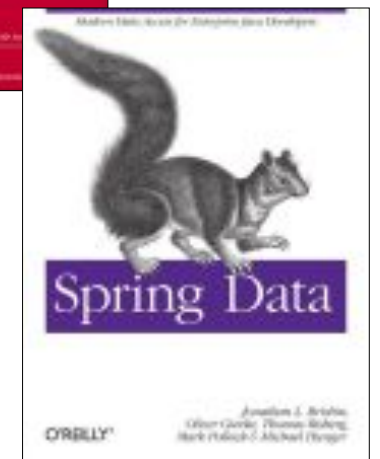# Spring Boot Apps on Kubernetes

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
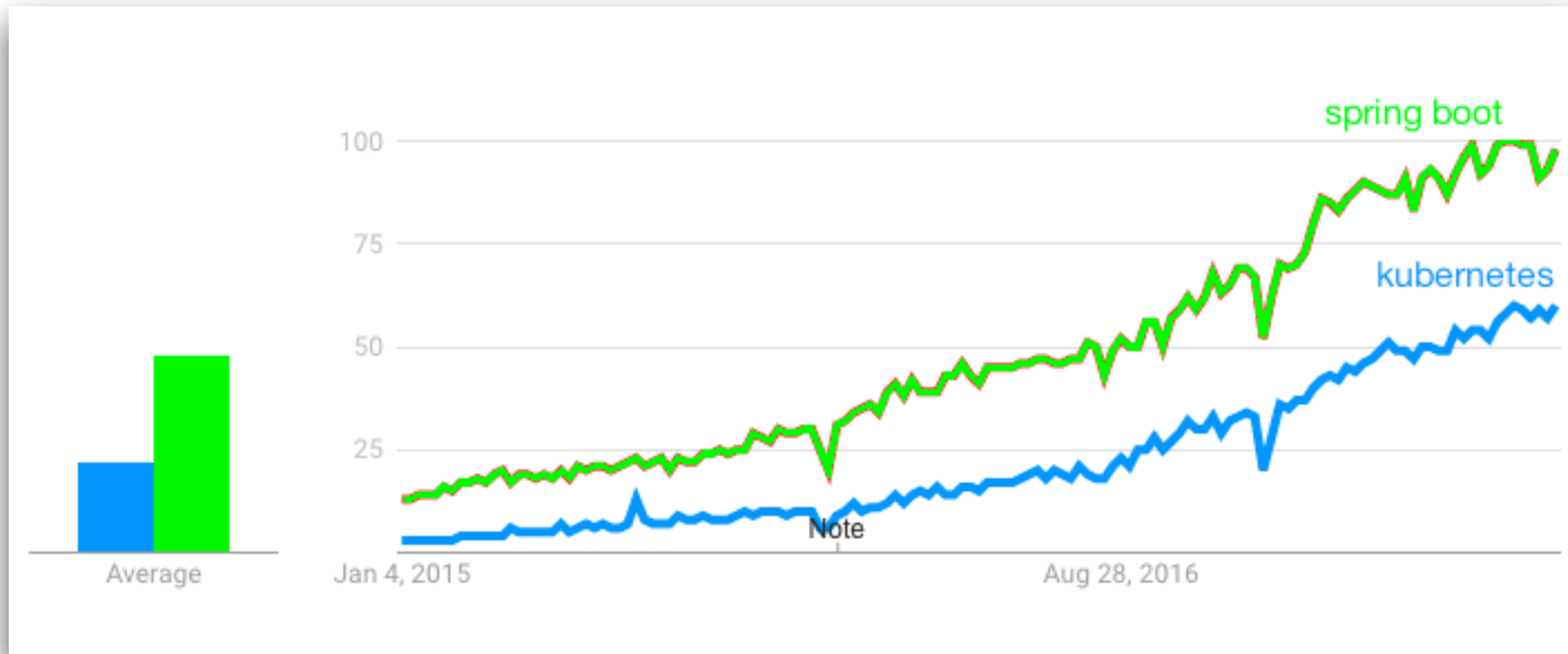
What is Spring Boot?

