Cloud Native (Java) Applications with Kubernetes

Kamesh Sampath, Director of Developer Experience Red Hat

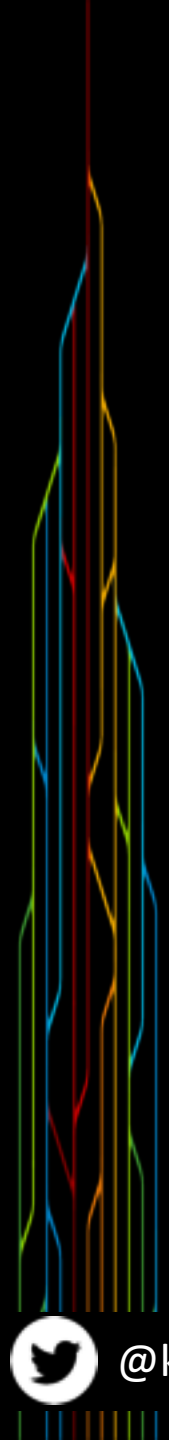
kamesh.sampath@hotmail.com

@kamesh_sampath

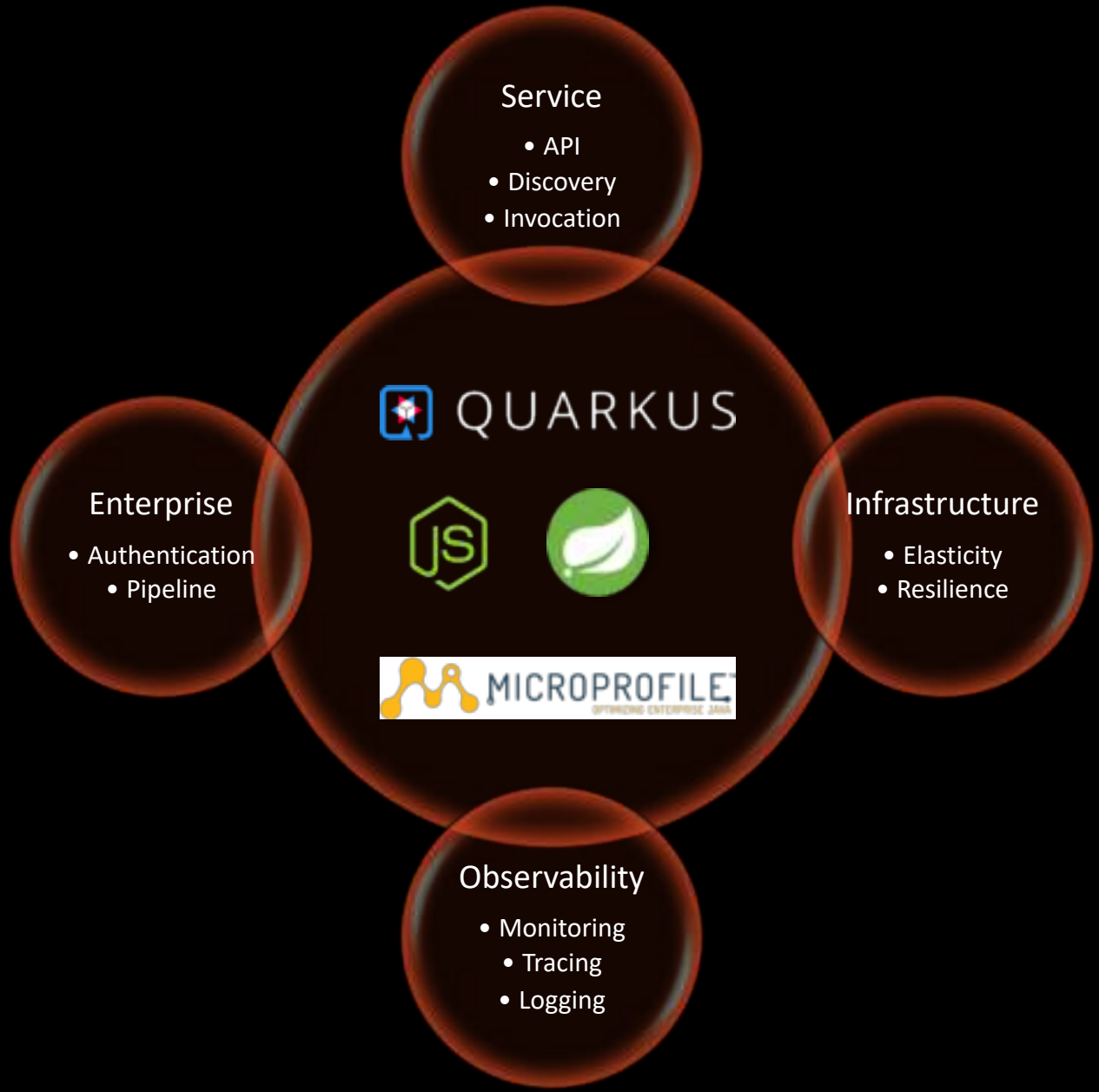
kameshsampath

RED HAT DEVELOPER

For developers
who know it's
about the journey,
and the destination
developers.redhat.com



Cloud Native Application ?



@kamesh_sampath

kameshsampath

RED HAT DEVELOPER

Architectural Styles

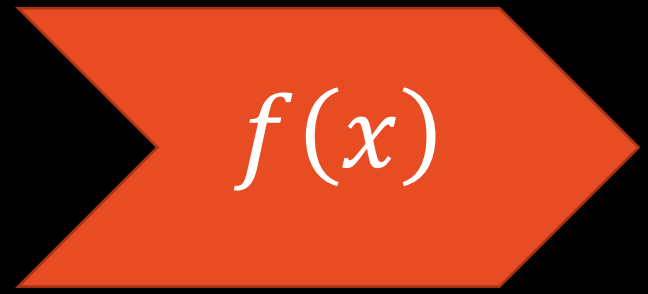
Services

- Autonomous
- Loosely Coupled

Microservices

- Single Purpose
- Stateless
- Independently Scalable
- Automated

Serverless



- Single Action
- Ephemeral

When to choose what ?

