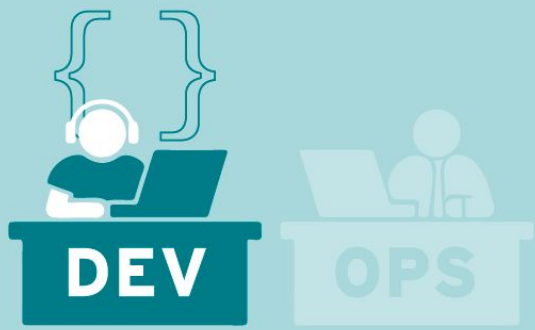
Red Hat



The Containers and Cloud-Native Roadshow Developer Track

A hands-on experience for developers

Software driven innovation explosion

The IDC predicts that from 2018 to 2023,

500 million new logical apps will be created, equal to

the number built over the past 40 years.

Source: https://www.idc.com/research/viewtoc.jsp?containerId=US44403818

Red Hat

Customers and businesses expect...

ON-DEMAND SERVICE

DELIGHTFUL INTERACTIONS

ACCESS FROM ANYWHERE

PERSONALIZED EXPERIENCE

Creating value depends on your ability
to develop and deliver
high quality applications faster.

Red Hat

How do you drive innovation to meet these expectations while keeping the lights on?

Optimize the IT you have

Integrate apps, data, & processes

Add & manage cloud infrastructure

Build more modern applications

Automate & manage IT

Leveraging the cloud becomes a key strategy for success

Red Hat

WHY CLOUD-NATIVE APPS?

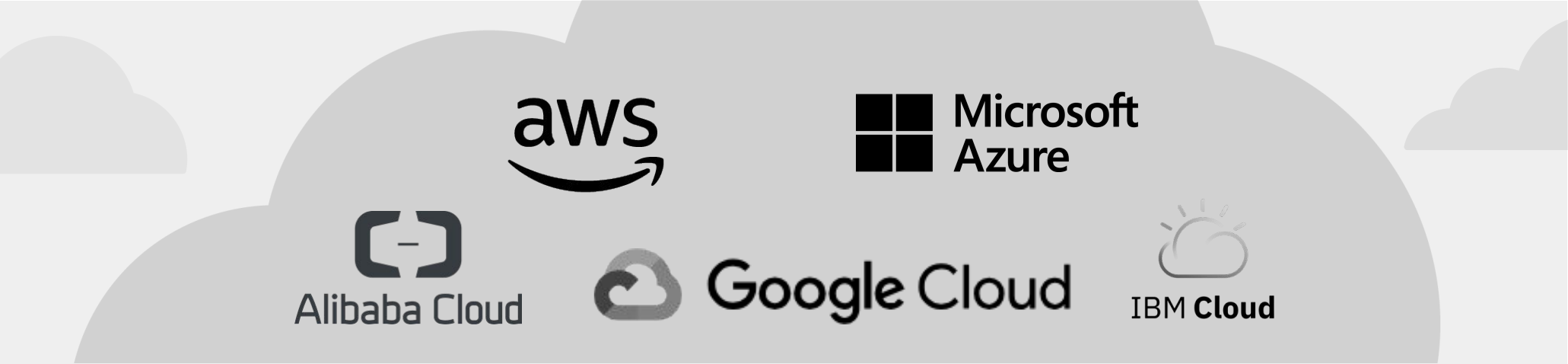
FASTER SERVICE DELIVERY

INCREASE SERVICE QUALITY

REDUCE RISK OF DELIVERY

How does one build apps for the cloud?

Write once, run anywhere?



THE PATH TO CLOUD-NATIVE APPS

A DIGITAL DARWINISM

Red Hat

RED HAT CLOUD-NATIVE DEV PLATFORM

Our vision is to simplify the creation of cloud-native services and serverless functions with a rich set of components and tools to match the **workloads** of modern cloud native apps.

Automate Kubernetes application operations with DevOps in mind

Cloud-native middleware applications services and service mesh

RED HAT®
MIDDLEWARE

Tools and standard processes to increase developer productivity on Kubernetes

RED HAT®
CODEREADY

Red Hat

Red Hat Developer Tools

Tools and standard processes to increase developer productivity on Kubernetes

Red Hat

OPENSHIFT DEVELOPER SERVICES

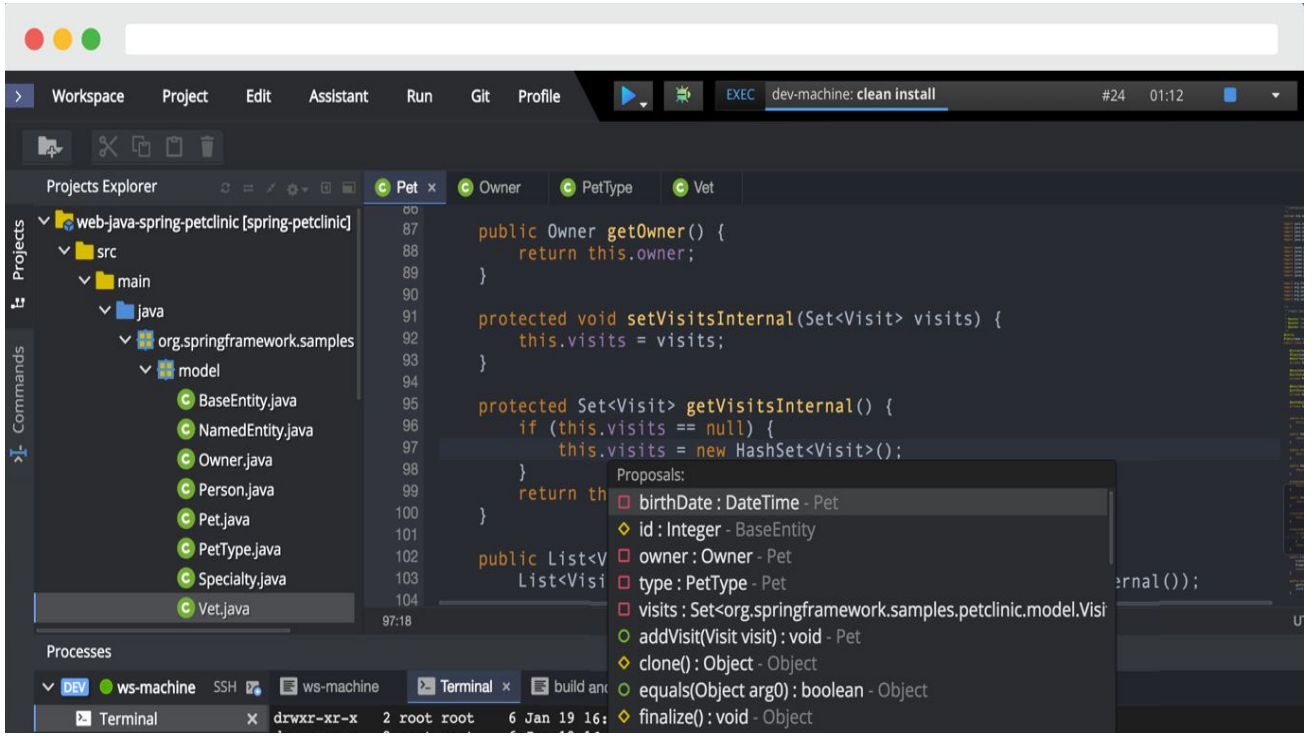
IDE	DEV CONSOLE	DEV CLI	BUILDS	CI/CD
Eclipse Che, VSCode, IntelliJ and Eclipse IDE provide web-based and desktop IDEs integrated with OpenShift and Kubernetes	Developer and application-centric web console for interacting with OpenShift	Developer CLI to provide an application-centric way of interacting with OpenShift	Automated and secure image builds from application source code, binary or Dockerfile	Continuous delivery pipelines optimized for Kubernetes (via the Tekton project)

Enabling developer productivity to build and deploy apps on Kubernetes

Red Hat

Red Hat CodeReady Workspaces

- Browser-based web IDE and dev environment in Kube pods
- Red Hat supported Eclipse Che
- Bundled with OCP/OSD SKU
- Available on OCP and OSD
- Enabled via an operator
- Stacks based on Red Hat Linux and Middleware
- Replaces VDI



https://www.youtube.com/watch?v=VwKEVeDy9TA

Eclipse Che

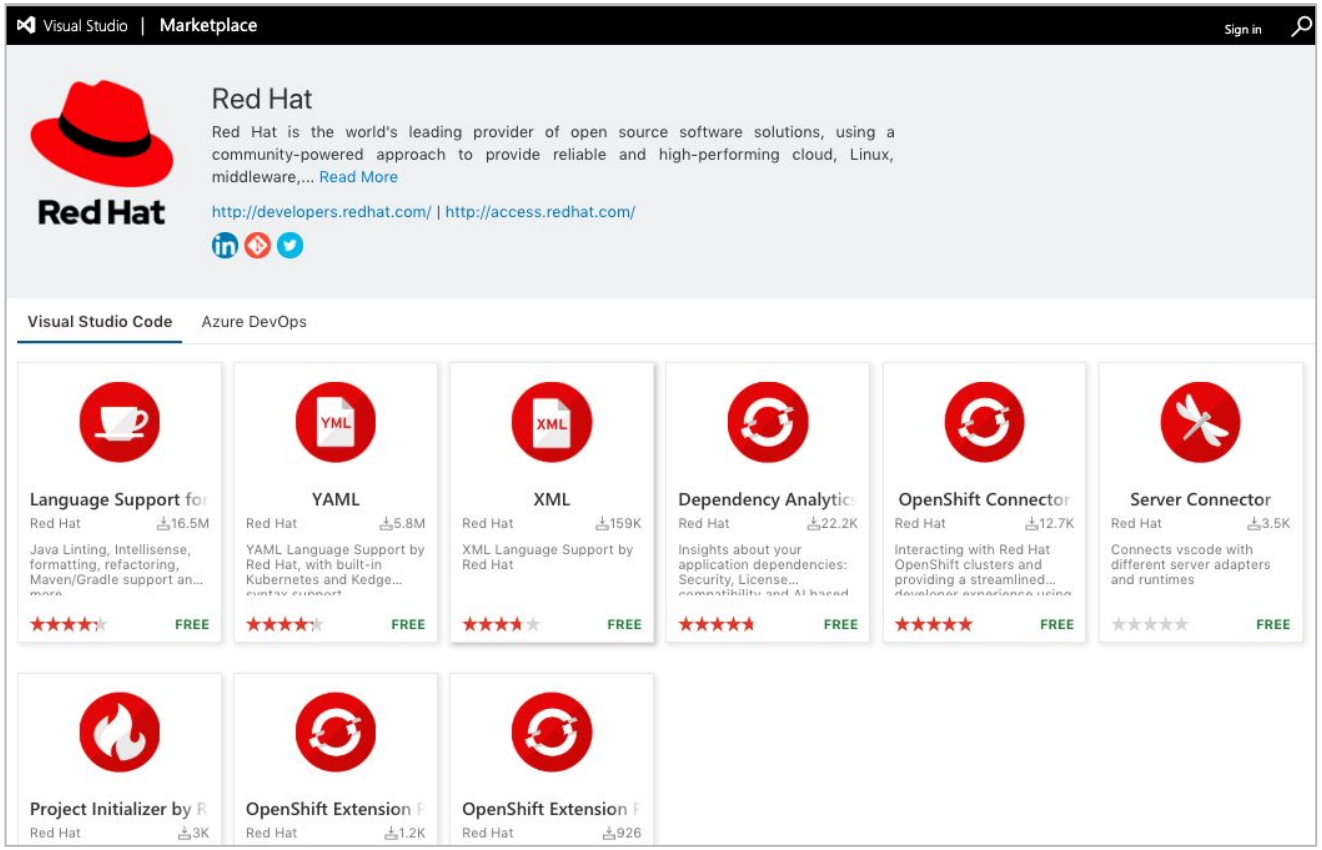
Red Hat

Red Hat Plugins for Microsoft VS Code

Red Hat plugins for VSCode add IDE superpowers for **Java**, **Kubernetes** YAML and XML.

The **OpenShift** plugin allows developers to quickly connect and deploy to OpenShift instances locally or remotely.

Dependency Analytics adds license and CVE package alerts.

