@trisberg)

- Member of the Spring engineering team at Pivotal
- Contributing to Spring Cloud Data Flow, Spring Cloud Deployer for Kubernetes projects
- Joined the Spring Framework open source project in 2003 working on JDBC support



# Two Hot Technologies



Based on: <https://trends.google.com/trends/explore?q=kubernetes,spring%20boot>

# What is Spring Boot?

*Spring Boot* takes an opinionated view of building production-ready Spring applications. Spring Boot favors convention over configuration and is designed to get you up and running as quickly as possible.

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

# Pair programming with Spring Team



# What is Kubernetes?

*Kubernetes* is an open-source system for automating deployment, scaling, and management of containerized applications.

It groups containers that make up an application into logical units for easy management and discovery.

<https://kubernetes.io/>

# Pairing with Google Engineering Team?

*Kubernetes builds upon 15 years of experience of running production workloads at Google, combined with best-of-breed ideas and practices from the community.*

# Running Kubernetes

- Hosted
- Scripted
- On prem cluster
- Minikube for dev
- CLI - `kubectl`



IBM Bluemix  
Container Service



Quick Start for  
**kubernetes**  
by  
**heptio**



**minikube**



Pivotal  
Container Service™





# Demo

**Simple Hello  
Spring Boot/Kubernetes  
app deployment**

<https://github.com/trisberg/devoxx-spring-boot-k8s/blob/master/demo-hello.adoc>

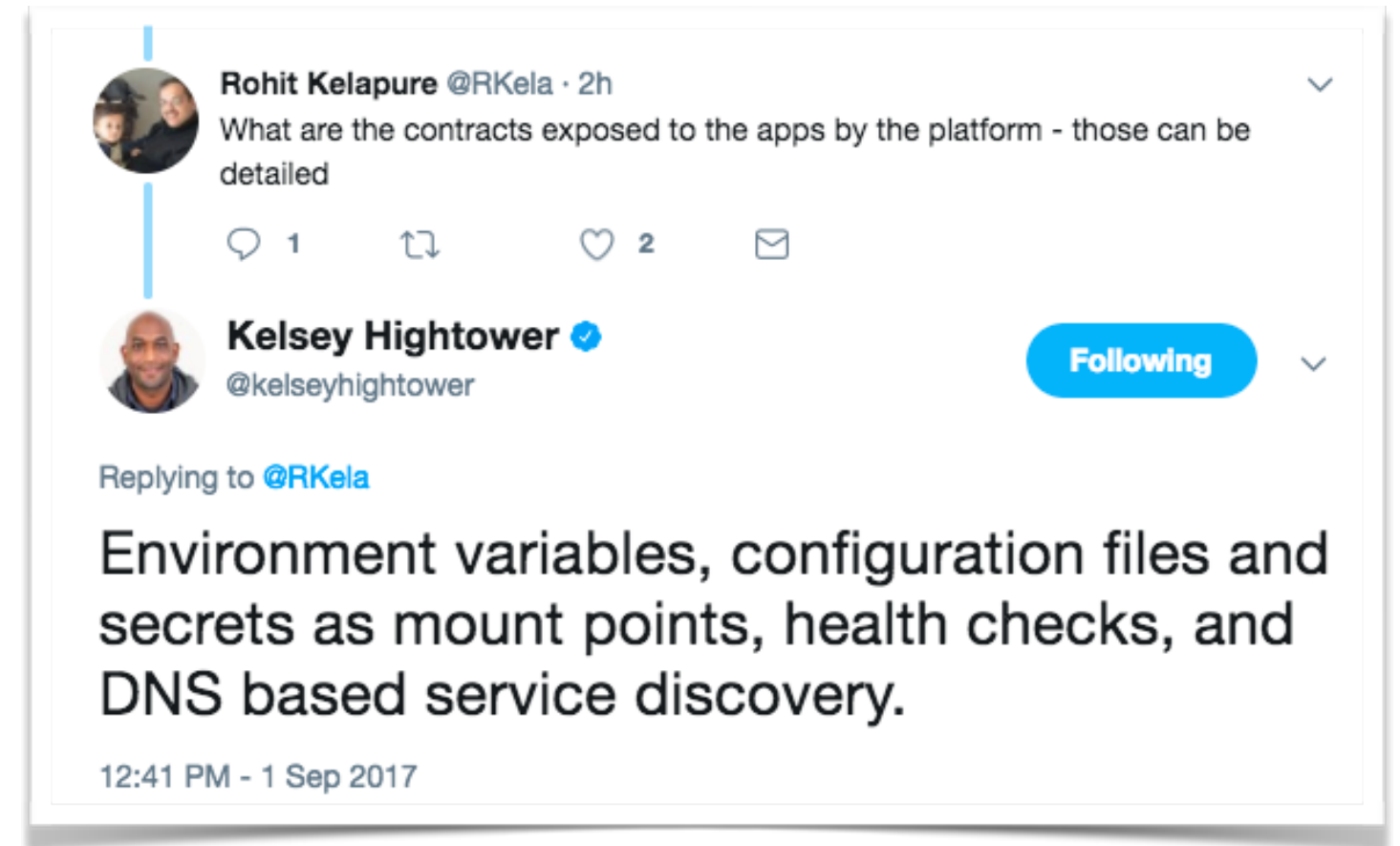
# Building Apps for Kubernetes



<https://twitter.com/kelseyhightower/status/903640408613306369>

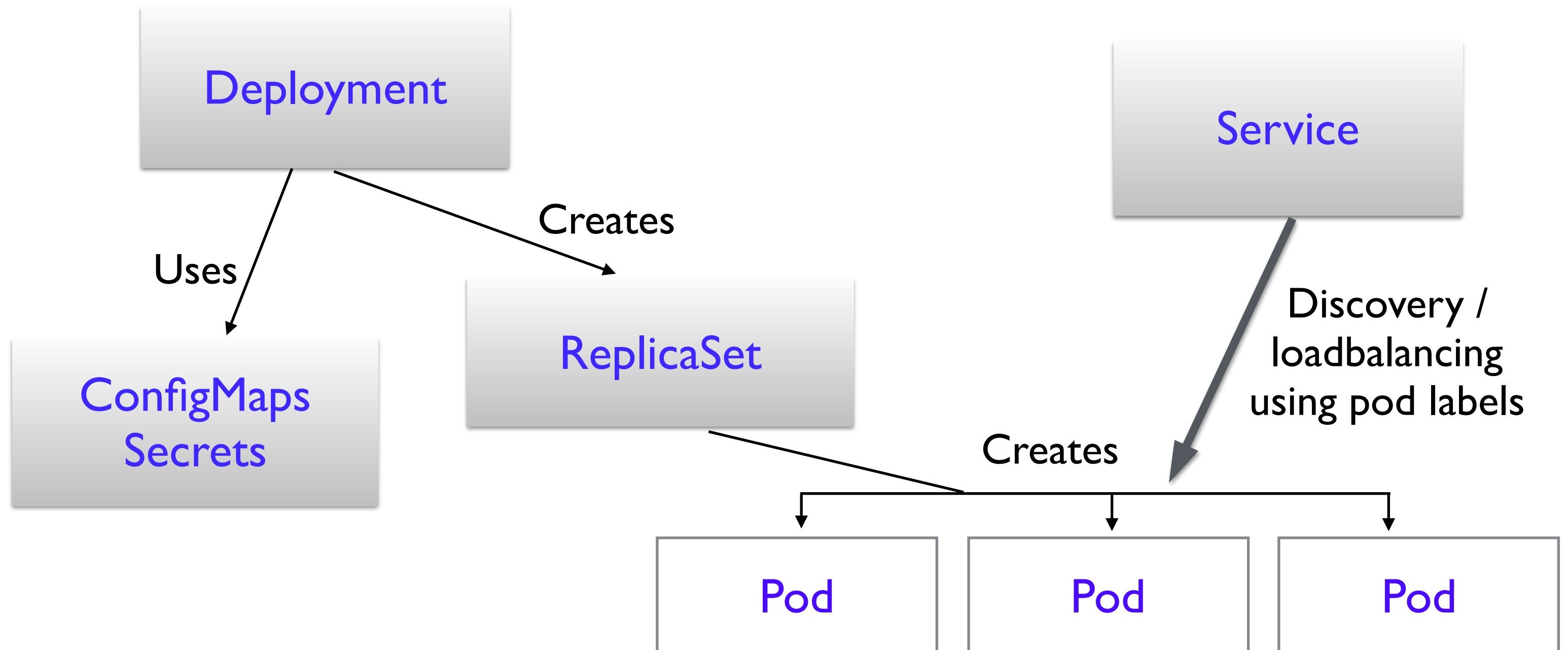
# Contracts exposed to the apps by the platform