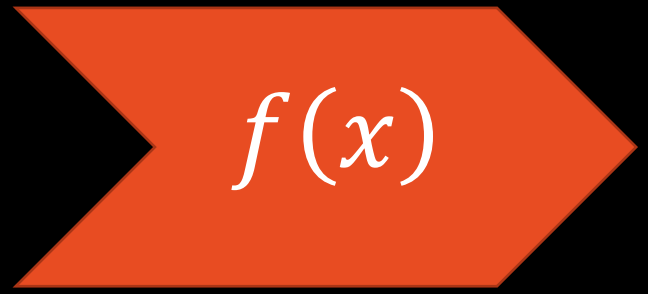
Services

- Autonomous
- Loosely Coupled

Microservices

- Single Purpose
- Stateless
- Independently Scalable
- Automated

Serverless



- Single Action
- Ephemeral

Control and High Complexity

Productivity and Low Control

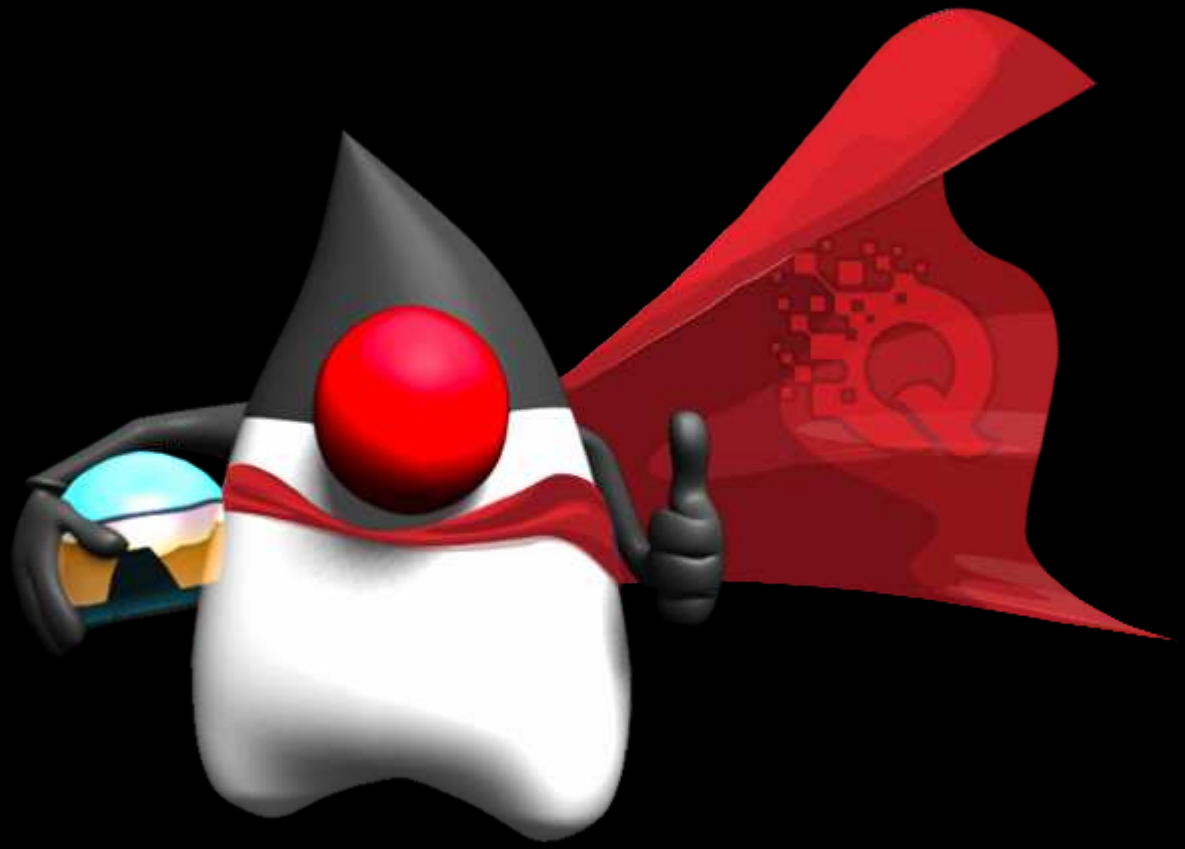
Portability

Why Java fails in linux containers?

Java does not understand cgroups

Why Java was a Alien in serverless world?

Java containers boot slow



DEMO

Still so much of goodness

Groovy

spring
by Pivotal

OSGi™
Alliance

Meet Quarkus!

Who are you ?

Quark a subatomic particle carrying a fractional electric charge

And us

the heart of software development

What you do ?

- A standards based platform that prioritises developer experience, startup speed and memory usage
- Optimised for cloud use cases
- Built on mature libraries such as Hibernate and RESTeasy
- Allows for compilation to native code via GraalVM

What does it mean to me ?

Up to 10x Smaller

Up to 100x Faster

Live Reload

JVM and Native

Imperative and Reactive

Serverless

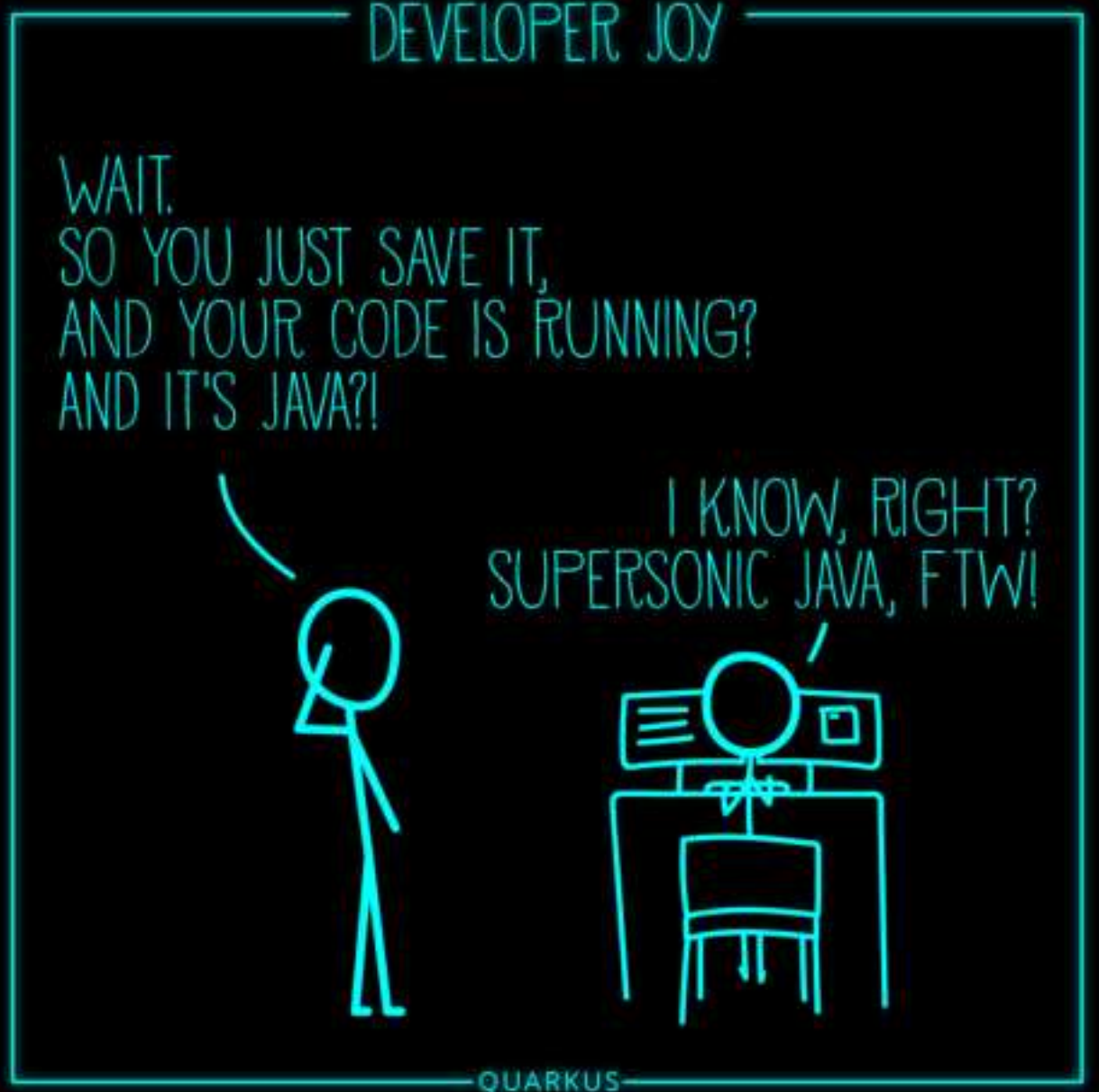
Optimized for JAX-RS and JPA (Hibernate)

Microservices

@kamesh_sampath

kameshsampath

RED HAT DEVELOPER


DEVELOPER JOY
WAIT.
SO YOU JUST SAVE IT,
AND YOUR CODE IS RUNNING?
AND IT'S JAVA?!
I KNOW, RIGHT?
SUPERSONIC JAVA, FTW!
QUARKUS