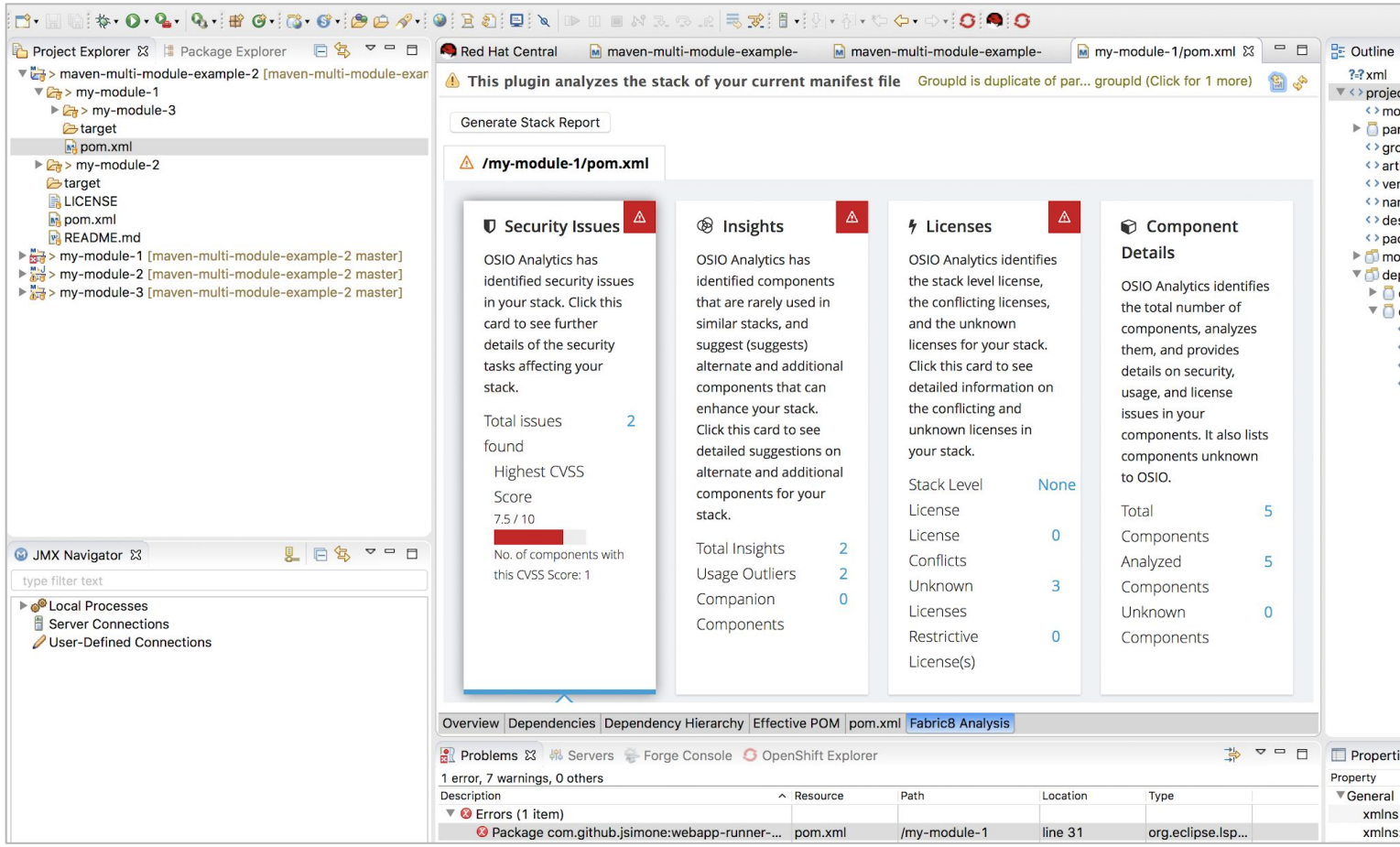


Use It To: Get the most out of Red Hat's products in the VS Code IDE.

Source Code Dependency Analytics

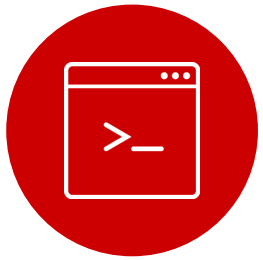
The dependency analytics service provides security and license warnings for any dependency in a project. This helps developers to fix problems earlier in the cycle.

- Find CVEs in any package
- Discover license mismatches
- Supported for Java and Node



Use It To: Help developers find critical issues before they hit production.

As a Red Hat Customer You Can Benefit from the Red Hat Developer Program and Tools Every Day.



LEVERAGE INTUITIVE DEVELOPER TOOLS FOR YOUR KEY PLATFORMS

RELY ON RED HAT SUPPORT FROM DEVELOPMENT THROUGH PRODUCTION

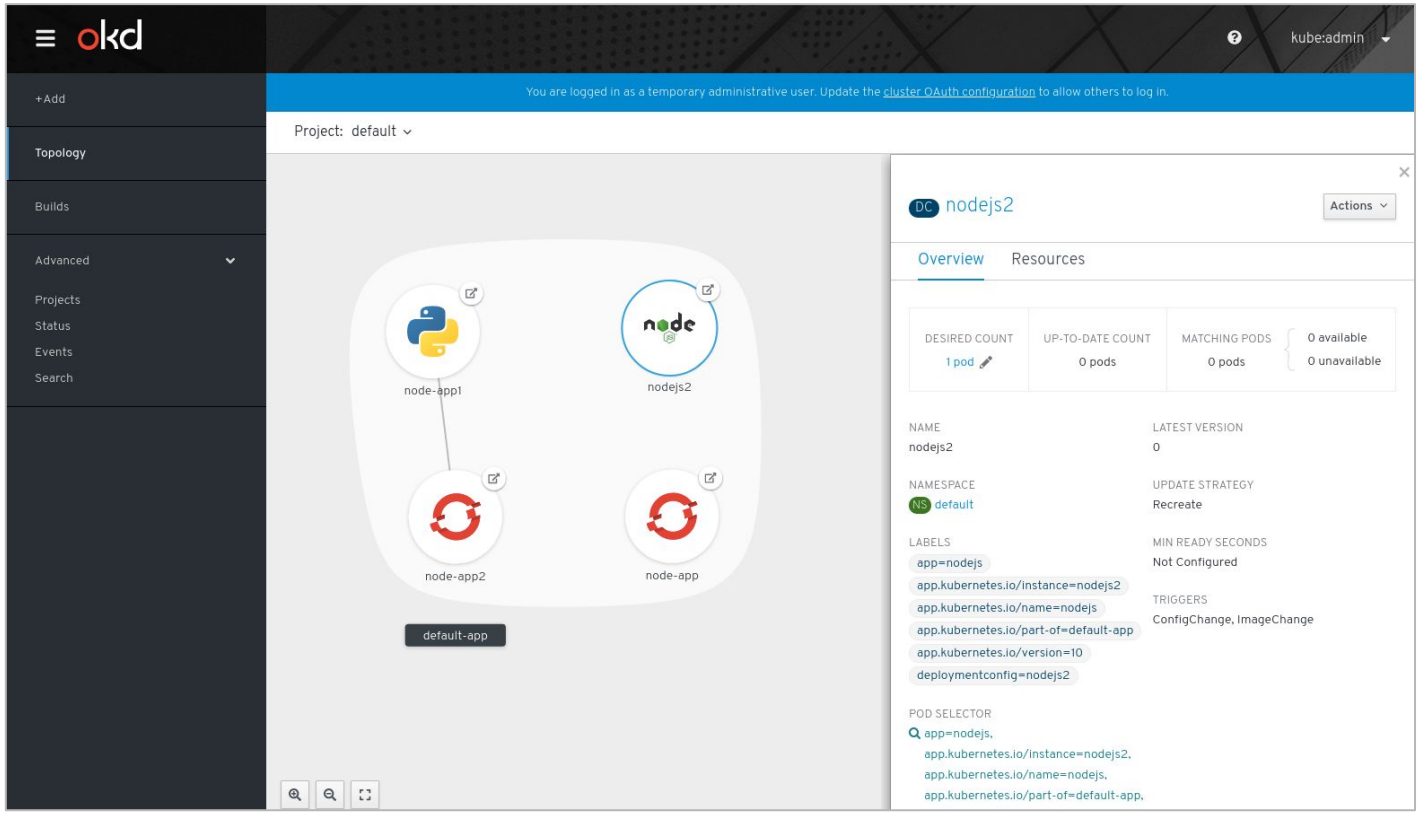
LEARN FROM RED HAT'S EXPERIENCE TO INFORM YOUR OWN DECISIONS

Red Hat

OpenShift Developer Console

Provide developers with an application-centric UI that enables them to quickly import code, create containers, link services and build their projects.

Will leverage OpenShift Pipelines for the CI/CD, and use Istio and Kiali project to provide a graphical view of container interactions for an application.



Use It To: Share an application- and code-centric UI with your development teams.

Red Hat

BUILD SOFTWARE THE RED HAT WAY IN OPEN INNOVATION LABS

EXPERIMENT

Rapidly build prototypes, do DevOps, and be agile.

IMMERSE YOUR TEAM

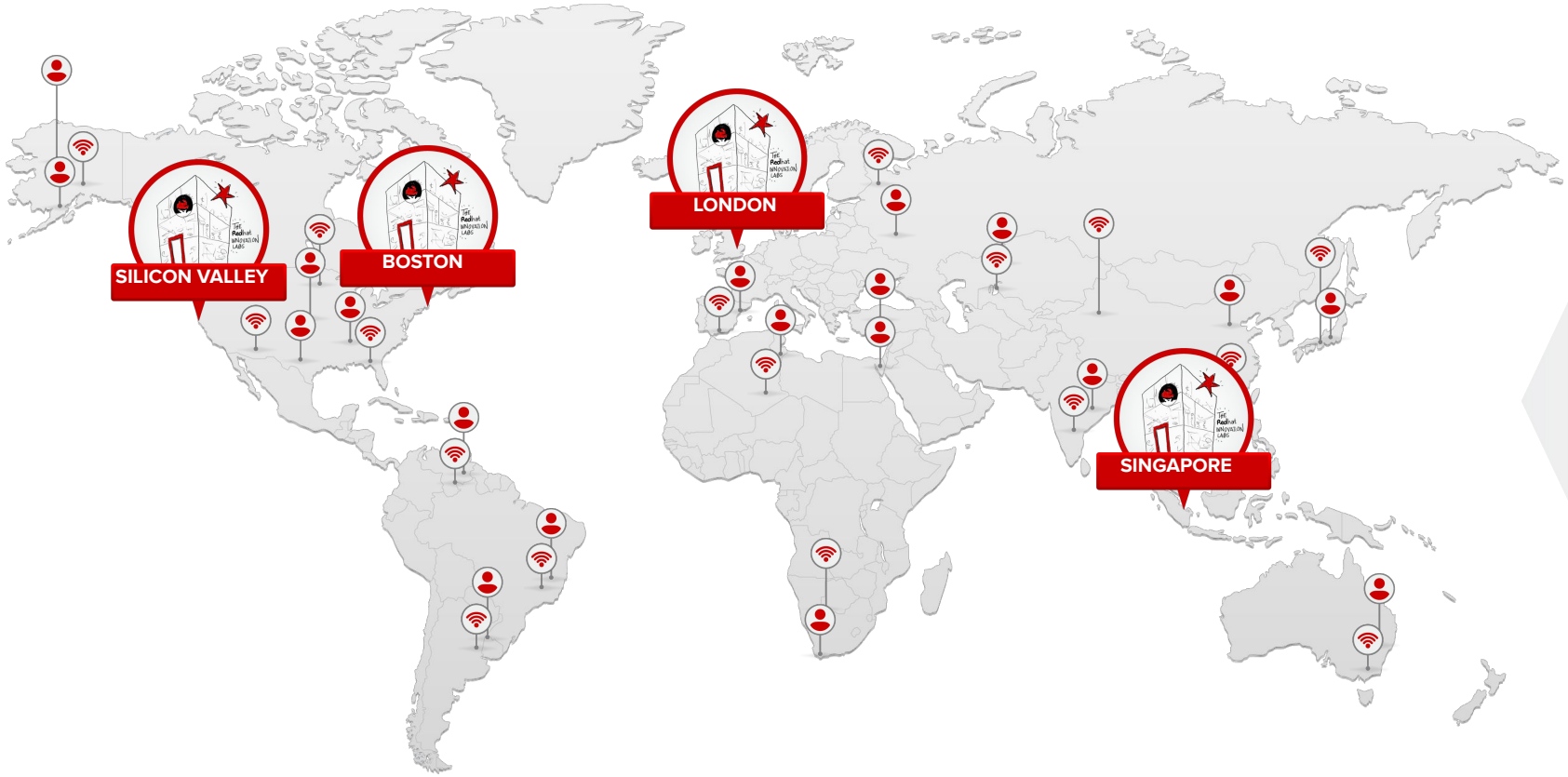
Work side-by-side with experts in a residency-style engagement.

