

Cloud-Native DevSecOps powered by Red Hat OpenShift on IBM zSystems and LinuxONE

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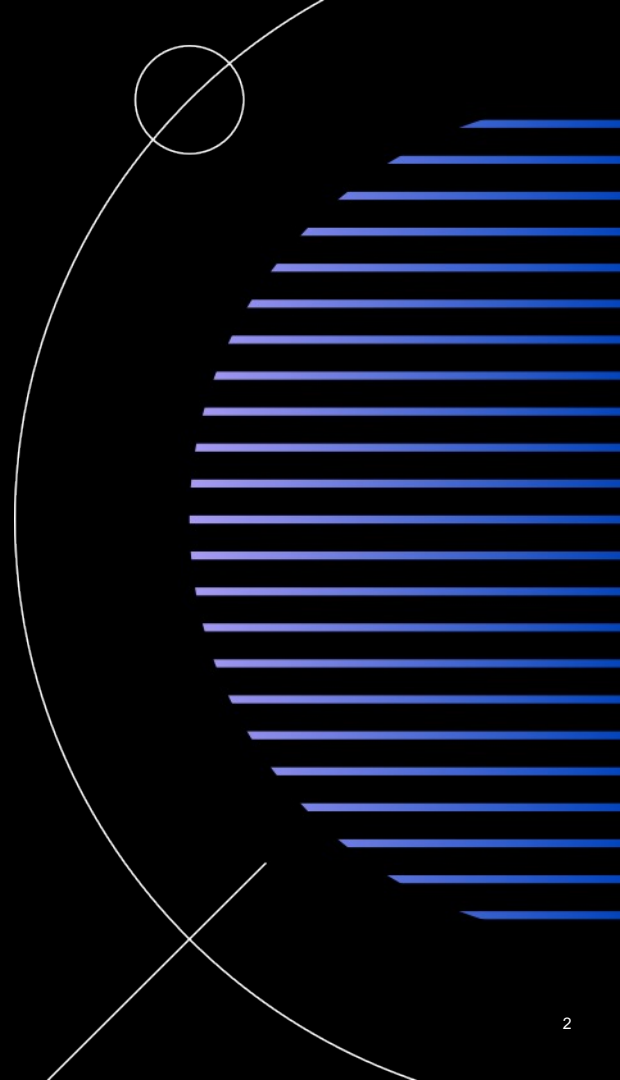
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IBM Washington Systems Center – IBM zSystems and LinuxONE



Workshop Overview

- 1. Introduction to Kubernetes and OpenShift**
- 2. Introduction to Cloud Native DevSecOps**
- 3. Lab: Build and Deploy a Cloud Native DevSecOps Pipeline in OpenShift on IBM zSystems and LinuxONE**



Introduction to Kubernetes and OpenShift

1

Evolution of cloud and
containerized
workloads
(Microservices)

2

What is Kubernetes?

3

What is OpenShift
Container Platform?