More Developer Joy

Known Standards

JAKARTA EE

MICROPROFILE
OPTIMIZING ENTERPRISE JAVA

Plethora of Extensions

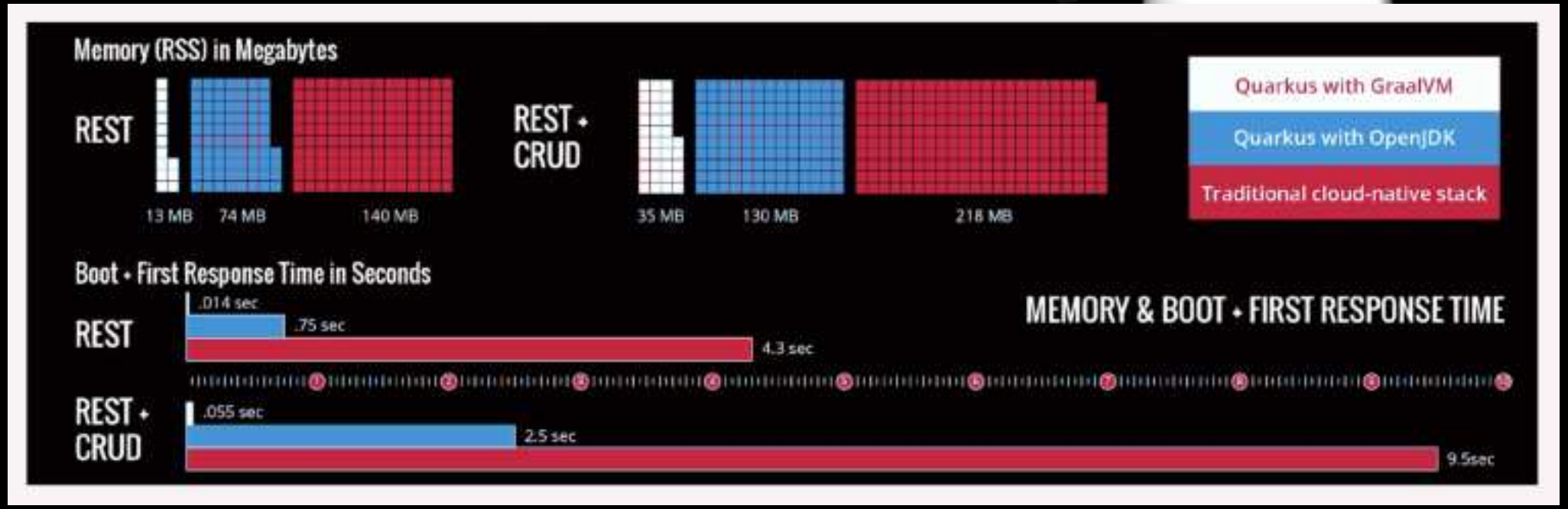
HIBERNATE

VERT.X

APACHE Camel

Infinispan

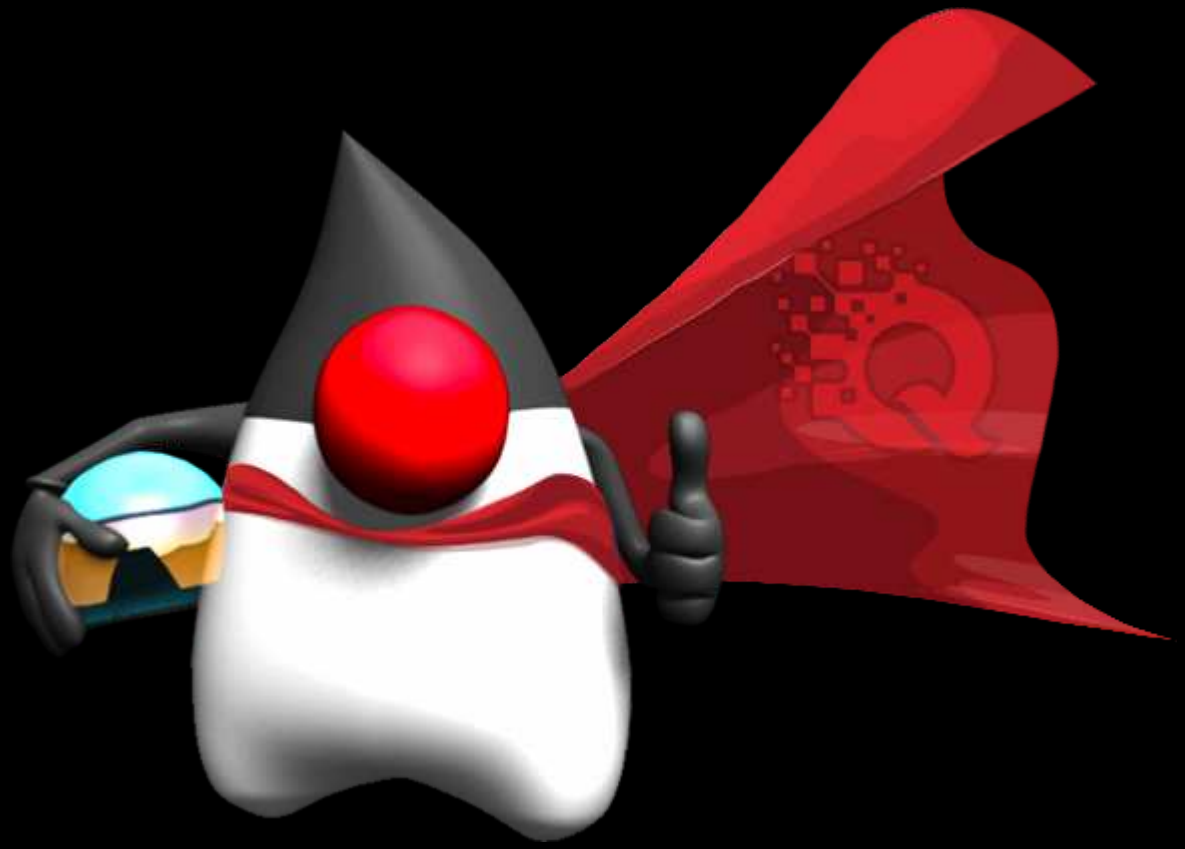
AWS Lambda



@kamesh_sampath

kameshsampath

RED HAT DEVELOPER

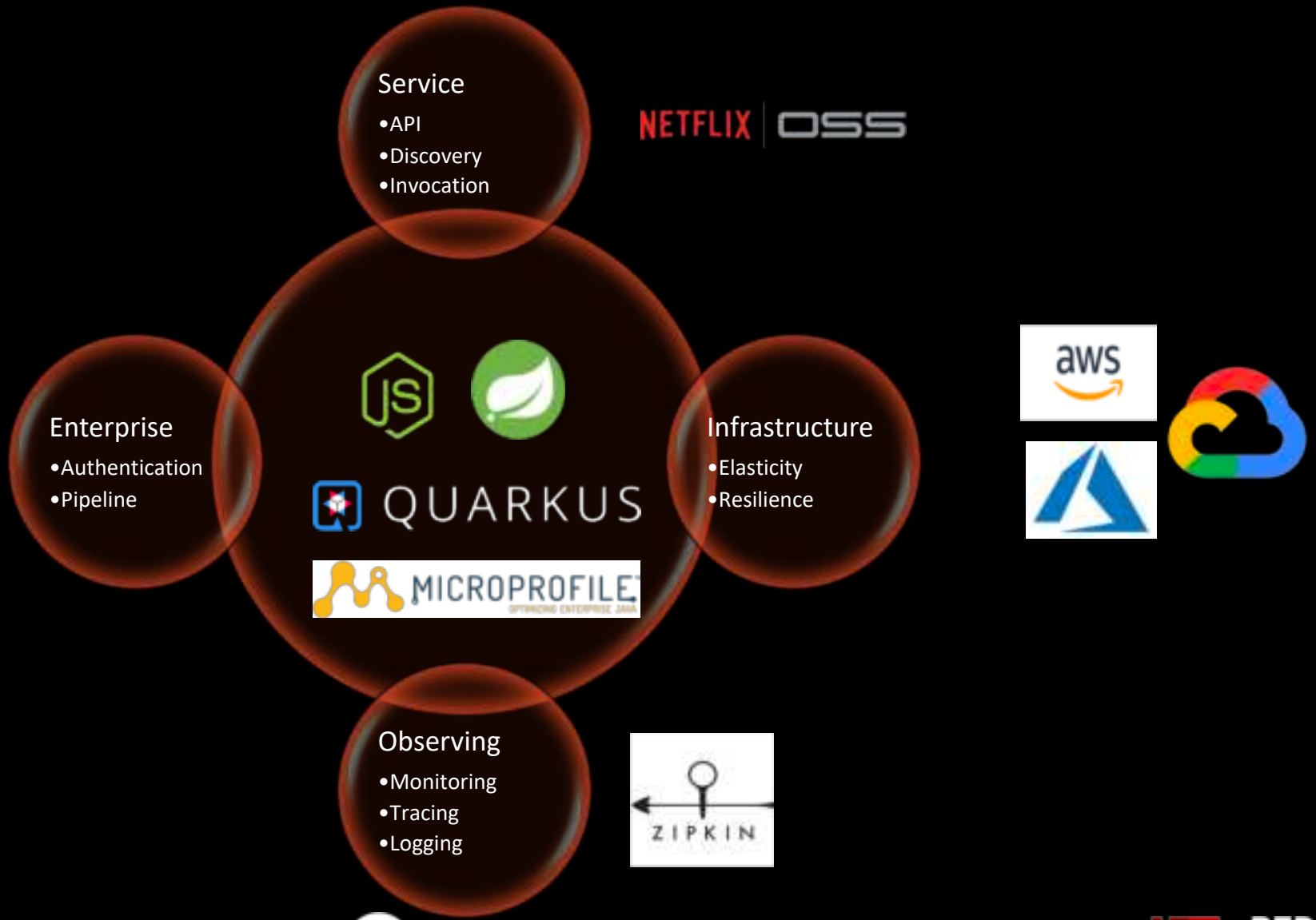


DEMO

Cloud Native Application Platform