- Environment variables
- Configuration files
- Secrets as mount points
- Health checks
- DNS based service discovery



<https://twitter.com/kelseyhightower/status/903643916599046145>

# Kubernetes Resources



# Externalized Configuration

- Environment variables
  - Easy to set in `deployment.yaml`
  - Might need to use `SPRING_APPLICATION_JSON` for map based properties
- ConfigMaps and Secrets
  - Can be set using environment or mounted as config files
- Use Spring Cloud Config Server
- Init container can write properties file to shared volume



# Demo

**Simple REST Repository App  
as part of a  
Microservice Architecture**

<https://github.com/trisberg/devoxx-spring-boot-k8s/blob/master/demo-actors.adoc>

<https://github.com/trisberg/devoxx-spring-boot-k8s/blob/master/demo-microservices.adoc>

<https://github.com/trisberg/boot-k8s-microservices/tree/devoxx-2017>

# Spring Cloud / Netflix OSS

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

- Spring Cloud Config
- Service Discovery
  - Netflix Eureka
  - Consul
- Load balancing / routing
  - Netflix Ribbon & Zuul
- Circuit Breakers
  - Netflix Hystrix

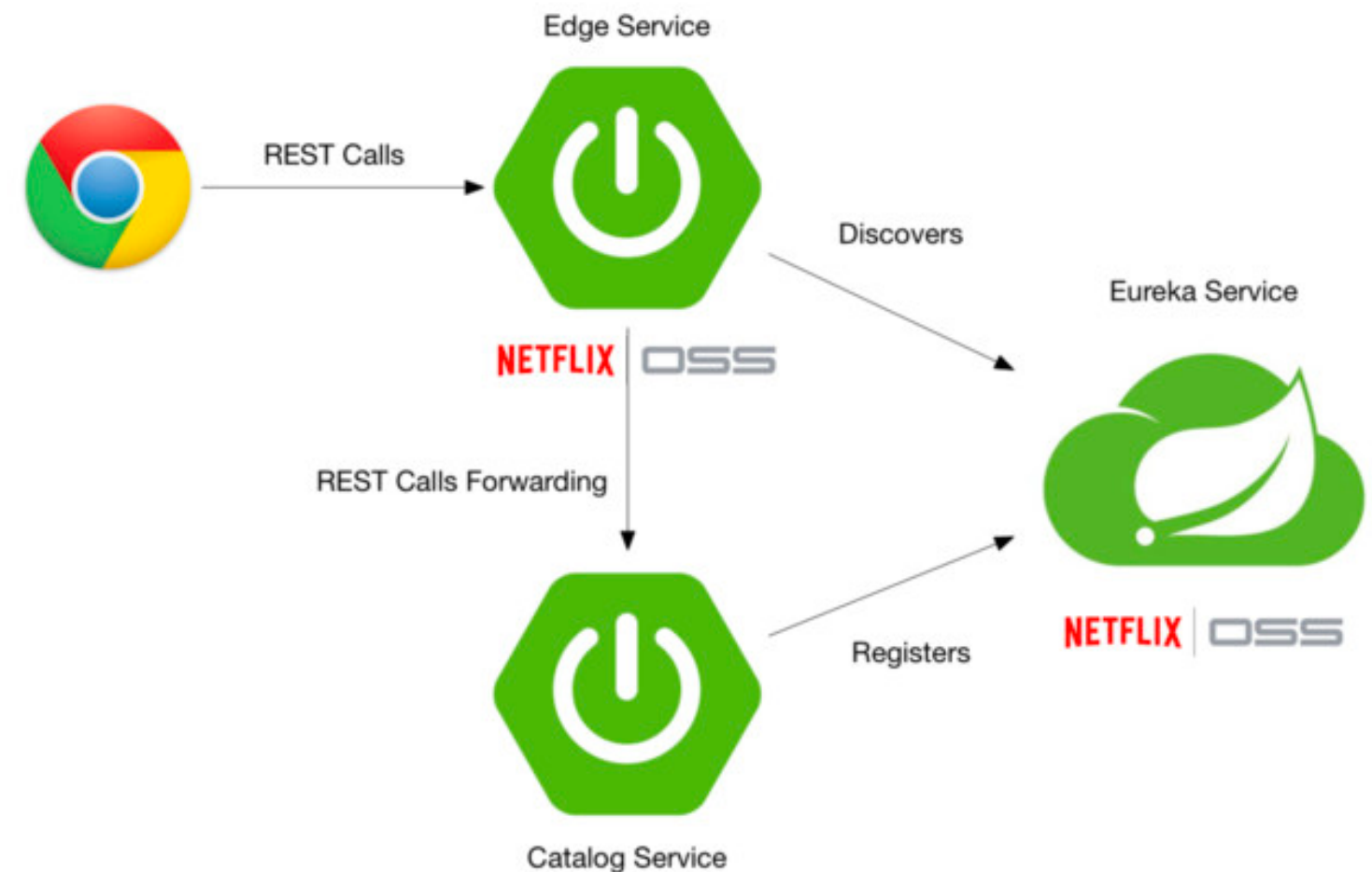
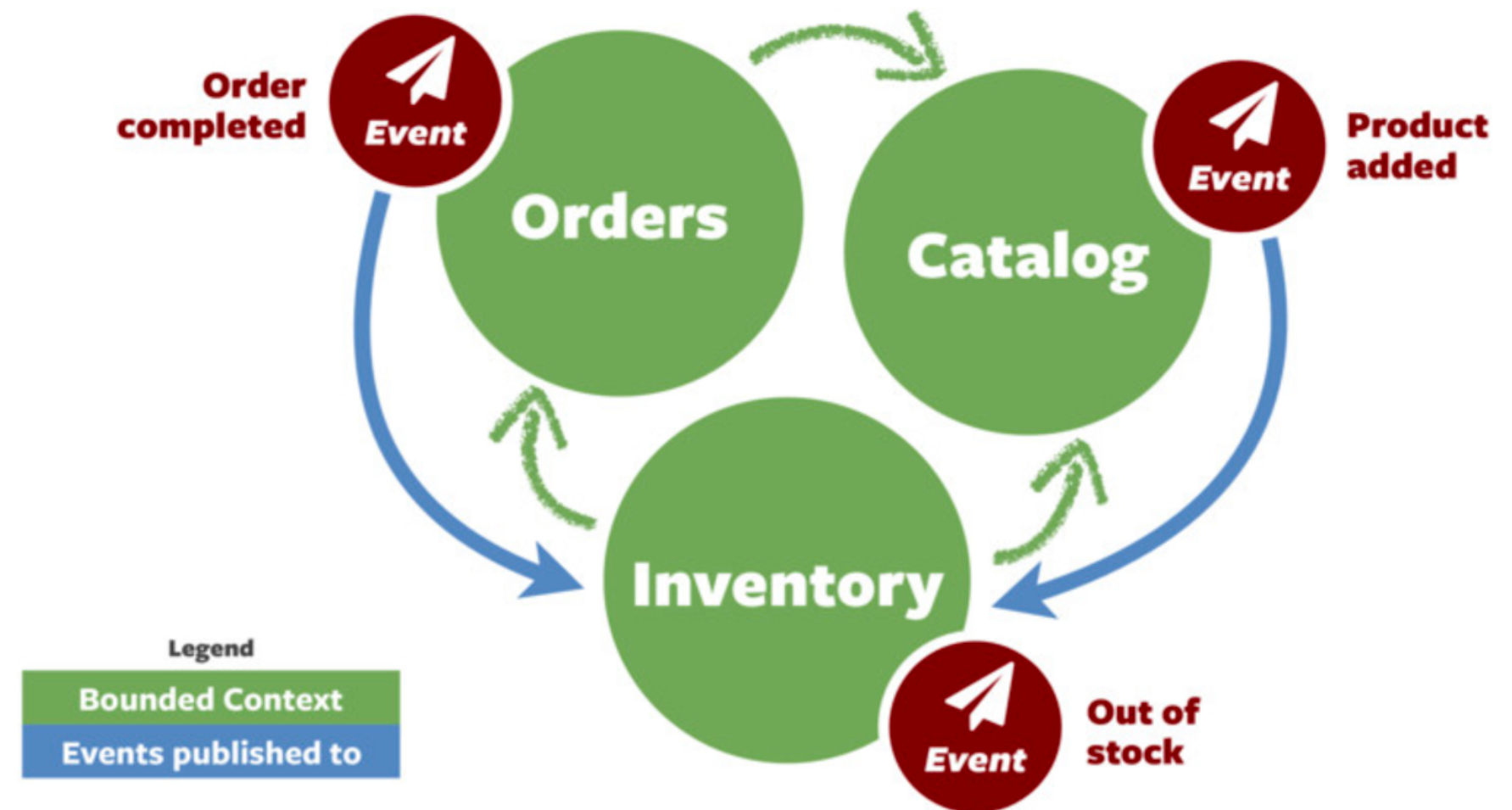