4

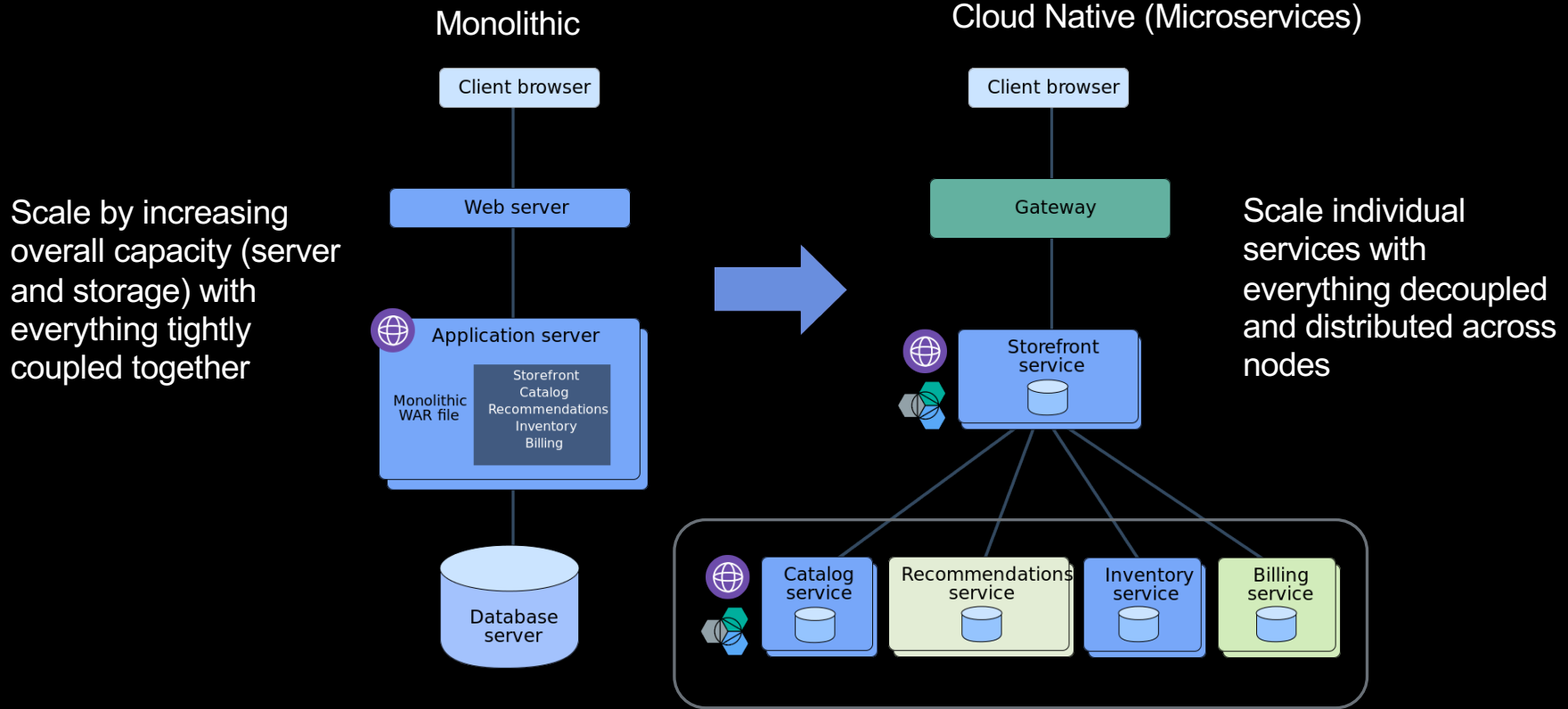
IBM's Open Hybrid
Cloud Platform

1. Evolution of cloud and containerized workloads (Microservices)

According to NIST cloud is

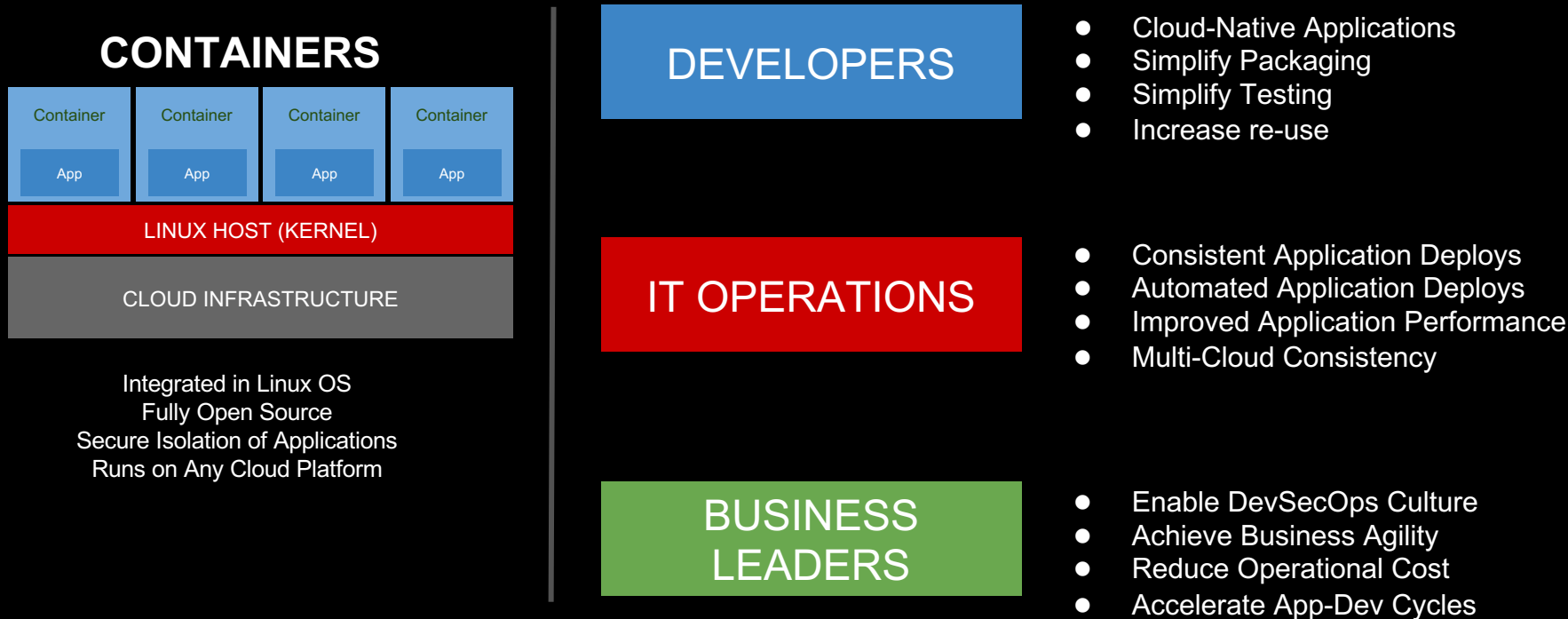


Need Apps to match scalability and speed of cloud ...