CATALYZE INNOVATION

Bring modern application development back to your team.

Red Hat

DRIVE A CULTURE OF INNOVATION
THROUGH A SPACE THAT FOSTERS COLLABORATION



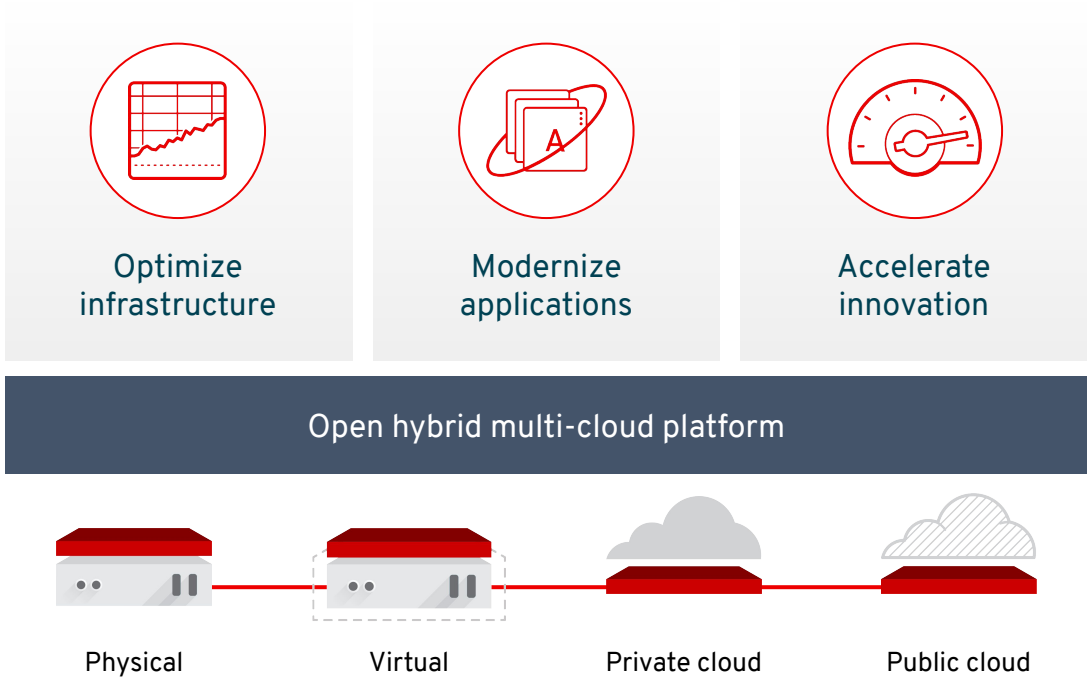
INNOVATE ANYWHERE

- Purpose-driven
- Collaborate and make
- Network and share
- Flex and adapt
- Rejuvenate and connect

Red Hat

Red Hat modernization and migration solutions

Innovation labs | Analytics service | Migration tooling | Open practice library



Establish platforms for the future

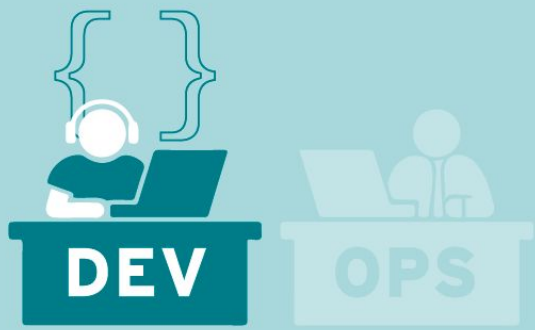
Accelerate adoption of next generation technologies

Reduce cost of existing applications and infrastructure

Transform development and operations practices and culture

Red Hat

Red Hat



The Containers and Cloud-Native Roadshow Developer Track Lab Guide

A hands-on experience for Ops and Dev professionals

DEVELOPER TRACK MODULES

1 OPTIMIZING EXISTING APPLICATIONS

Migrate an existing monolithic Java application from a legacy platform to Red Hat.

Modernize by incrementally refactoring to microservices architecture and modern Java platform

2 DEBUGGING, MONITORING AND CONTINUOUS DELIVERY

Debug, instrument and monitor a modern microservice application.

Deploy continuously using Pipelines

3 CONTROL CLOUD NATIVE APPS WITH SERVICE MESH

Gain a deep understanding of app behavior through service mesh instrumentation and visualization

4 ADVANCED CLOUD NATIVE WITH EVENT-DRIVEN SERVERLESS

Dynamically respond to events and scale applications using powerful Kubernetes constructs

Red Hat

OpenShift Concepts

Red Hat

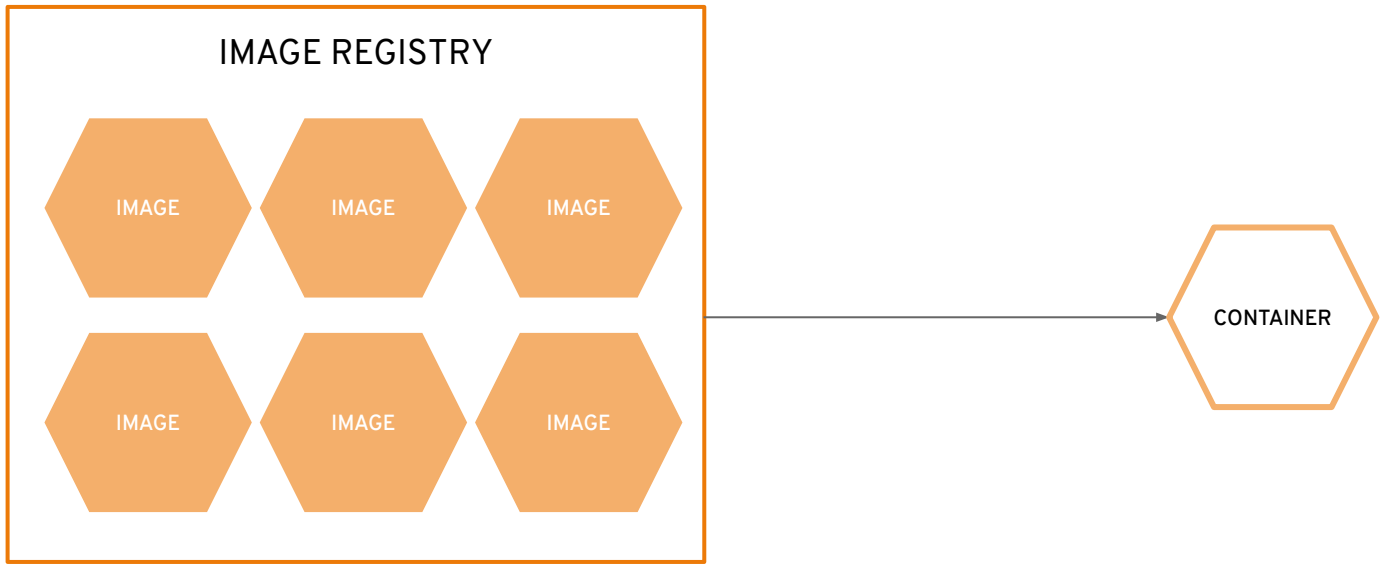
a container is the smallest compute unit