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`

Demo

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

https://github.com/trisberg/boot-k8s/blob/master/demo-hello.adoc

Spring Cloud / Netflix OSS

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

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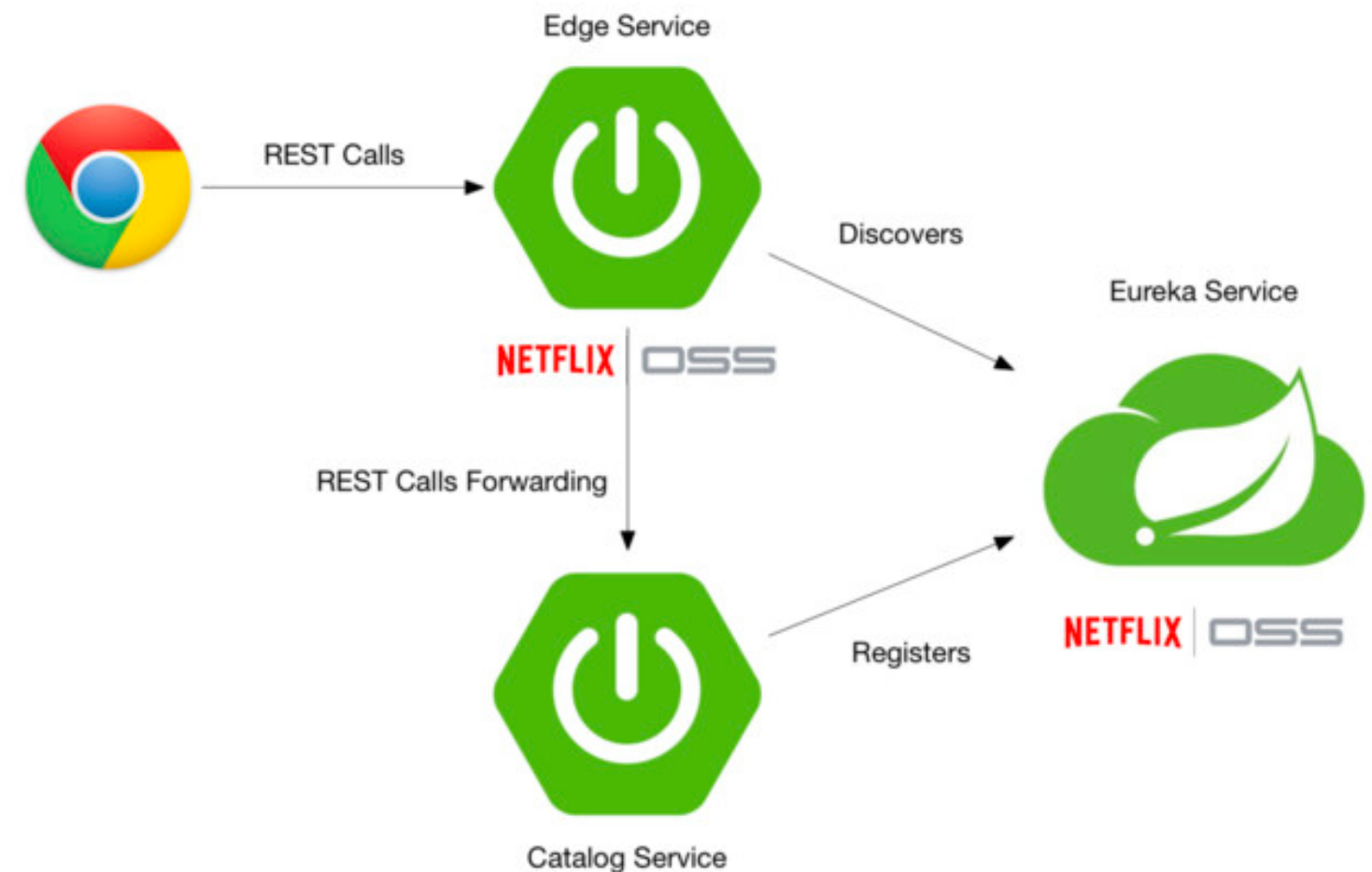- Circuit Breakers
  - Netflix Hystrix

