

Spring Boot Apps on Kubernetes



Thomas Risberg

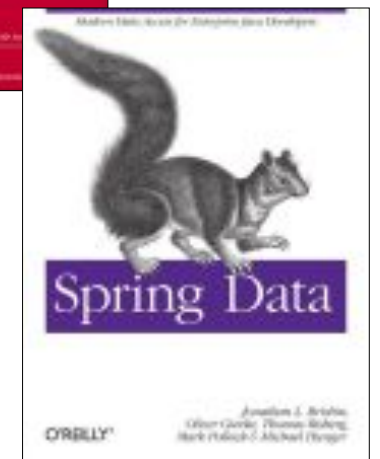
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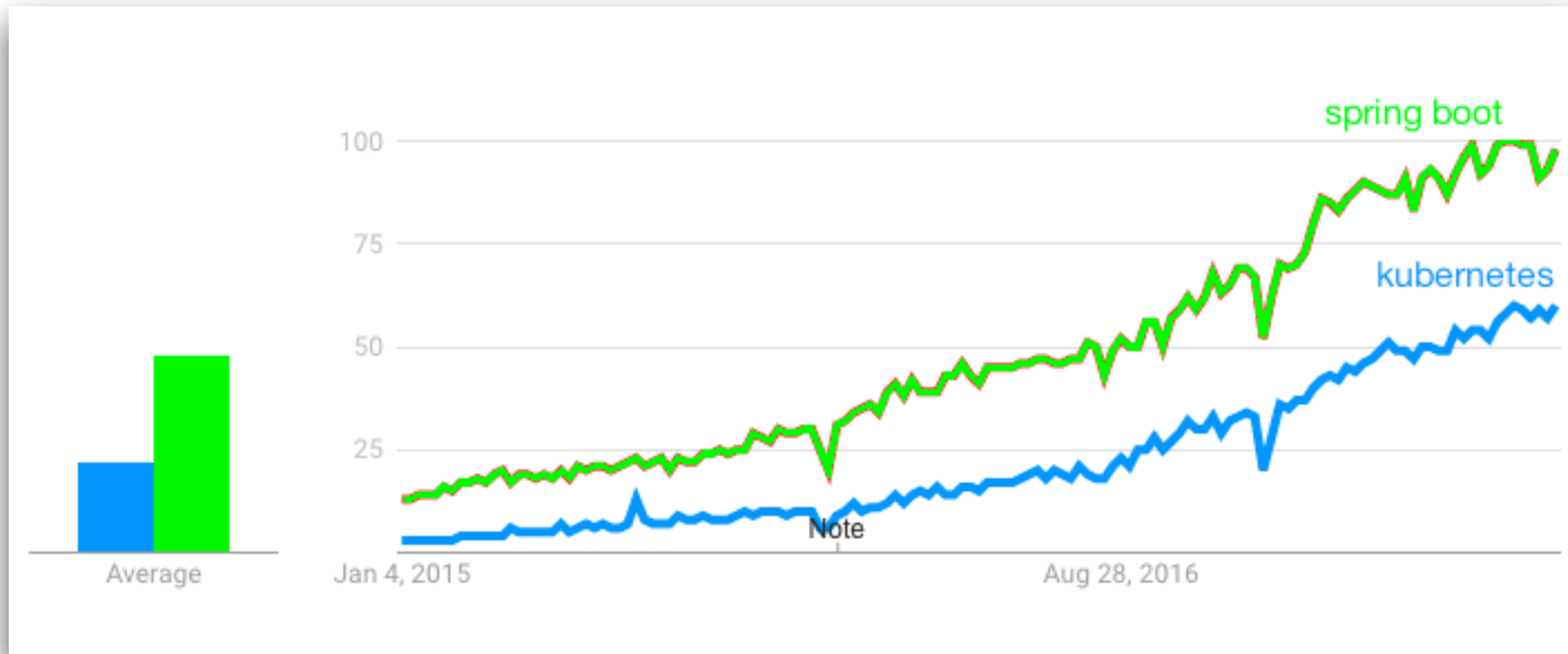
About me