Red Hat

containers are created from container images

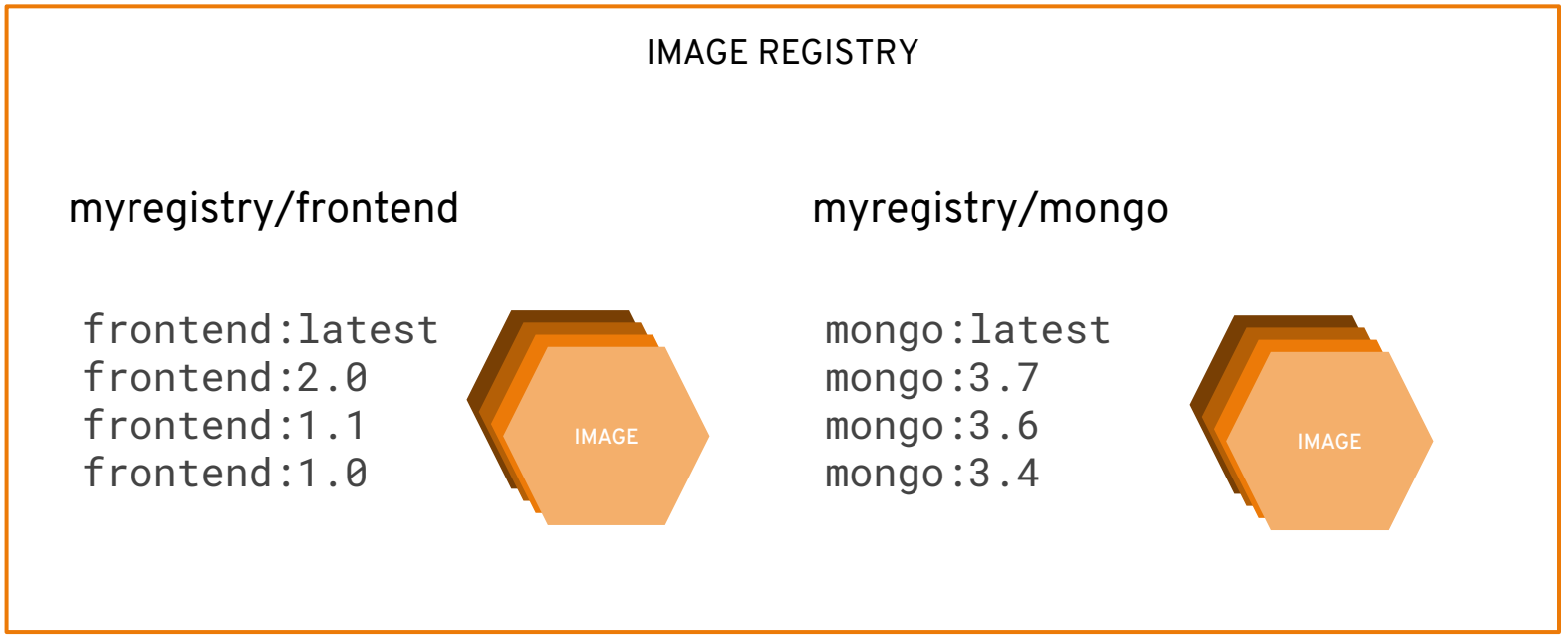
Red Hat

container images are stored in an image registry



Red Hat

an image repository contains all versions of an image in the image registry

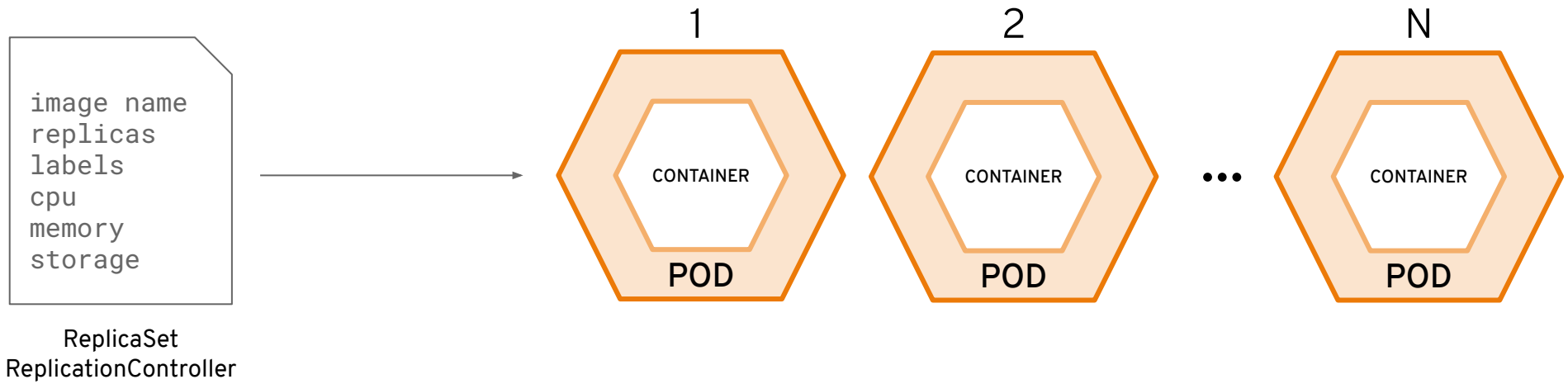


Red Hat

containers are wrapped in pods which are units of deployment and management

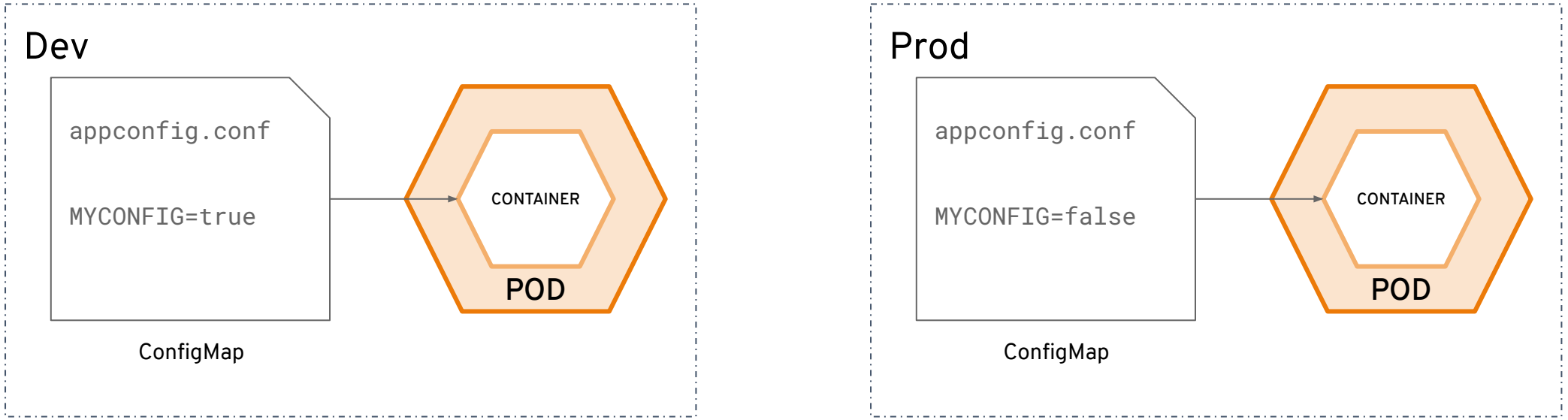
Red Hat

`ReplicationControllers` & `ReplicaSets` ensure a specified number of pods are running at any given time