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

Spring Cloud for Kubernetes

- Fabric8 team created some integration libs

    `spring-cloud-kubernetes`

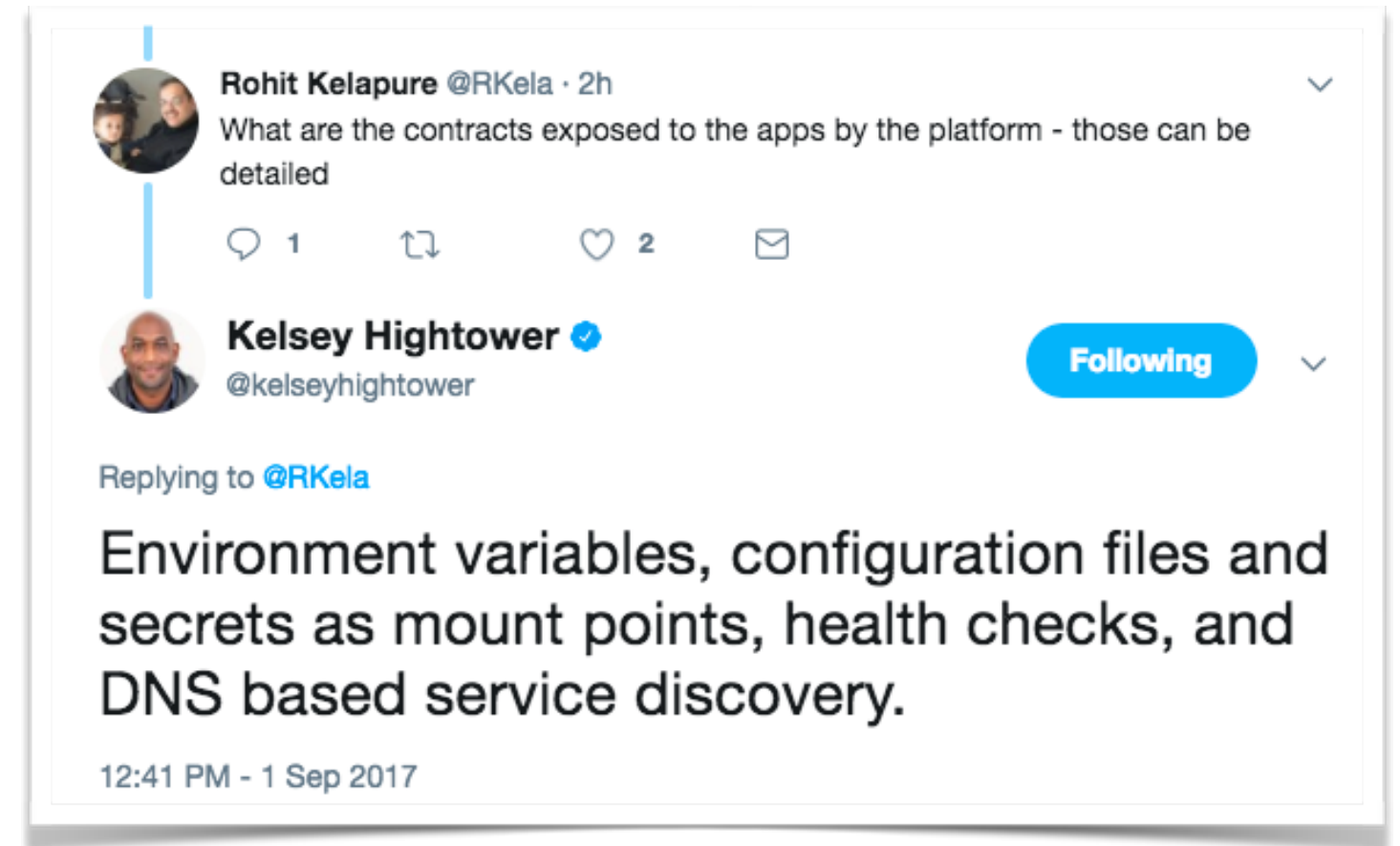- Now available in `spring-cloud-incubator` on GitHub

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

Rohit Kelapure @RKela · 2h
What are the contracts exposed to the apps by the platform - those can be detailed

💬 1   ↻   ♡ 2   ✉

Kelsey Hightower ✔
@kelseyhightower   Following

Replying to @RKela

Environment variables, configuration files and secrets as mount points, health checks, and DNS based service discovery.