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>

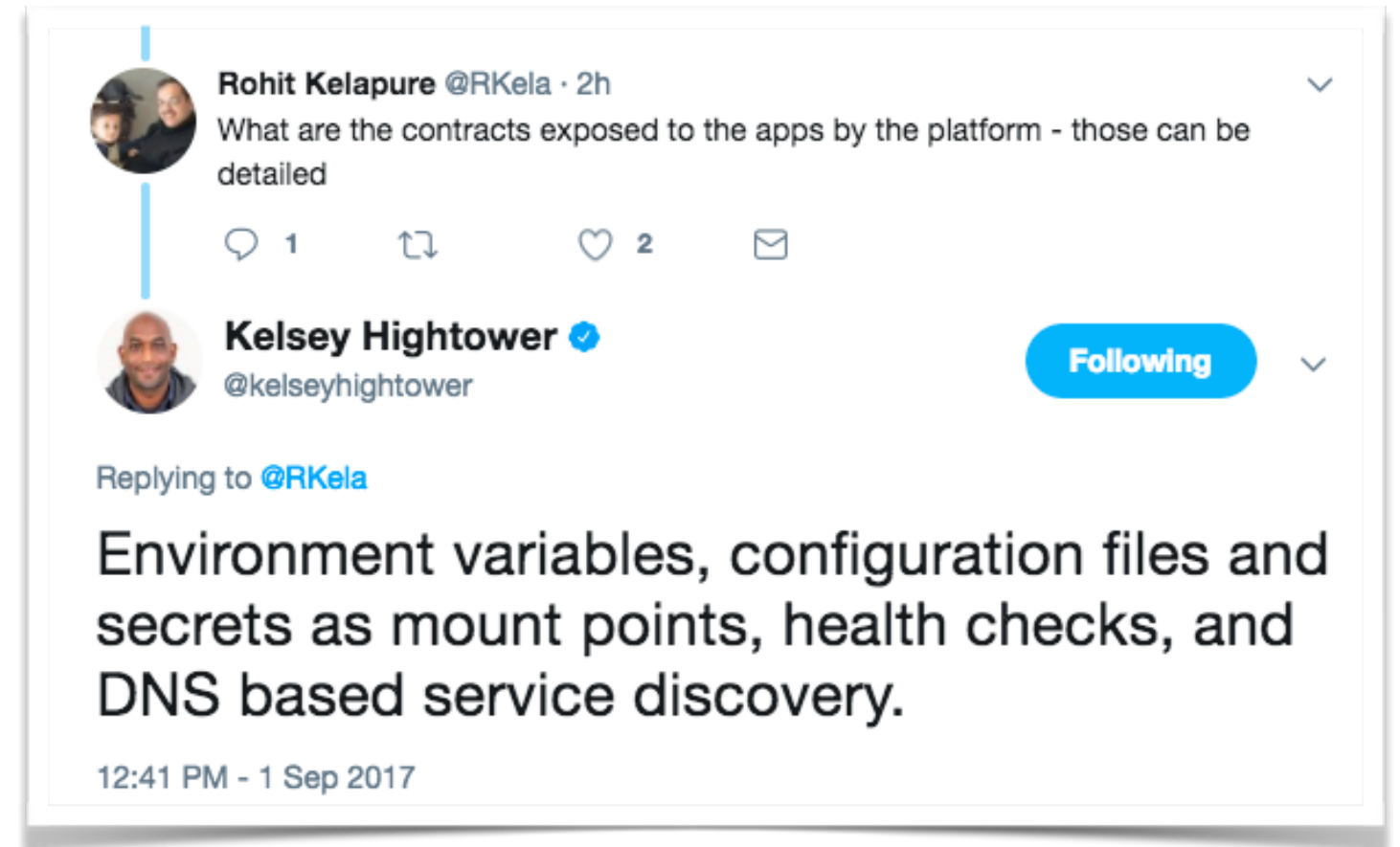
Building Apps for Kubernetes



<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>

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
 - Can be set using environment or mounted as config 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/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