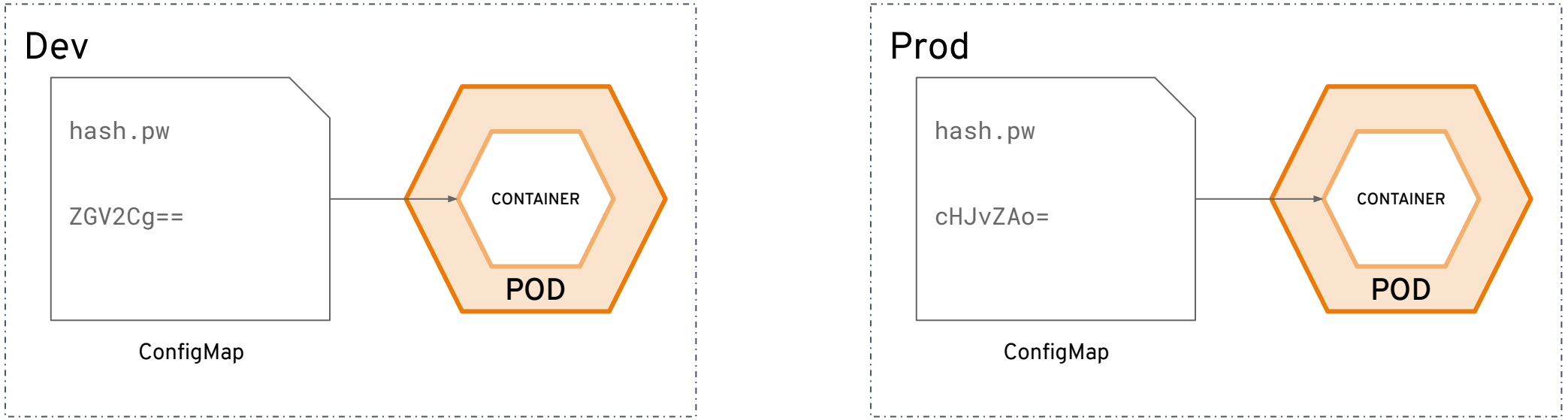
Red Hat

`configmaps` allow you to decouple configuration artifacts from image content



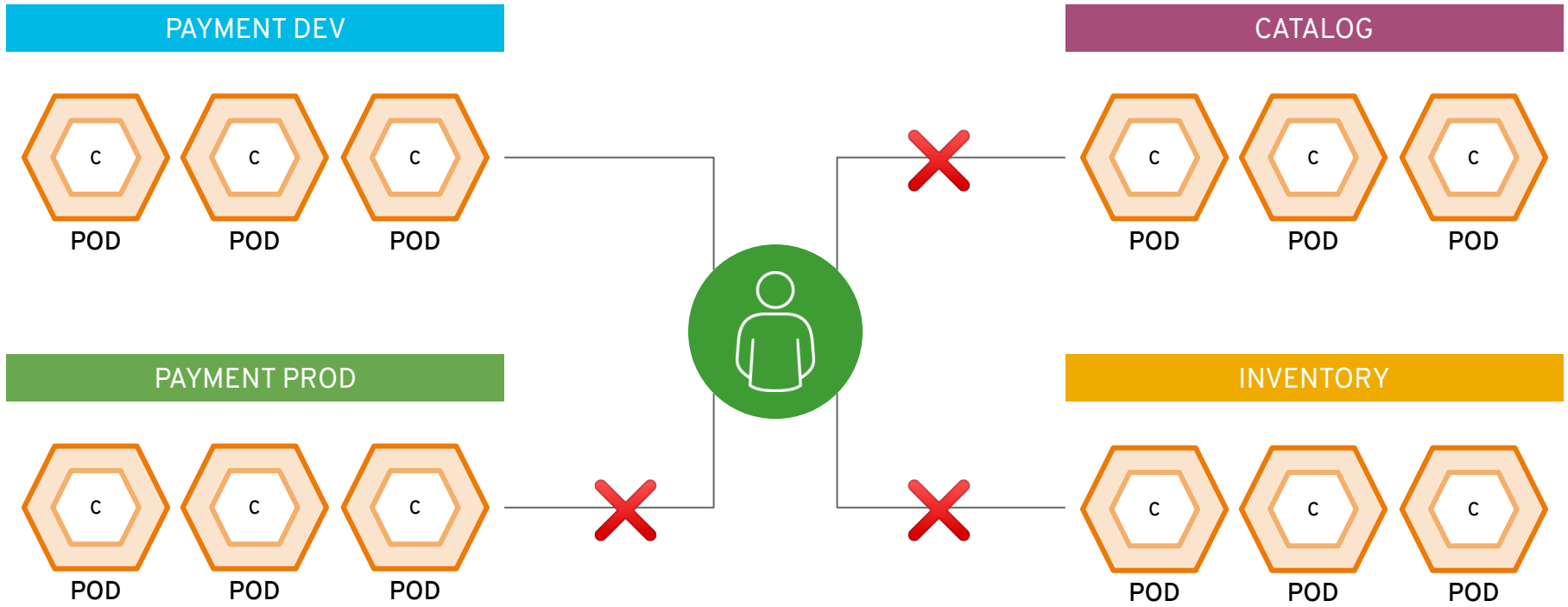
Red Hat

`secrets` provide a mechanism to hold sensitive information such as passwords



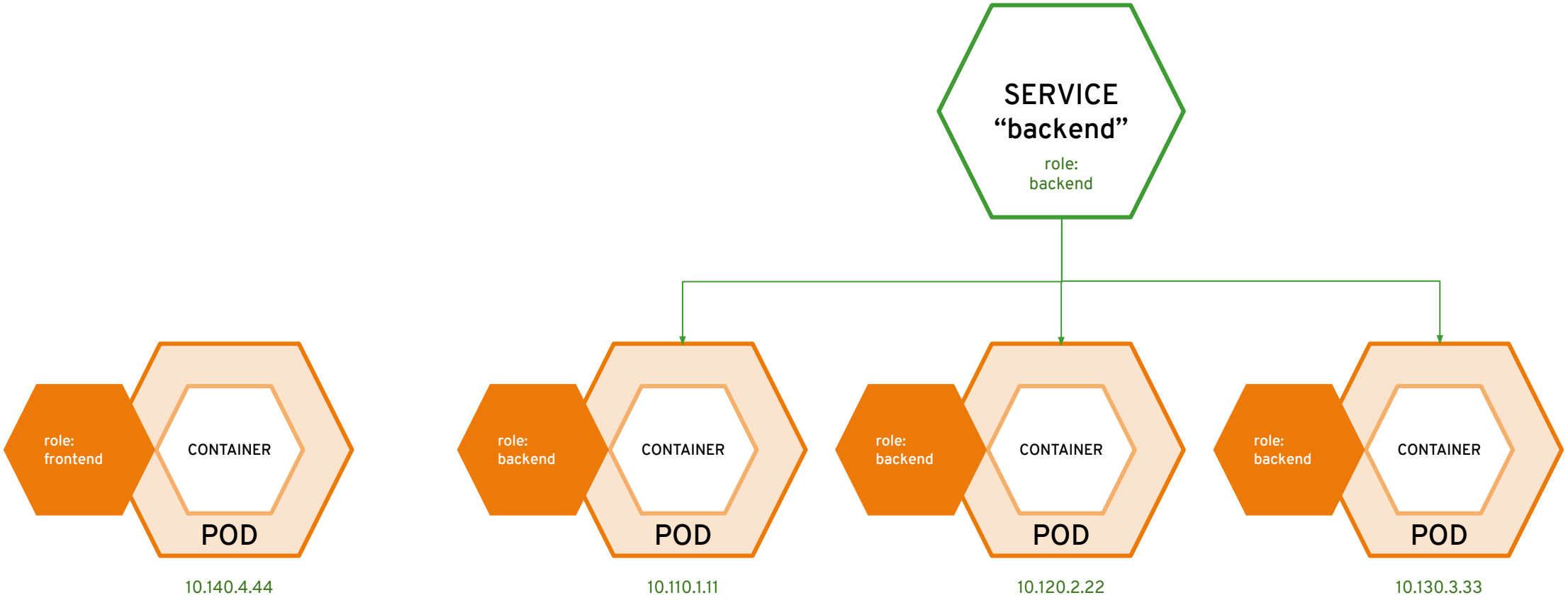
Red Hat

projects isolate apps across environments, teams, groups and departments



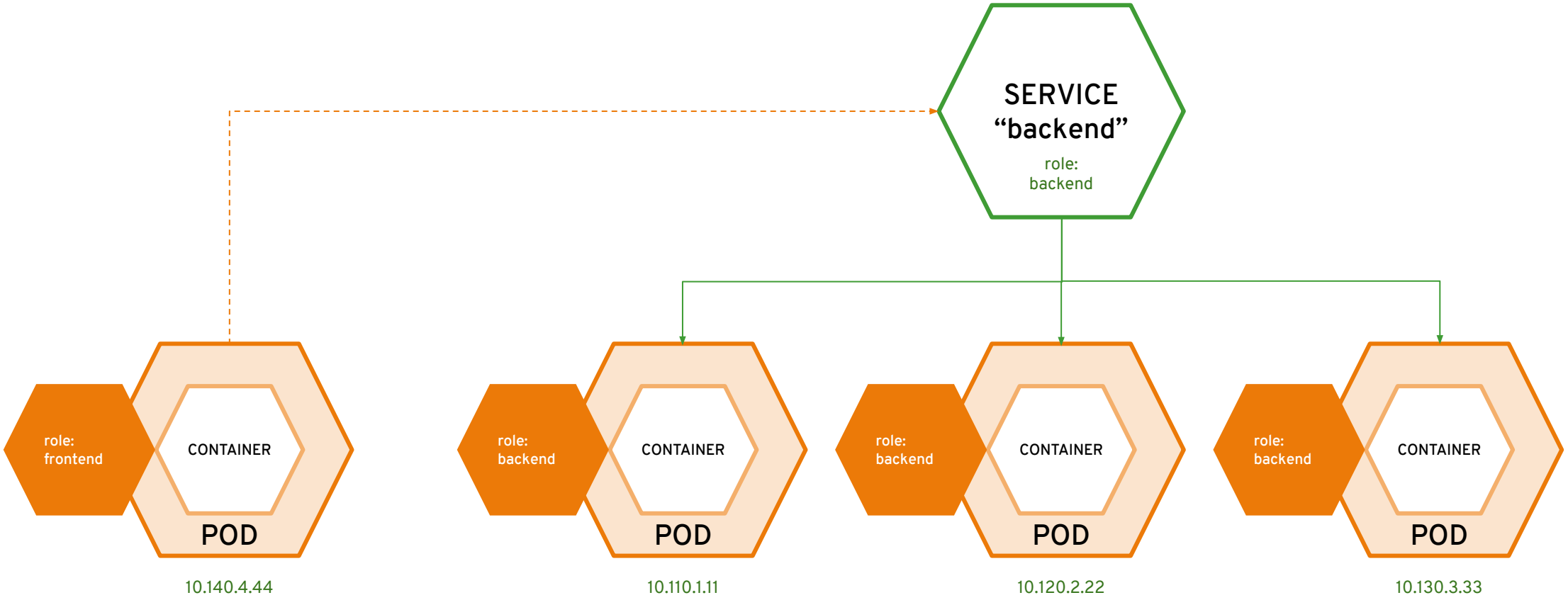
Red Hat

services provide internal load-balancing and service discovery across pods



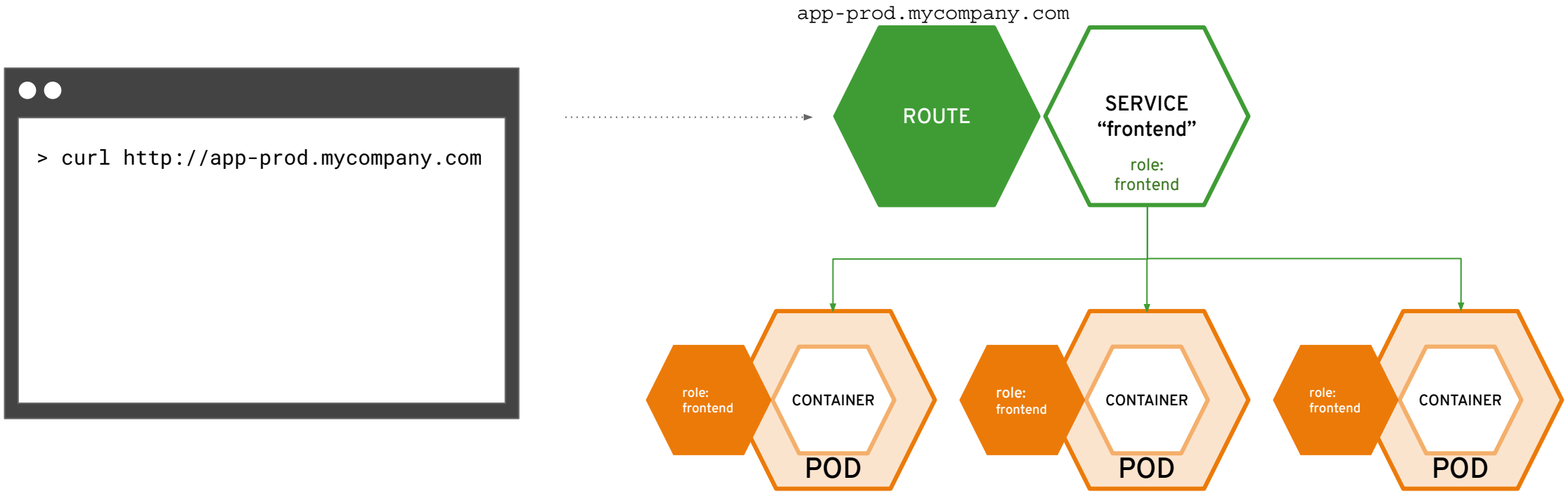
Red Hat

apps can talk to each other via services



Red Hat

`routes` make services accessible to clients outside the environment via real-world urls



Red Hat

OpenShift Features

Enabling Agile Development

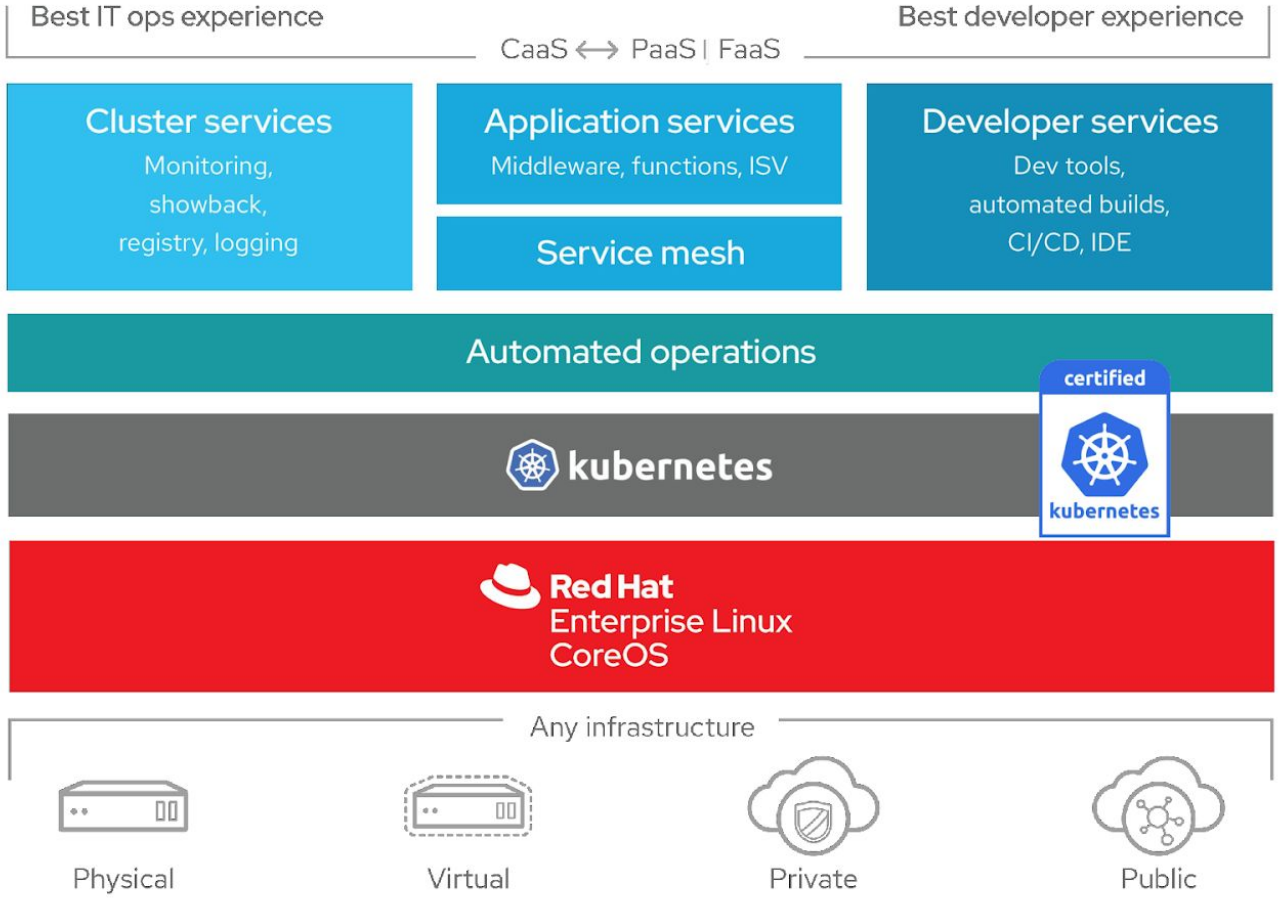
Red Hat

Trusted enterprise Kubernetes

- Trusted host, content, platform
- Full-stack automated installation
- Seamless updates

Red Hat

OpenShift 4 - A smarter Kubernetes platform



Automated, full-stack installation from the container host to application services

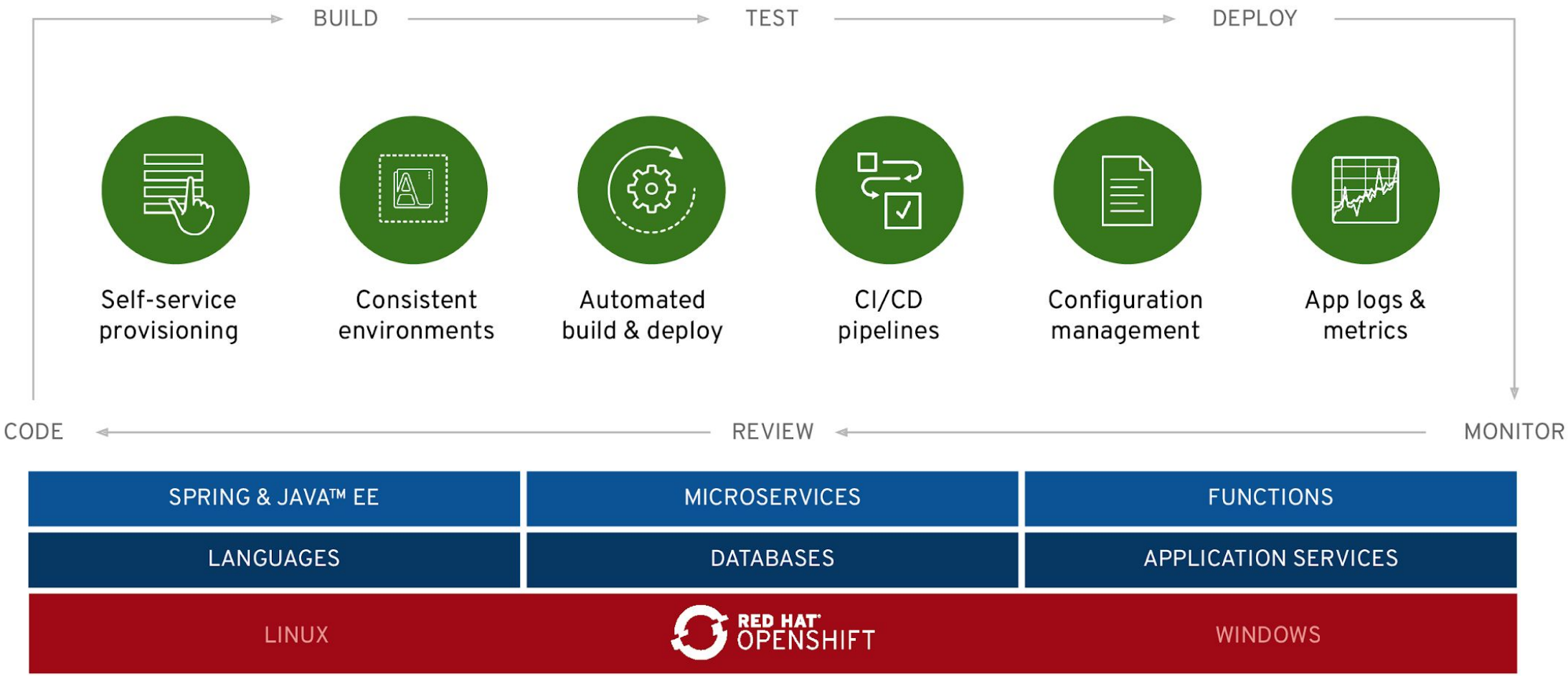
Seamless Kubernetes deployment to any cloud or on-premises environment