Config Server

NETFLIX Ribbon



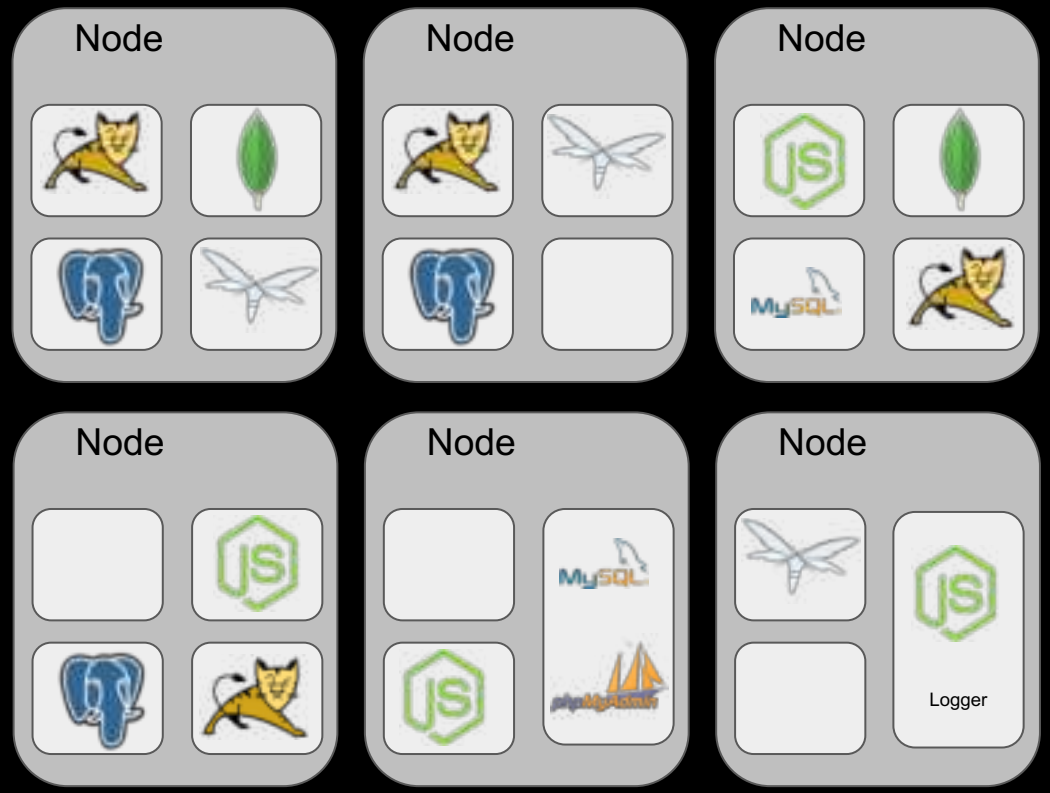
@kamesh_sampath

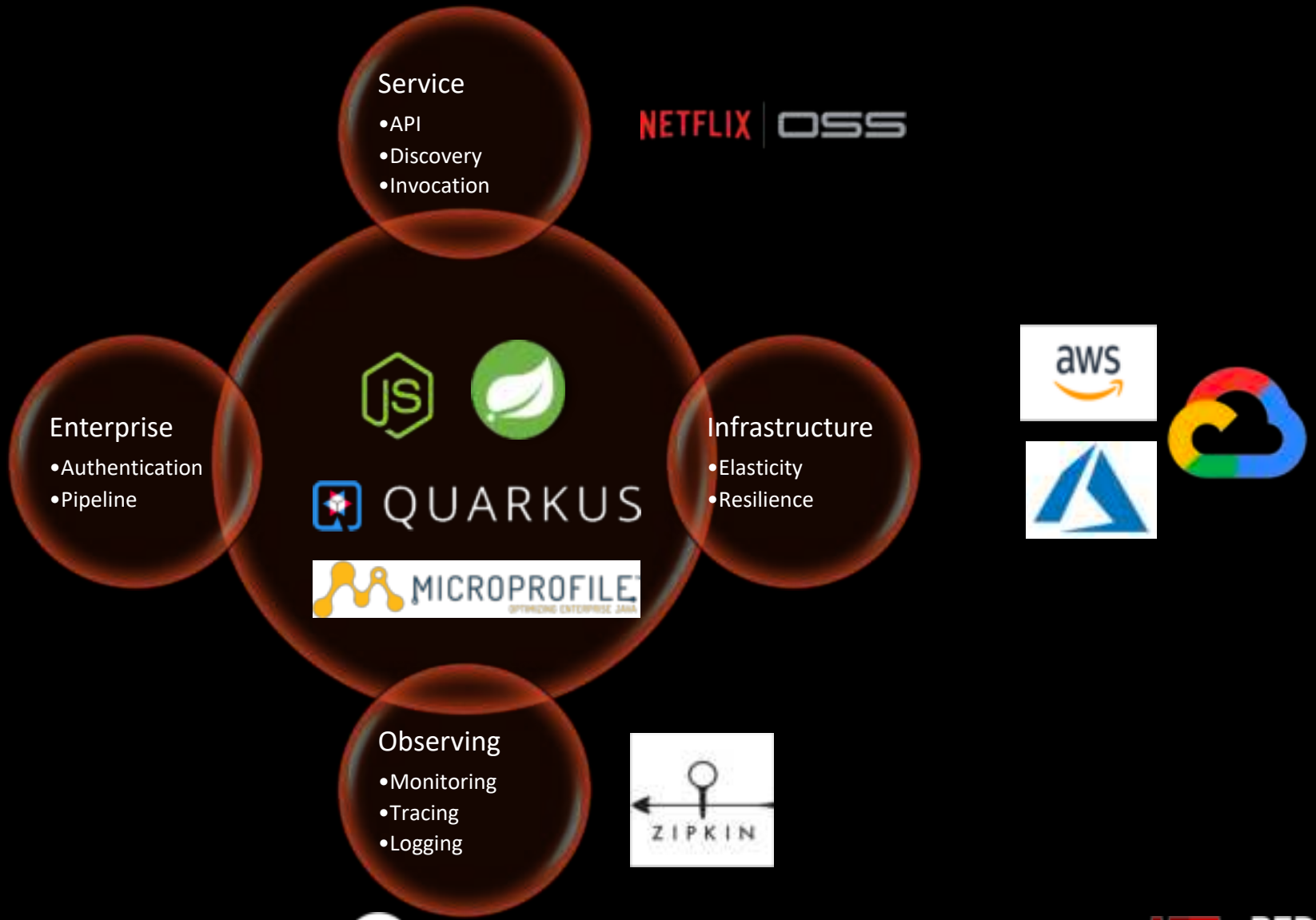
kameshsampath

RED HAT DEVELOPER

DevOps Challenges with Cloud Native Applications

- How to scale?
- How to avoid port conflicts?
- How to manage them on multiple hosts?
- What happens if a host has trouble?
- How to keep them running?
- How to update them?