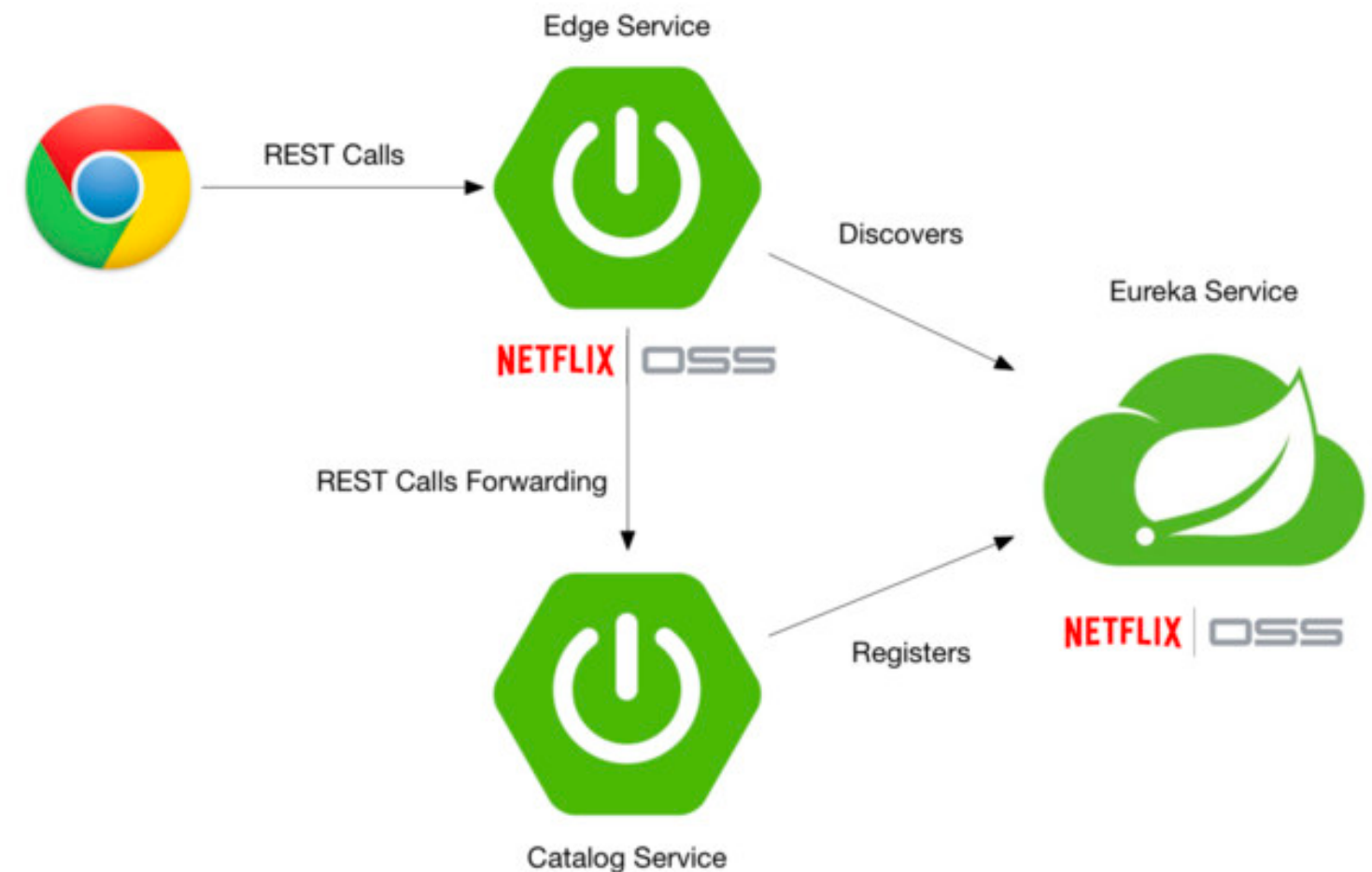


Image from: <https://www.slideshare.net/mraible/develop-hip-apis-and-apps-with-spring-boot-and-angular-connecttech-2017/16?src=clipshare>