Autoscaling of cloud resources

One-click updates for platform, services, and applications

Red Hat

OpenShift enables developer productivity



Red Hat

Building next-gen applications

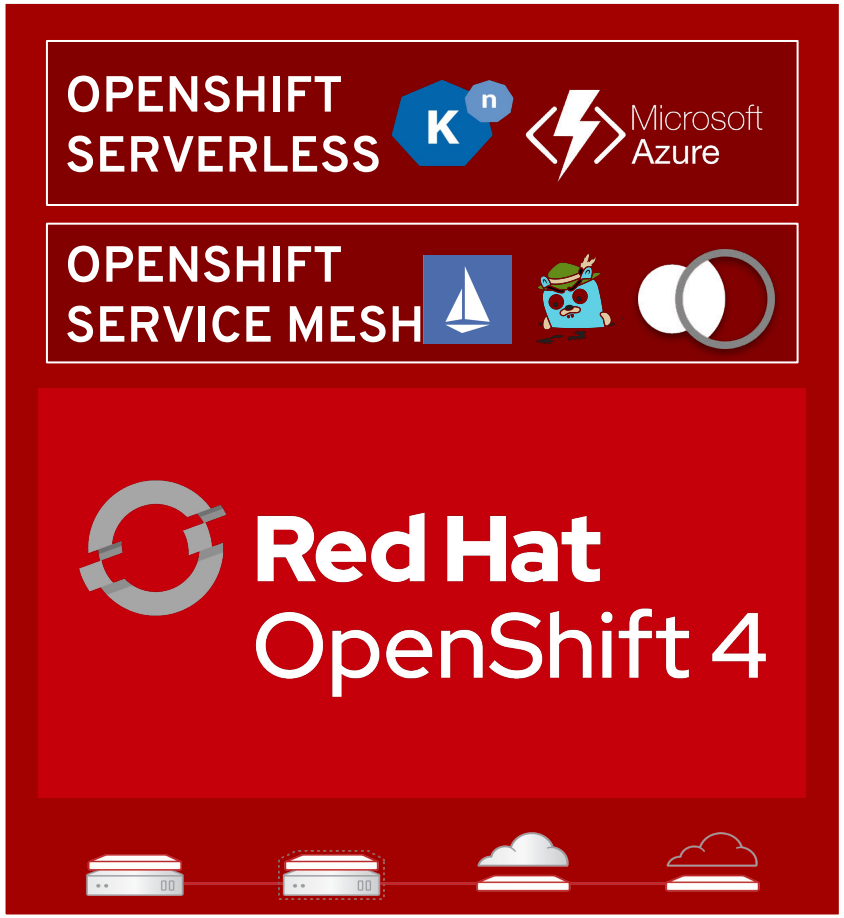
OpenShift Service Mesh

- Integrated Service Mesh for enhanced security and network segmentation of microservices applications. Combines Istio, Kiali (UI), and Jaeger (Tracing) projects.

August 25th!

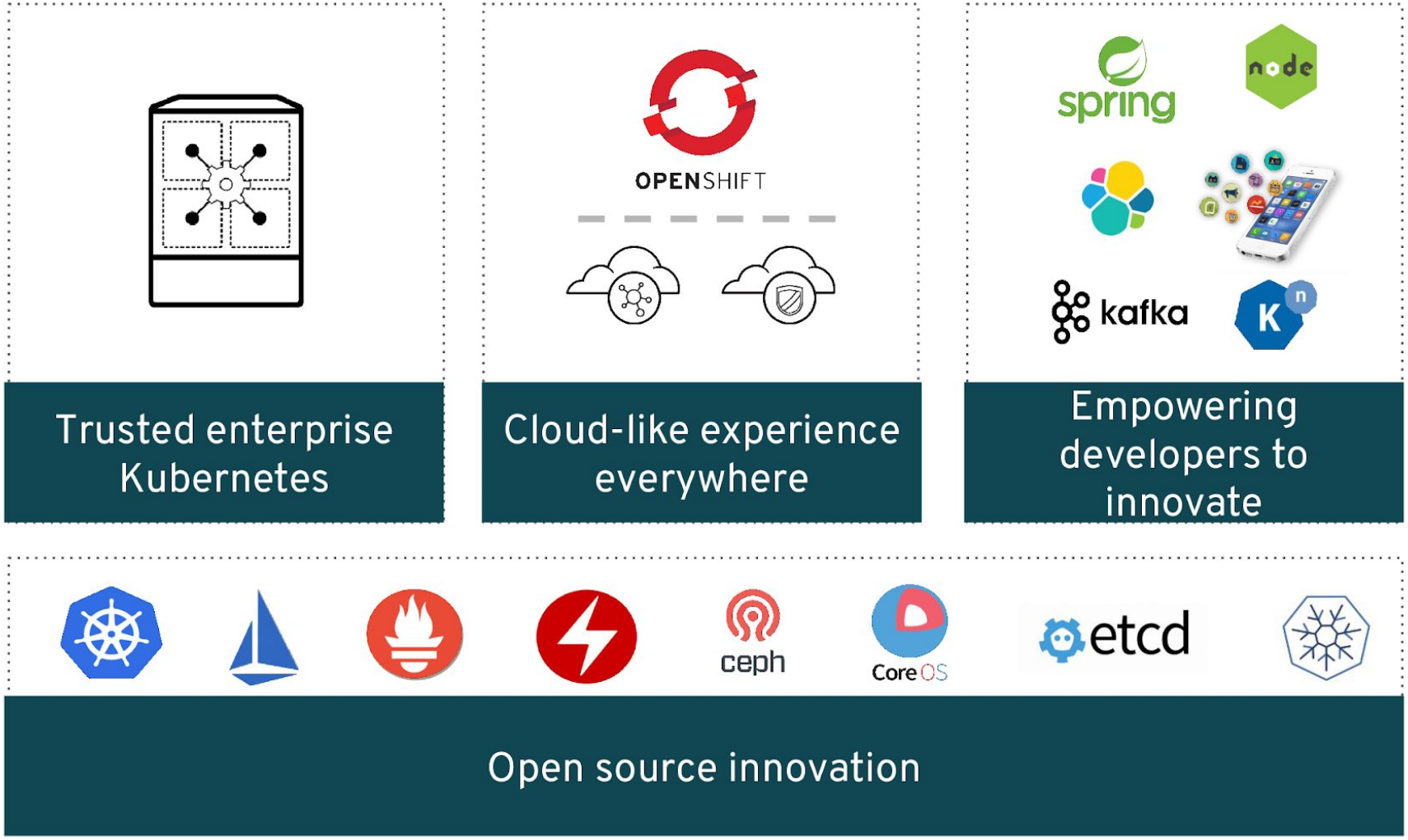
OpenShift Serverless

- Integrated serverless, enabling scale-to-zero FaaS services and event sources - built on the Knative framework.
- Support for Azure Functions
- Integrated with Camel-k for rich set of initial event sources: HTTP, Kafka, AMQP