@kamesh_sampath

kameshsampath

RED HAT DEVELOPER

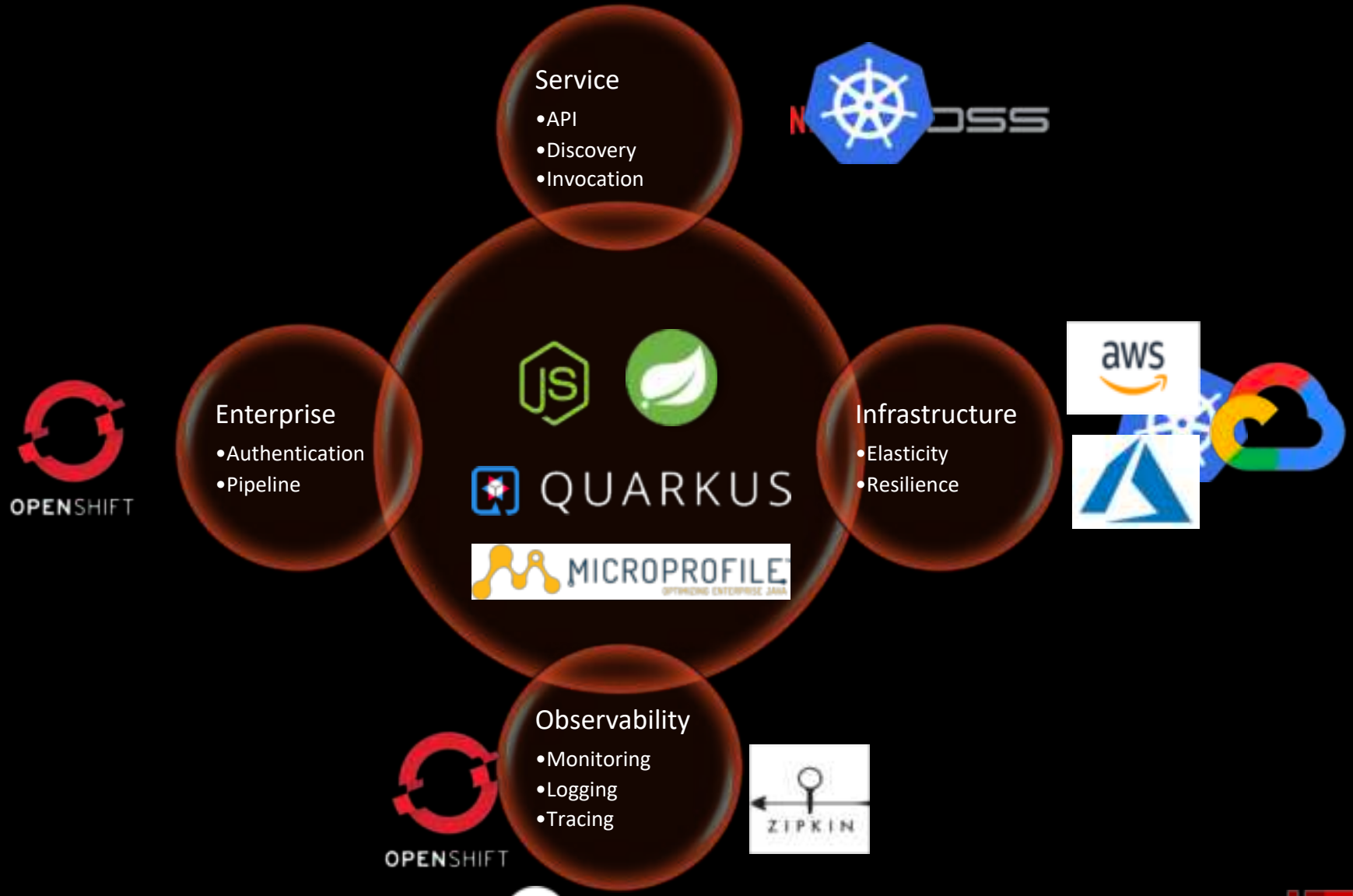
OPENSHIFT

@kamesh_sampath

kameshsampath

RED HAT DEVELOPER

The Cloud Native Application Platform

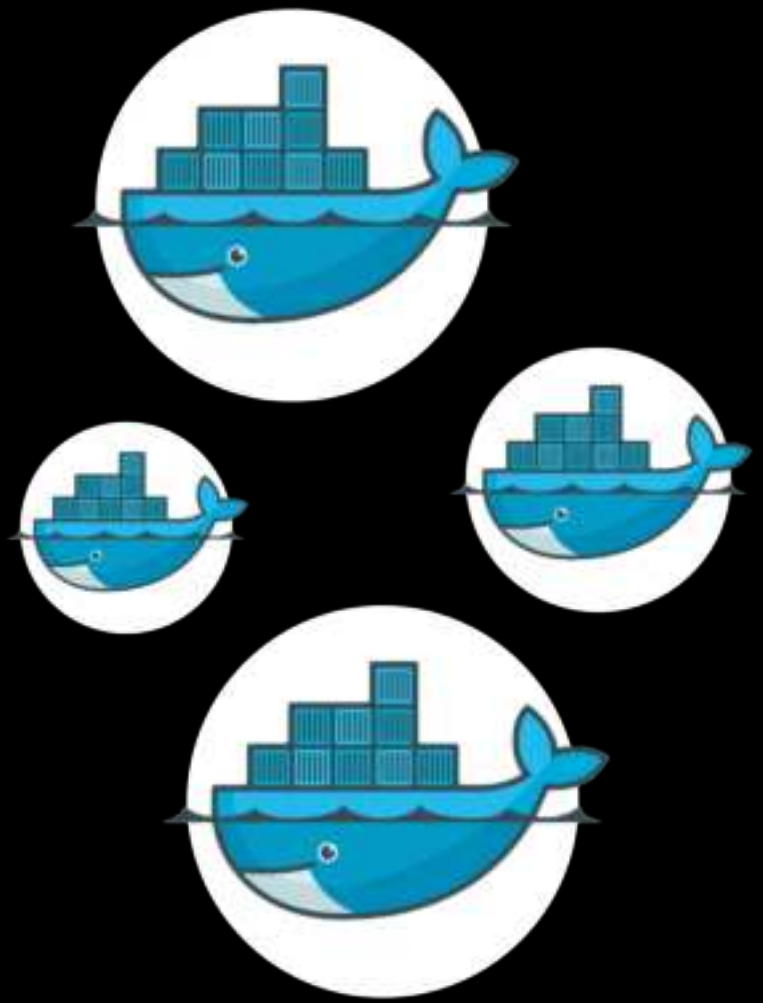


Pods

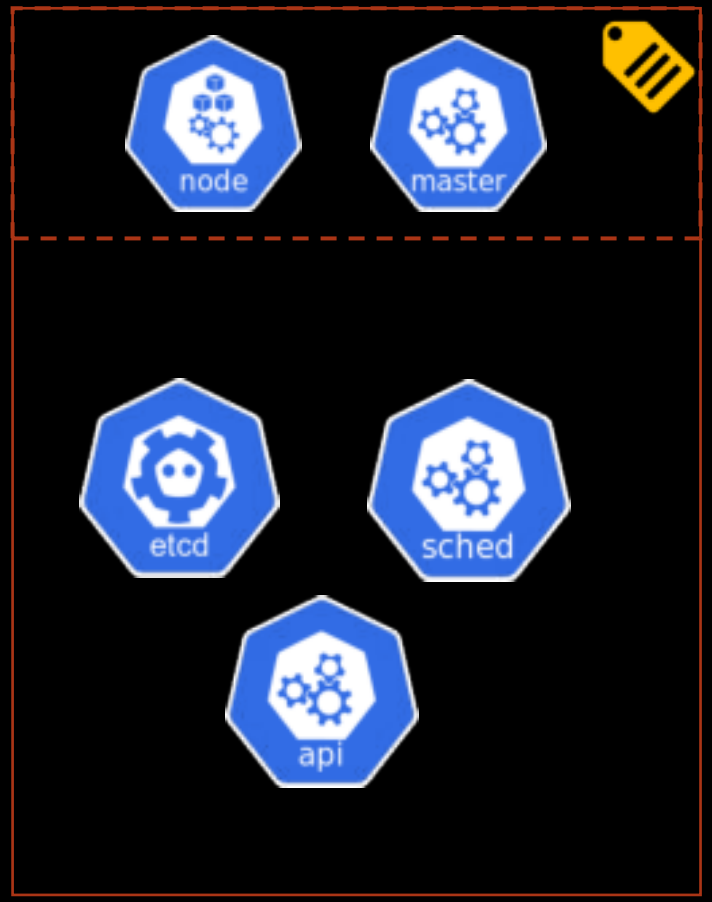
A group of whales is commonly referred to as a pod and a pod usually consists a group of whales that have bonded together either because of biological reasons or through friendships developed between two or more whales.

