Panta Rhei

Runtime configuration updates with Spring Boot

Intro

- All apps have config
  - Allows same artefact to run in different ways

- Environment-specific
- **Changes within an environment**

TRIFORK.

Effectuating Changes

- Config read at **startup**
  - Available via PropertySources of the Environment
  - Consumed by beans
- So reloading means **restarting**

- Lose availability, state, JIT, …

Config

Spring Cloud Context

- Supports reloading config
  - Part of Spring Cloud Commons
- POST to /actuator/env (if enabled)
  - Update Environment with request data
  - Rebind @ConfigurationProperties & log levels
- POST to /actuator/refresh and @RefreshScope
  - Reloads property sources
  - Rebind plus refresh of scoped beans

TRIFORK.

Demo

Reloading Behind The Scenes

- Listener for EnvironmentChangeEvent
  - Rebinds @ConfigurationProperties
  - Sets logger levels
- @RefreshScope beans are lazy-loading proxies
  - On refresh their target is replaced
  - /refresh refreshes *all* scoped beans!

TRIFORK.

Automatic Refresh

Automic Refresh

- Supported by various externalized config options
  - Spring Cloud Config Server
  - Spring Cloud Consul / Vault (HashiCorp)
  - Spring Cloud Kubernetes
  - Spring Cloud AWS
  - …
- Shared config
- (Long) polling, callbacks, …
- Optionally use Spring Cloud **Bus**

TRIFORK.

Spring Cloud Bus

- Abstraction over AMQP (RabbitMQ) or Kafka
- Can publish RefreshRemoteApplicationEvents
- Q: anybody knows anyone using this? ✋

TRIFORK.

Demo

TRIFORK.

Refresh Health Indicator

- As demoed, binding/validation can fail
- "Refresh" indicator will report status down
  - Details include error
- Consider how to use this
  - 👍Good: alert
  - 👎Maybe not so good: crash loop

Spring Cloud Kubernetes

- Reload config maps and secrets
- PropertySource reload:
  - K8S API (socket) or poll
  - Deprecated since 2020
- Configuration Watcher
  - Separate controller app
  - Notifies apps on change

spring.cloud.kubernetes.reload.enabled

Spring
Cloud Kubernetes
Configuration Watcher

Spring Cloud K8S Configuration Watcher

- Checks config maps and secrets
- Fires events for changes
  - Only when certain label present
  - To apps with same name (by default)
- Various <u>configuration options</u>
  - Delay to fire event
  - What apps to notify if not 1:1
  - When using Spring Cloud Bus

TRIFORK.

Demo

Interested? ✋

TRIFORK.

Notes & Gotchas

- Online info often still refers to *Bootstrap context*
  - Mostly obsolete
  - Replaced with Spring Boot config loading
- Always access property of @ConfigurationProperties bean
  - Assigning to field would require @RefreshScope
- Secure relevant actuator endpoints

TRIFORK.

Notes & Gotchas

- Refresh on restart useful with JVM Checkpoint Restore (CRaC)
- Don't use Hikari to reload DataSource
- For AWS RDS, use <u>dedicated support</u>
- AOT & native images not supported
  - i.e. GraalVM
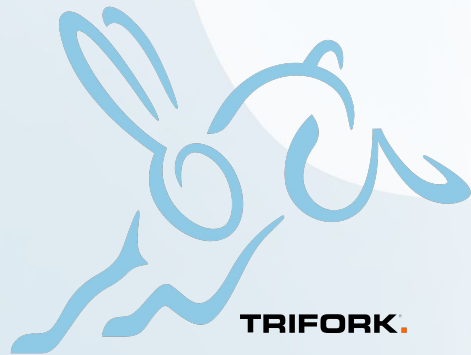
TRIFORK.

Notes & Gotchas

- Consider possible scenarios
  - <u>binding errors</u>
  - "partial updates"

- Test!
  - Monitor "refresh health"
  - Validate using /env and /configprops

TRIFORK.

Thank you!

https://github.com/jkuipers/spring-reload-demos

CTO TRIFORK AMSTERDAM

Joris Kuipers

🌐   trifork.nl

🐦   @jkuipers, @triforkams

TRIFORK.