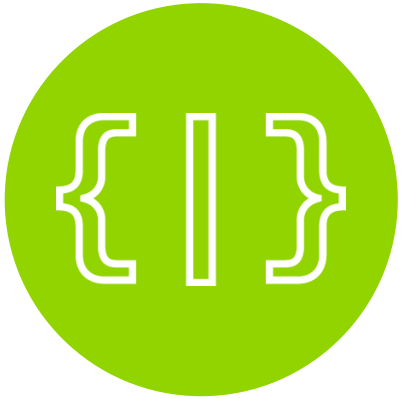


Red Hat

Why customers choose Red Hat OpenShift



Red Hat

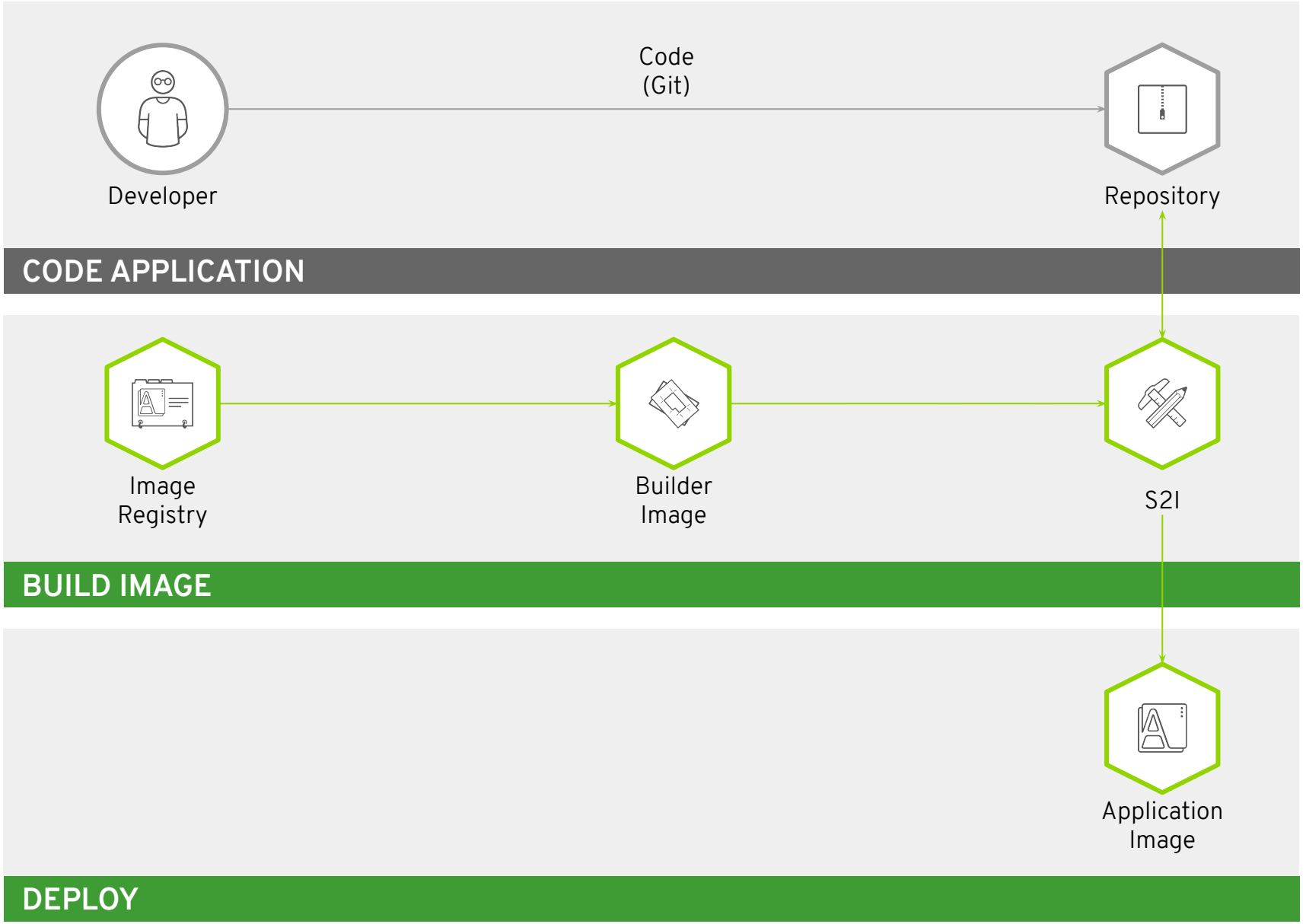


DEPLOY YOUR SOURCE CODE

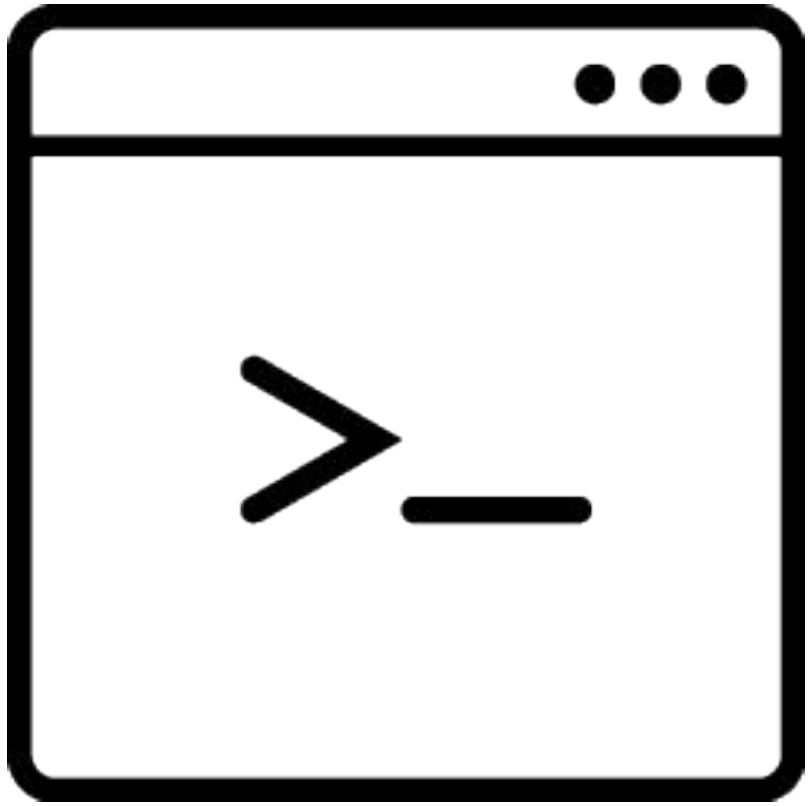
DEPLOY YOUR APP BINARY

DEPLOY YOUR CONTAINER IMAGE

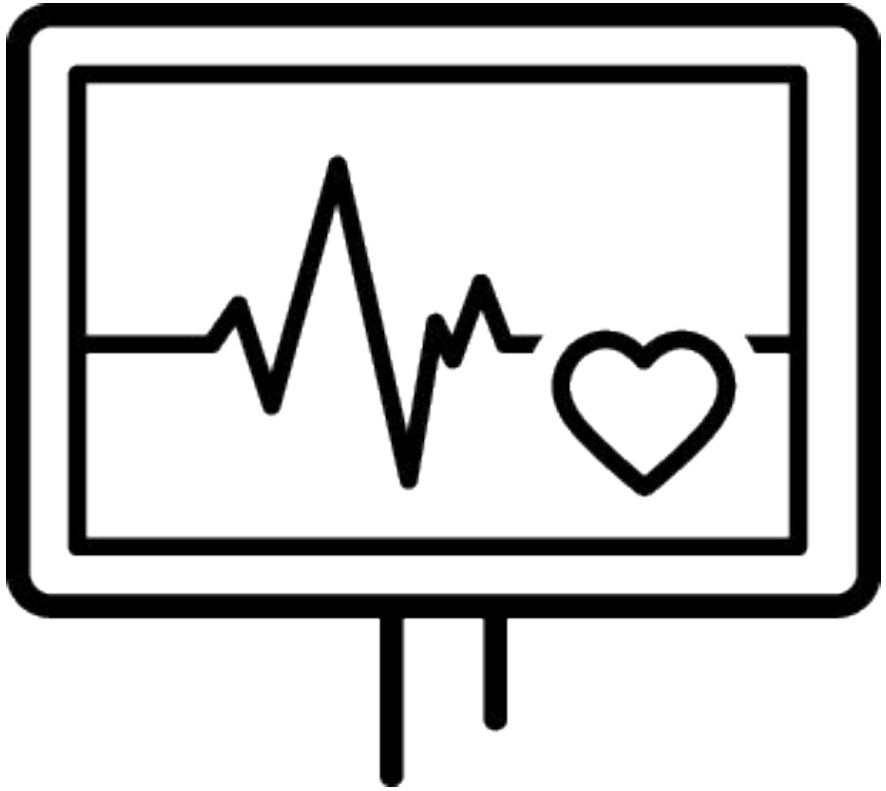
Red Hat


Code
(Git)
Developer
Repository
CODE APPLICATION
Image
Registry
Builder
Image
S2I
BUILD IMAGE
Application
Image
DEPLOY

Red Hat



OPENSHIFT UI BRINGS KUBERNETES POWER TO YOUR FINGERTIPS



APPLICATION METRICS AND LOGS BRING CLARITY ABOUT APP HEALTH

Red Hat

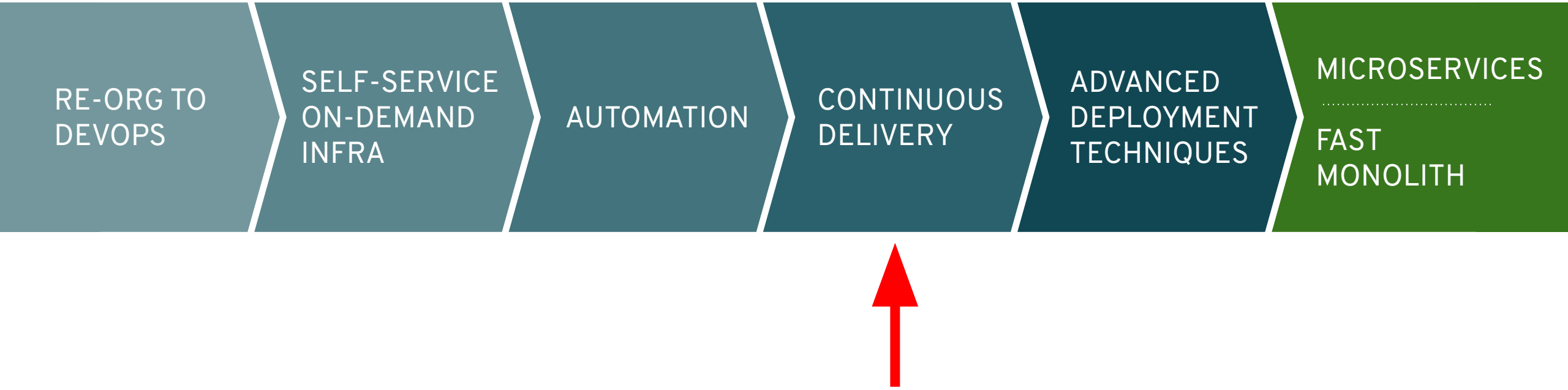
Module 2: Debugging, Monitoring and Continuous Delivery

1. Optimizing Existing Applications
2. Debugging, Monitoring, and Continuous Delivery
3. Control Cloud Native Apps with Service Mesh
4. Advanced Cloud Native with Event-Driven Serverless

Red Hat

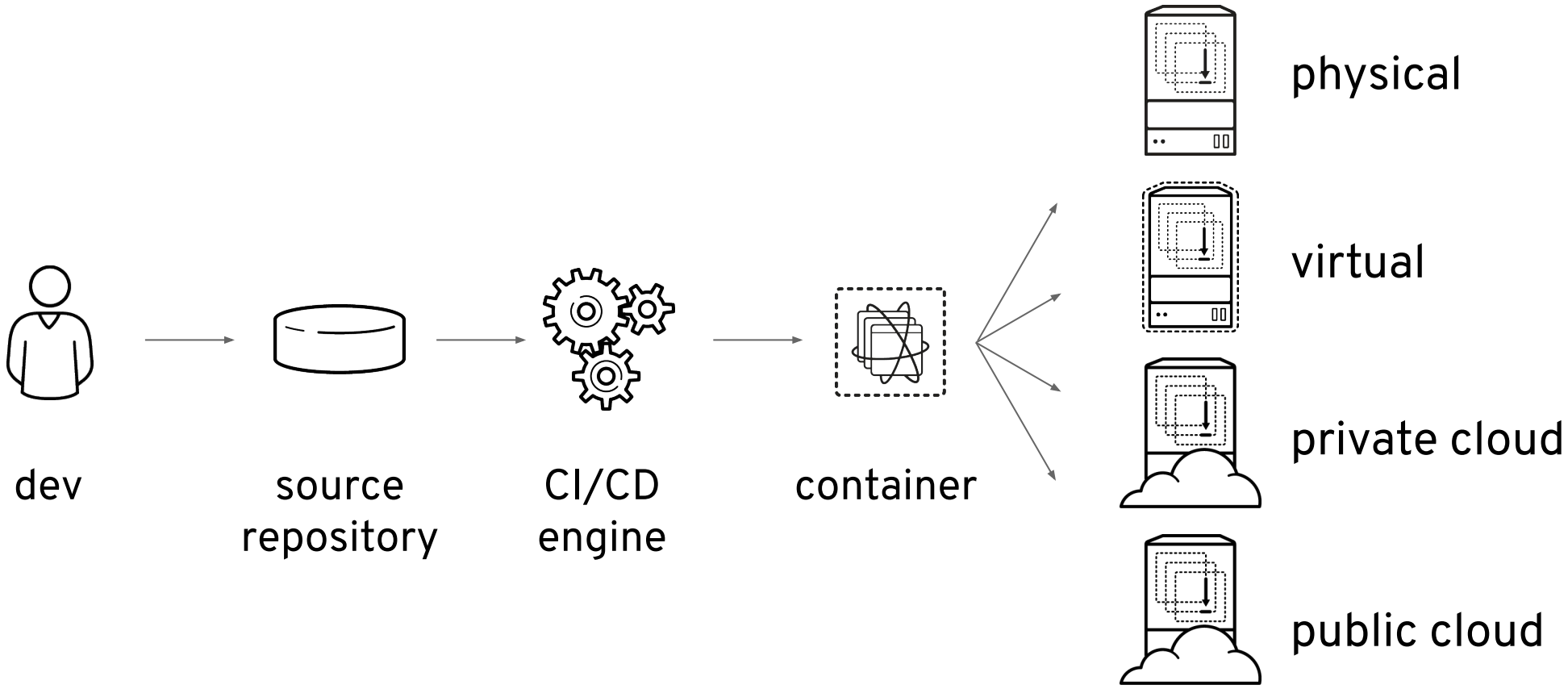
THE PATH TO CLOUD-NATIVE APPS

A DIGITAL DARWINISM



Red Hat

DEPLOYMENT PIPELINES



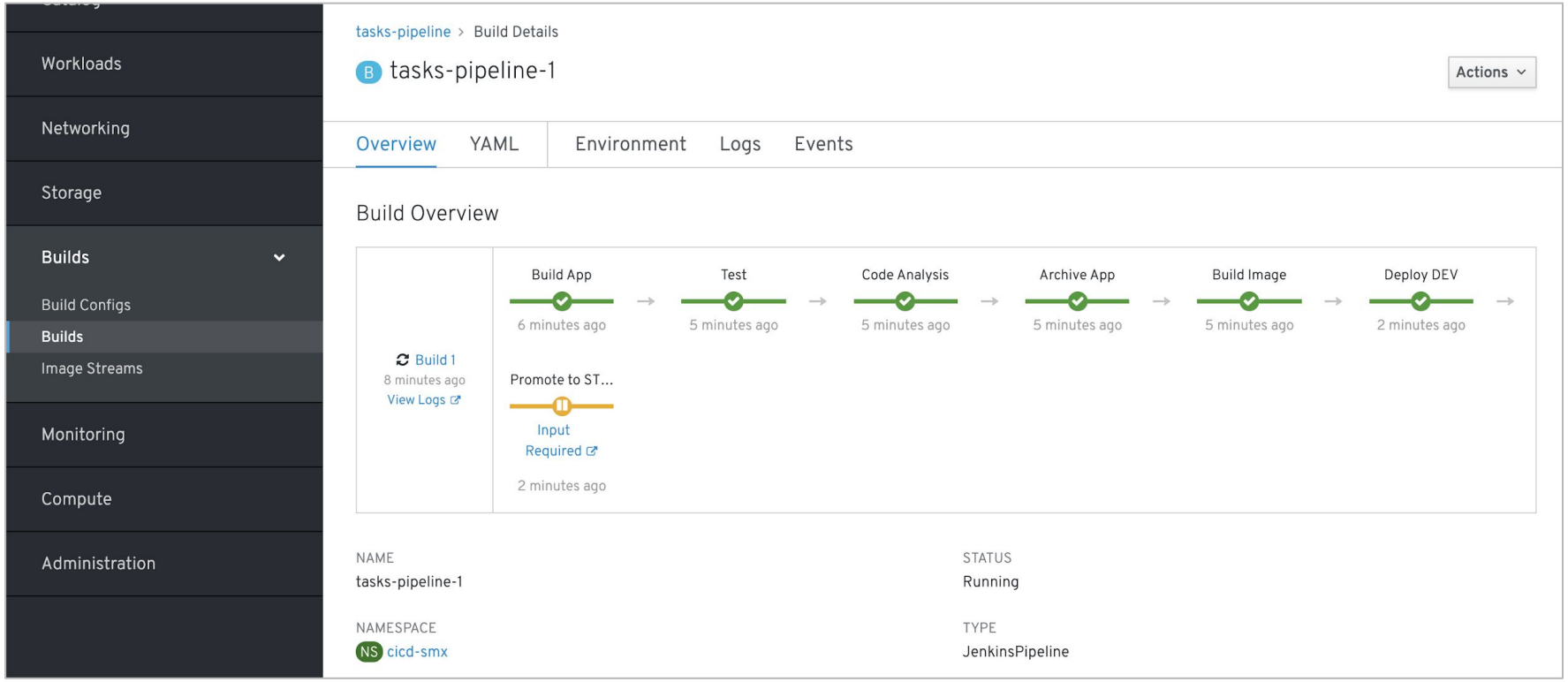
Red Hat

OPENSHIFT PIPELINES

Jenkins is still the most used CI/CD platform in enterprises and can be used from inside OpenShift.