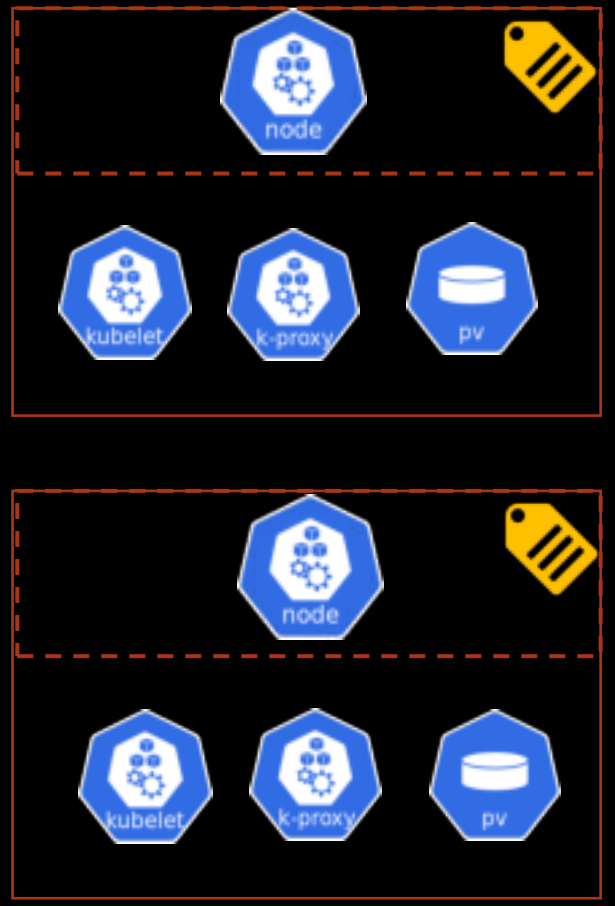
In many cases a typical whale pod consists of anywhere from 2 to 30 whales or more.*

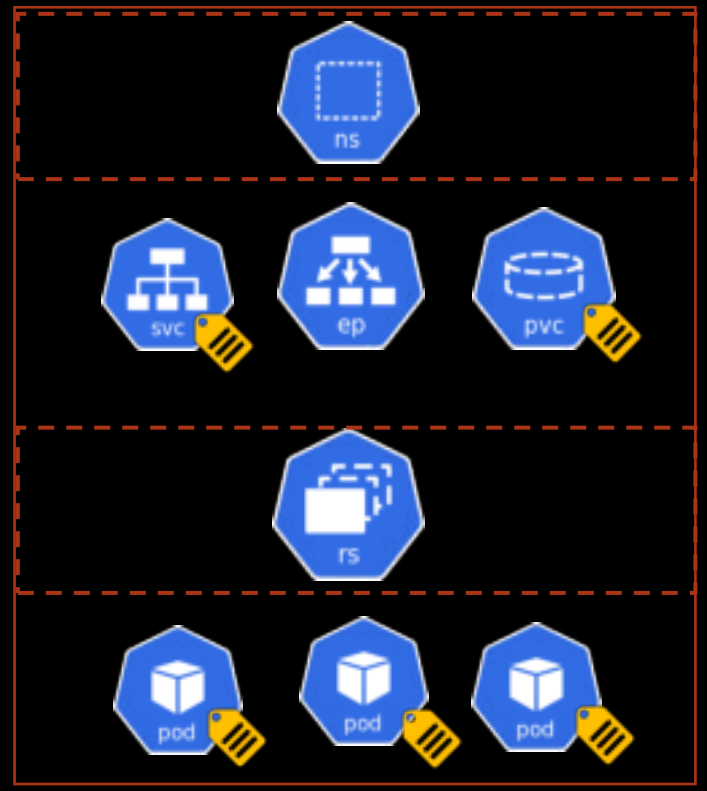
Source: http://www.whalefacts.org/what-is-a-group-of-whales-called/