Spring Cloud for Kubernetes

- Fabric8 team created some integration libs

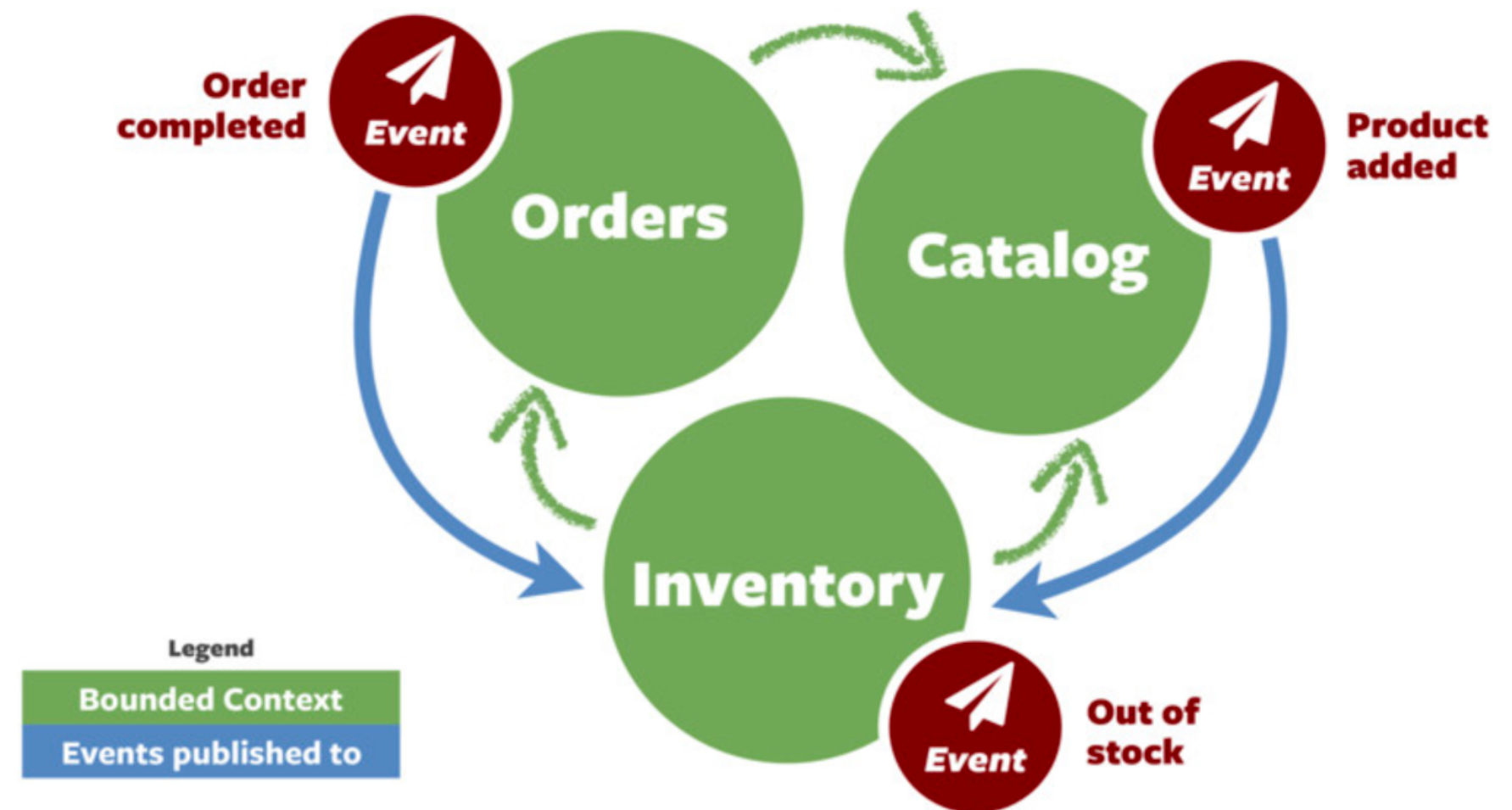
`spring-cloud-kubernetes`

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



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
-



- 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

- **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/>
- ▶ <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/>