12:41 PM - 1 Sep 2017

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

Externalized Configuration

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

Demo

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

https://github.com/trisberg/boot-k8s/blob/master/demo-actors.adoc

https://github.com/trisberg/boot-k8s/tree/master/microservices

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
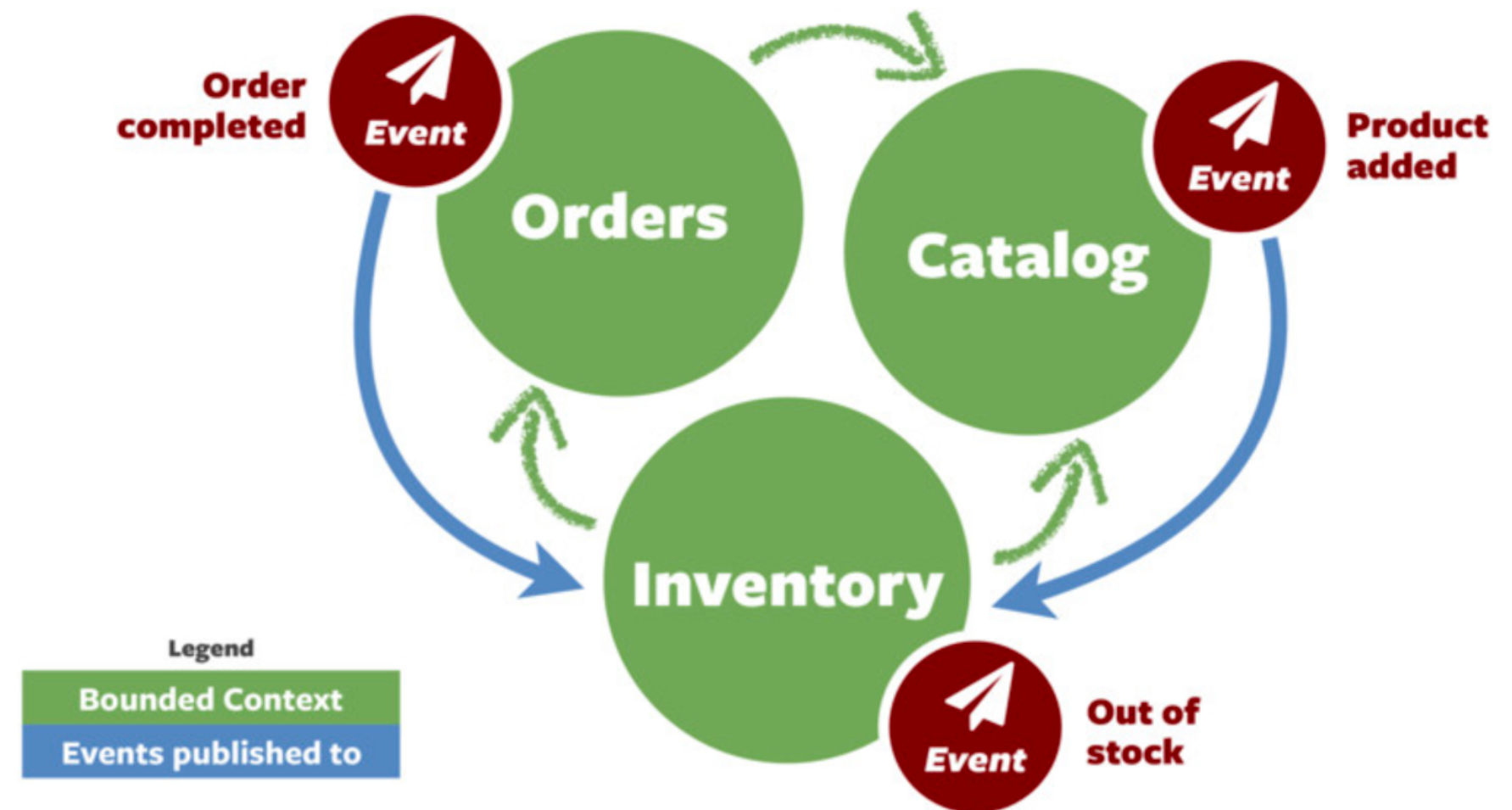
Microservice Runtime Management

- Circuit-breaker
  - Netflix Hystrix
- Distributed Tracing
  - Spring Cloud Sleuth
  - Zipkin
- Metrics
  - Spring Boot Actuator
  - Micrometer for Spring Boot 2.0
  - Prometheus

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

- **KubeApps**

  - Discover & launch great Kubernetes-ready apps

  - ‣ https://kubeapps.com/

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 HTTP server

  - Use `helm repo add` to add it to helm CLI

- Local repo

  - Use `helm serve`

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/

▶ 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/