Kubernetes Jargons







TEKTON

CD.FOUNDATION

Governed by the Continuous Delivery Foundation

Contributions from Google, Red Hat, Cloudbees, IBM, Pivotal and many more

@kamesh_sampath

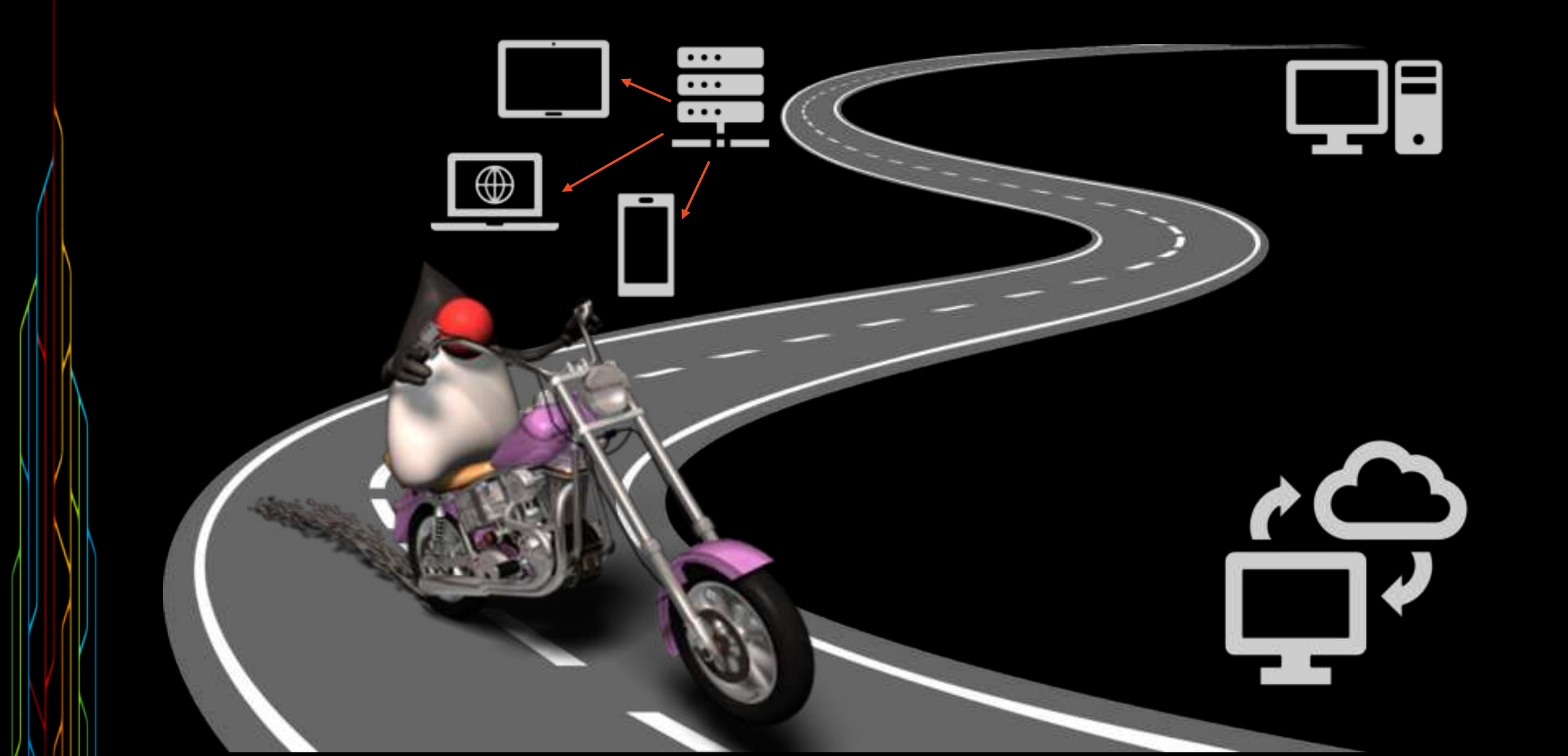
kameshsampath

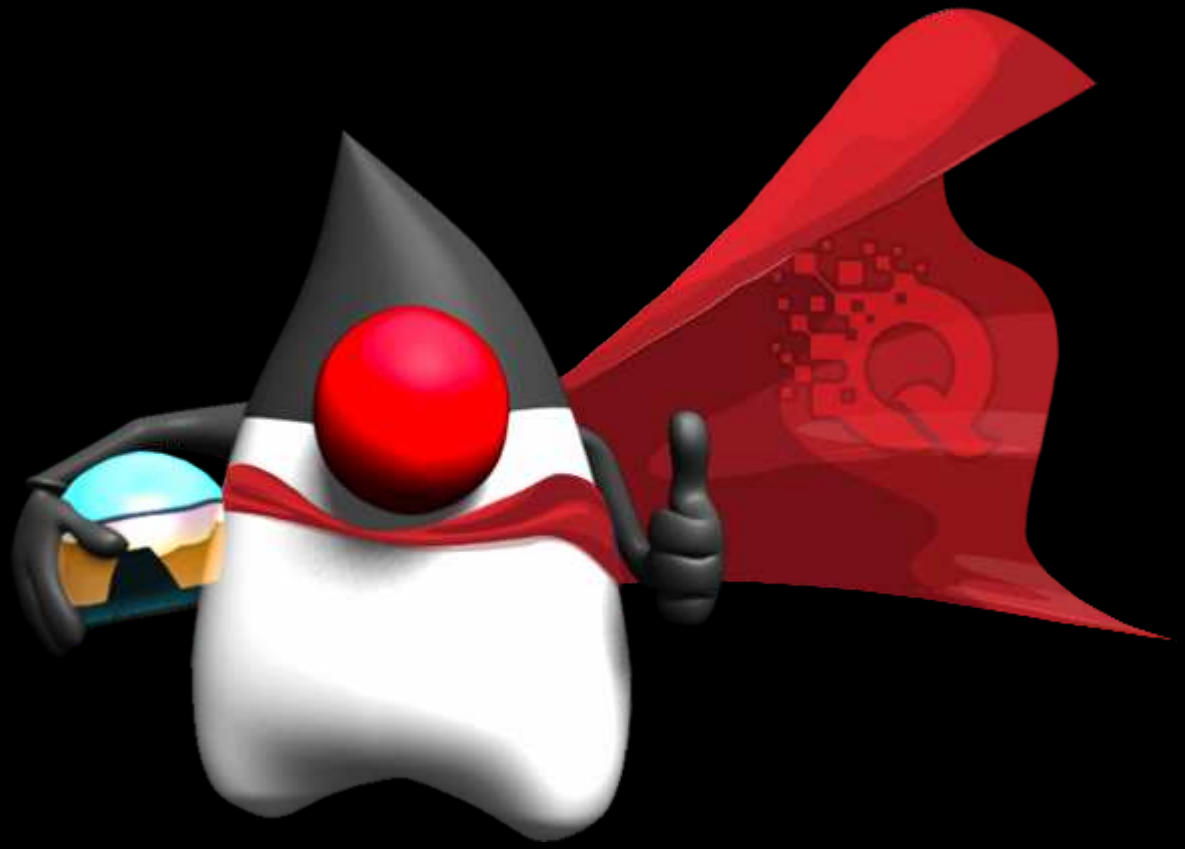
RED HAT DEVELOPER

What is Tekton ?

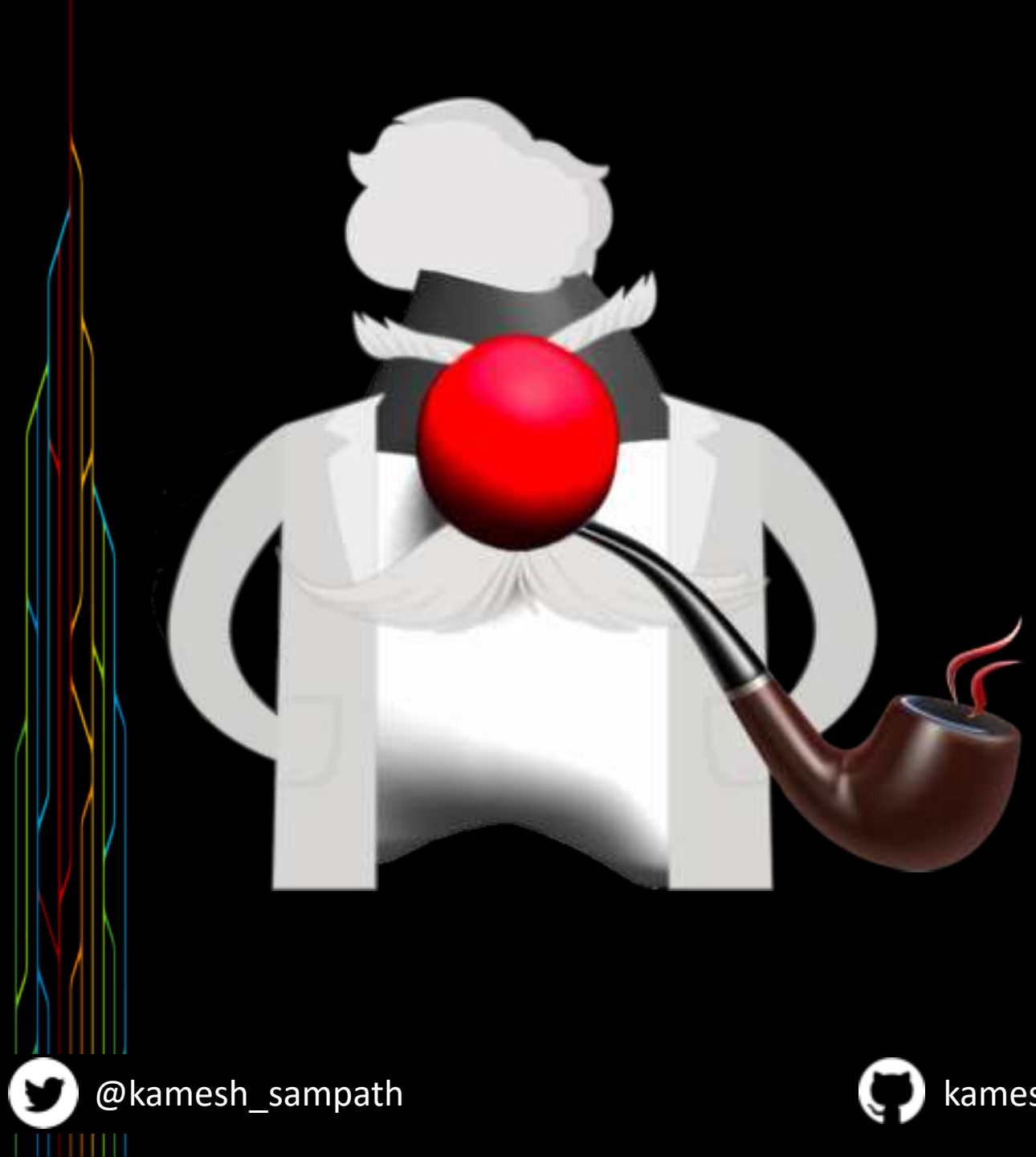
- Cloud Native
  - Run on Kubernetes
  - Use containers as building blocks
- Decoupled
  - Pipeline tasks can be run together or individually
- Typed

```
if containerFirst && cloudNative {
System.out.println("Kubernetes Native");
}
```