An intuitive pipeline visualization makes it simple for users to see how builds are progressing.

The full Jenkins UI is also available.



Red Hat

OPENSHIFT PIPELINES

- CI/CD workflow via **Jenkins**
- Pipelines are started, monitored, and managed similar to other builds
- Auto-provisioning of Jenkins server
- On-demand Jenkins slaves
- Embedded Jenkinsfile or in Git repo

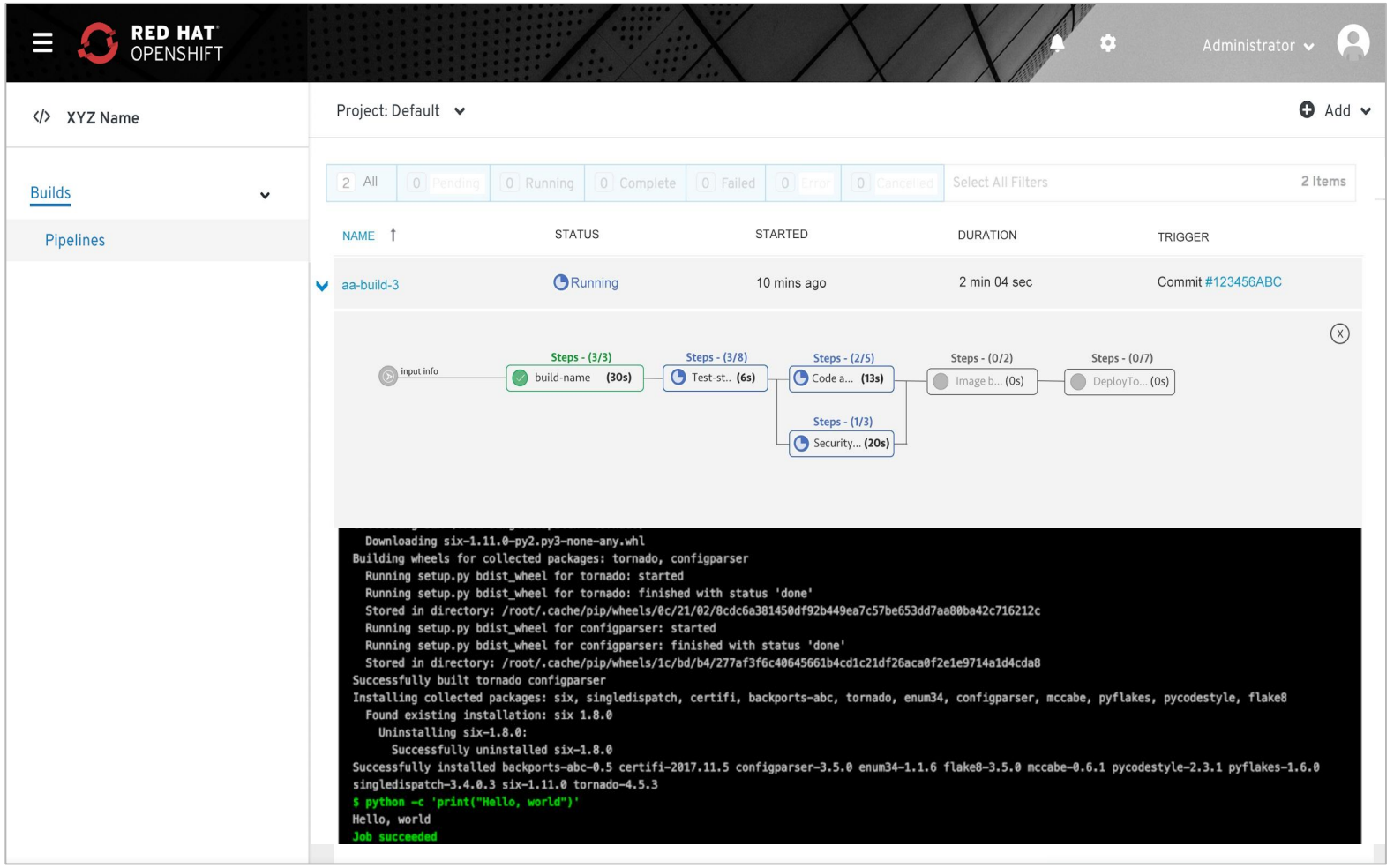
```
pipeline  {
  agent  {
    label  'maven'
  }
  stages  {
    stage('build  app')  {
      steps  {
        git  url:
'https://git/app.git'
        sh  "mvn  package"
      }
    }
    stage('build  image')  {
      steps  {
        script  {
          openshift.withCluster()  {
            openshift.startBuild("...")
          }
        }
      }
    }
  }
}
```

Red Hat

OPENSHIFT PIPELINES CI/CD PLATFORM

Next-gen Kubernetes CI/CD pipeline that works for containers (including serverless).

Based on the **Tekton** project (which was spun out of the Knative Pipelines project) started by Google, Red Hat and others.



Red Hat

OpenShift Application Monitoring

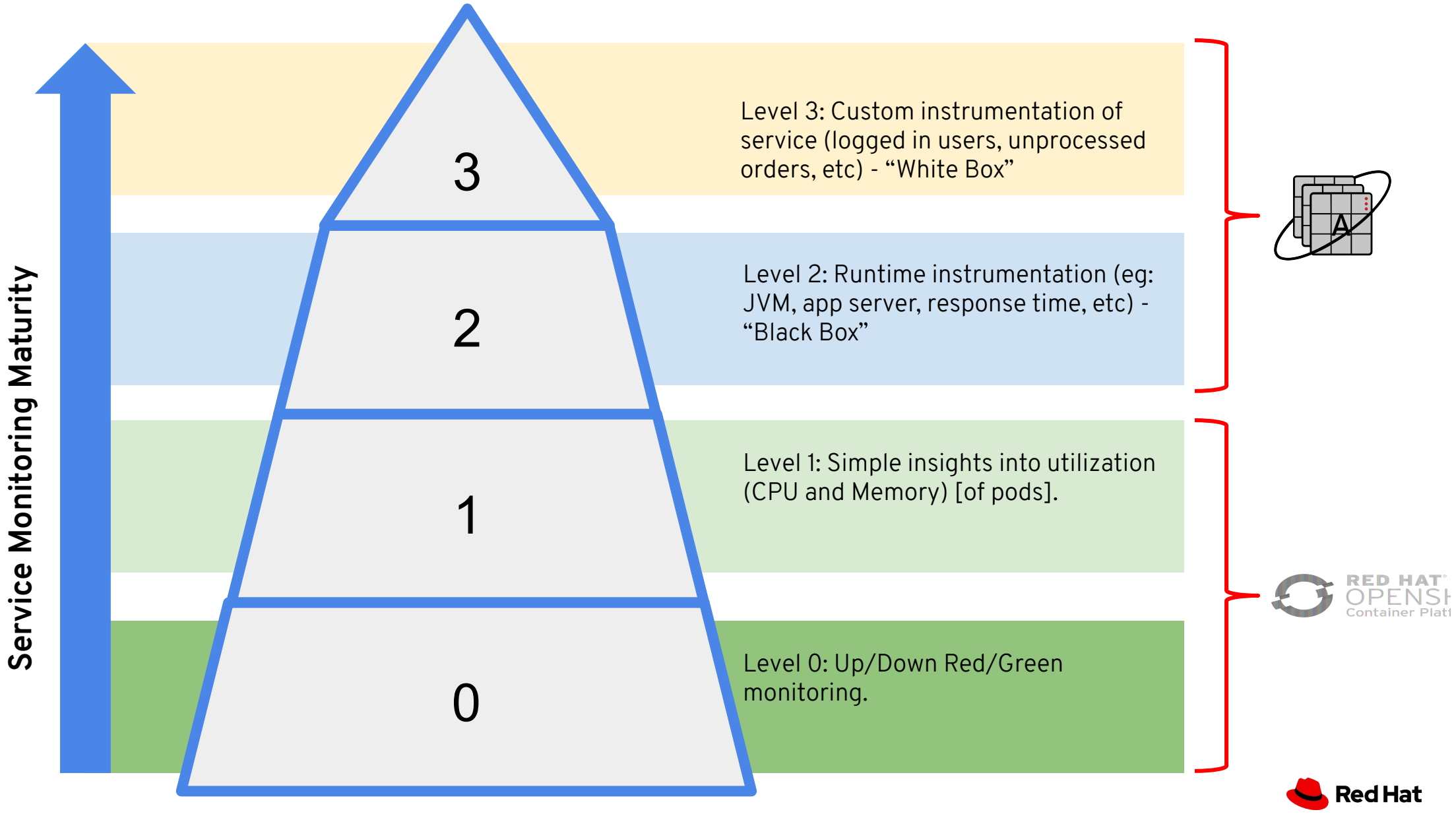
Metrics collection and storage via Prometheus, an open-source monitoring system time series database.

Alerting/notification via Prometheus' Alertmanager, an open-source tool that handles alerts sent by Prometheus.

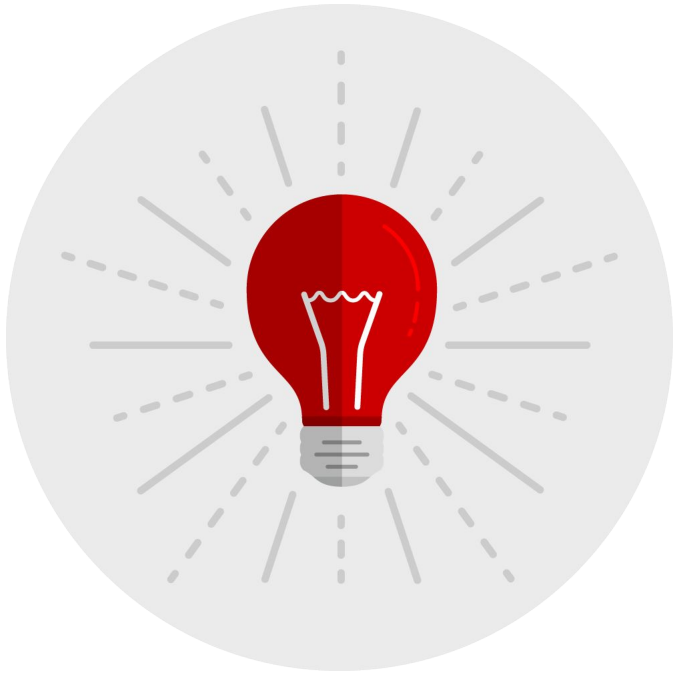
Metrics visualization via Grafana, the leading metrics visualization technology.

Red Hat

Service Monitoring Maturity Model



Middleware OOTB Instrumentation



Prometheus Endpoint
Runtimes (Thorntail, Node.js, vert.x, Quarkus, Spring Boot), Decision & Process Servers.
Coming in EAP 7.3

Health Endpoint
EAP, Runtimes (Thorntail, Node.js, vert.x, Spring Boot, Quarkus), Decision & Process Servers.

Distributed Tracing Client
EAP, Runtimes (Thorntail, Node.js, vert.x, Spring Boot, Quarkus), Fuse.

JSON logging format
EAP, Spring Boot, Decision & Process Servers

Red Hat

GOAL FOR MODULE

In this module you will learn:

- How to create a CI/CD pipeline using Jenkins to automate the deployment of updates to microservice applications
- How to use CodeReady Workspaces to debug Java apps
- How to create health probes to allow the platform to act on unhealthy apps
- How to use distributed tracing and Jaeger to gain insight into application behavior
- How to instrument and monitor application performance using Prometheus (metrics ingestion and alerting) and Grafana (visualization)

Red Hat

LAB INSTRUCTIONS

- **Everything is done in browser** - no local commands or installs needed on your laptop
- Tested with **Chrome 75.0.3770.142**, **Firefox 60.8.0esr**. → **Safari 12.x does not work!**
- If things get weird, just reload browser page
- **Turn off VPN** (we use websockets extensively), **pause AdBlock** for the lab domain (there are no ads)
- To recreate the lab locally, visit

  `github.com/RedHat-Middleware-Workshops/cloud-native-workshop-v2-infra`

To get started:

https://bit.ly/CCNm2-July2020

Password: `r3dh4t1!`

If you get stuck, raise a hand!

Red Hat