Image from: <https://www.slideshare.net/mraible/develop-hip-apis-and-apps-with-spring-boot-and-angular-connecttech-2017/16?src=clipshare>



# Microservice Architecture Concerns

- Externalized Configuration ✓
  - ConfigMap and Secrets
- Service Discovery ✓
  - DNS, DiscoveryClient
- Circuit-breaker
- Distributed Tracing
- Metrics
- Log aggregation



<https://speakerdeck.com/olivergierke/refactoring-to-a-system-of-systems?slide=29>



# Microservice Runtime Management

- Circuit-breaker - Netflix Hystrix
- Distributed Tracing - Spring Cloud Sleuth / Zipkin
- Metrics - Spring Boot Actuator / Micrometer



- 
- Service Mesh - Istio
    - load balancing / routing
    - policy enforcement
    - telemetry and reporting



# Log Aggregation

- Spring Cloud Sleuth
  - <https://cloud.spring.io/spring-cloud-sleuth/>
- Stackdriver
  - <https://kubernetes.io/docs/tasks/debug-application-cluster/logging-stackdriver/>
- Elasticsearch and Kibana
  - <https://kubernetes.io/docs/tasks/debug-application-cluster/logging-elasticsearch-kibana/>
- Loggly
  - <https://www.weave.works/blog/log-aggregation-kubernetes-loggly/>

# Packaging

- **Helm**

- The package manager for Kubernetes
  - [https://docs.helm.sh/using\\_helm/#quickstart-guide](https://docs.helm.sh/using_helm/#quickstart-guide)



- **KubeApps**

- Discover & launch great Kubernetes-ready apps
  - <https://kubeapps.com/>

- **Example**

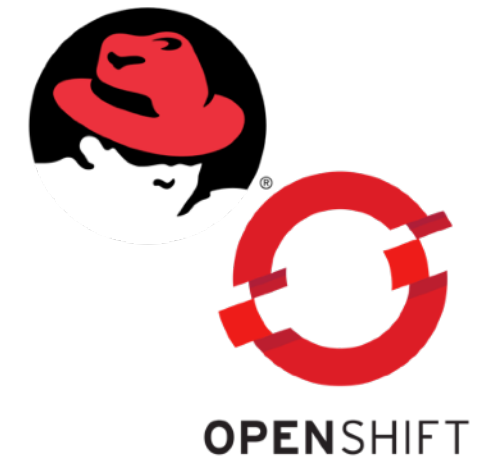
- <https://github.com/trisberg/boot-k8s-microservices/tree/devoxx-2017>

# Helm Repos

- Stable/Incubator official published charts
  - <https://github.com/kubernetes/charts>
- Your own repo
  - Use `helm init` to create and then publish the repo with any HTTP server
  - Use `helm repo add` to add it to helm CLI
- Local repo
  - Use `helm serve`

# Spring Cloud for Kubernetes

- Fabric8 team created spring-cloud-kubernetes
  - DiscoveryClient for Kubernetes
  - ConfigMap and Secrets PropertySource
  - Ribbon discovery in Kubernetes
  - Zipkin discovery in Kubernetes
  - and more ...
- Now available in spring-cloud-incubator on GitHub





# Questions?

## Useful Links

- ▶ <https://github.com/trisberg/devoxx-spring-boot-k8s>
- ▶ <https://projects.spring.io/spring-boot/>
- ▶ <https://kubernetes.io/>
- ▶ <https://projects.spring.io/spring-cloud/>
- ▶ <http://www.oreilly.com/programming/free/kubernetes-for-java-developers.csp>
- ▶ <https://github.com/spring-cloud-incubator/spring-cloud-kubernetes>
- ▶ <https://developers.redhat.com/blog/2017/10/03/configuring-spring-boot-kubernetes-configmap/>
- ▶ <https://developers.redhat.com/blog/2017/10/04/configuring-spring-boot-kubernetes-secrets/>