DEMO

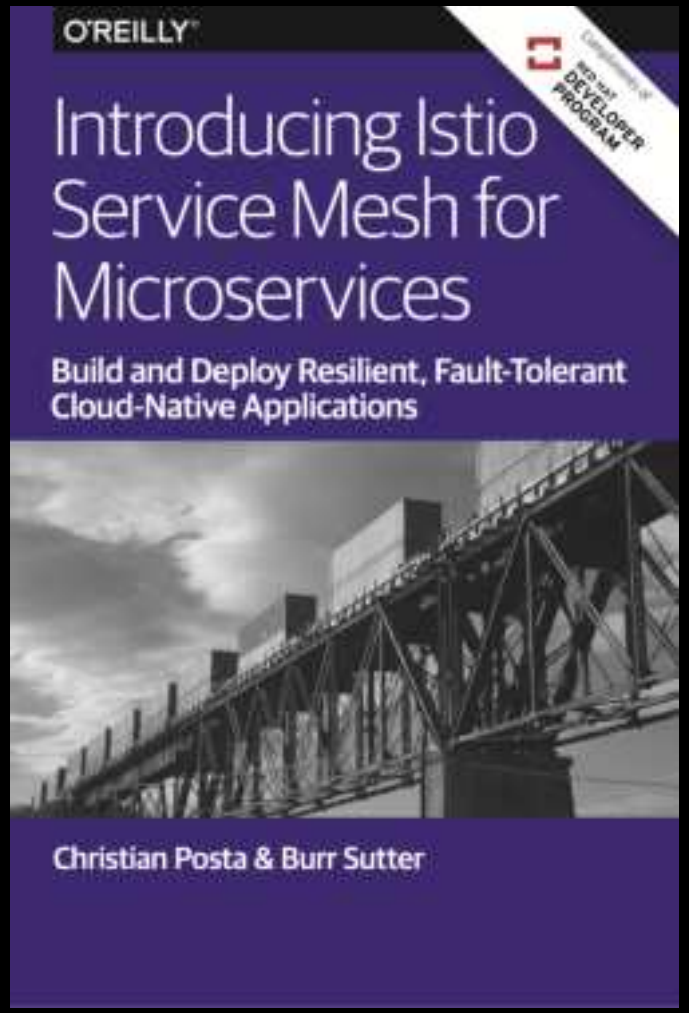


THE END

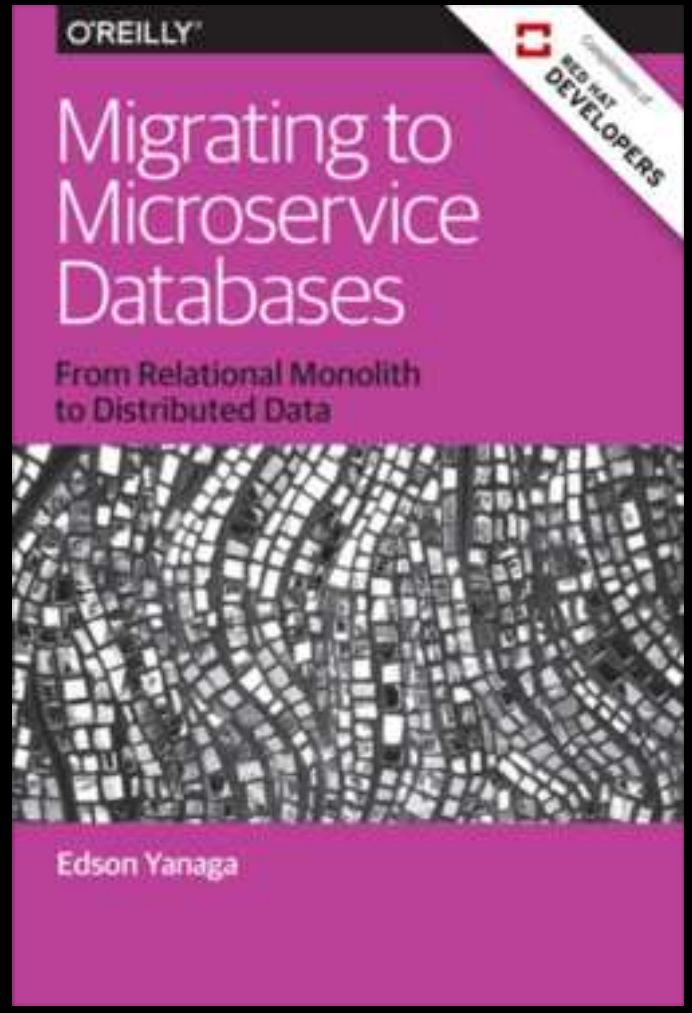
It’s beginning!

#JavaIsEverAwesome

bit.ly/istiobook



bit.ly/mono2microdb

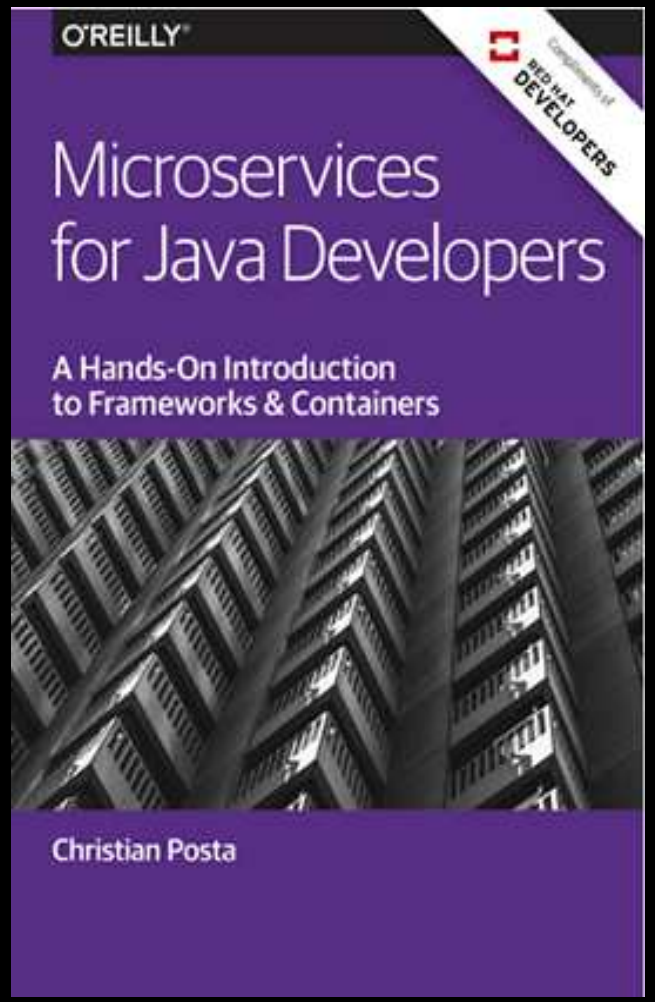


@kamesh_sampath

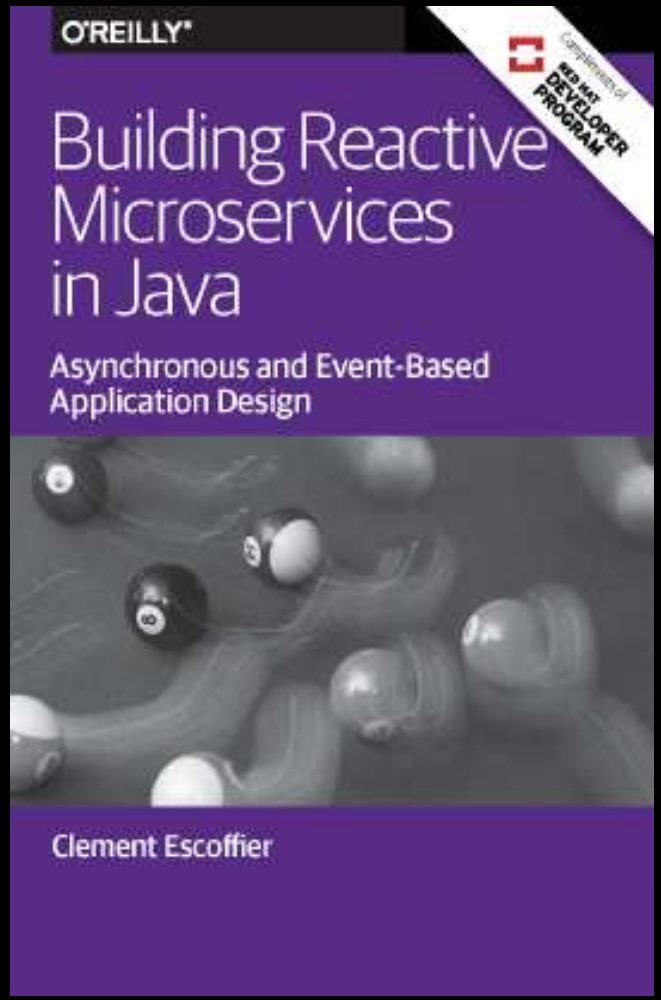
kameshsampath

RED HAT DEVELOPER

bit.ly/javamicroservicesbook



bit.ly/reactivemicroservicesbook



@kamesh_sampath

kameshsampath

RED HAT DEVELOPER

Resources

- Tutorials
  - Quarkus Tutorial - bit.ly/quarkus-tutorial
  - Knative Tutorial – bit.ly/knative-tutorial
  - Istio Tutorial - bit.ly/istio-tutorial
  - Demo: bit.ly/msa-instructions
  - Slides: bit.ly/microservicesdeepdive
- Video Training:
  - bit.ly/microservicesvideo
  - Kubernetes for Java Developers
  - 9 Steps to Awesome with Kubernetes

- Java and Containers
  - https://developers.redhat.com/blog/2017/03/14/java-inside-docker/
  - https://blogs.oracle.com/java-platform-group/java-se-support-for-docker-cpu-and-memory-limits