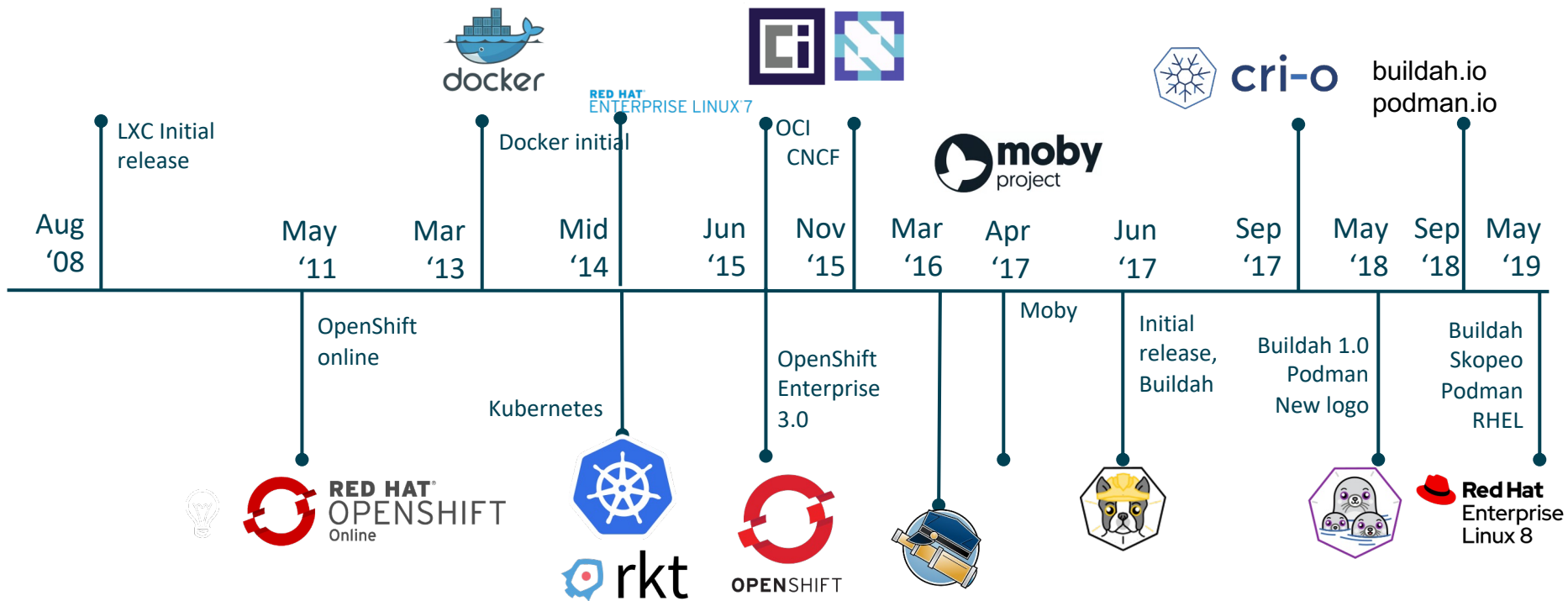


... and Containers to enable this

Consistent Tools for Both Developers and IT Operations



CONTAINER INNOVATION CONTINUES





Why Orchestration (short)

Why Orchestration (long) ?

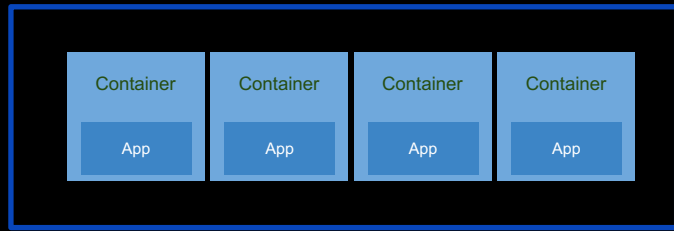
Scaling Out Containers (especially for microservices) leads to management issues

- What happens when a container dies? (recovery)
- How do I rollout new versions of my application?
- How do I expose containers to the outside world (port conflicts become a problem if using one host)?
- How do I scale my application and load-balance calls to it?
- How do I secure access to my containers?
- How do I manage credentials for my applications?
- How can I manage my containers across nodes from one control plane to better utilize resources (resource pooling -> improved scheduling -> improved utilization)?

....

2. What is Kubernetes?

Why do Containers need Kubernetes?



CONTAINERIZED
APPLICATIONS



Manage Containers
Securely

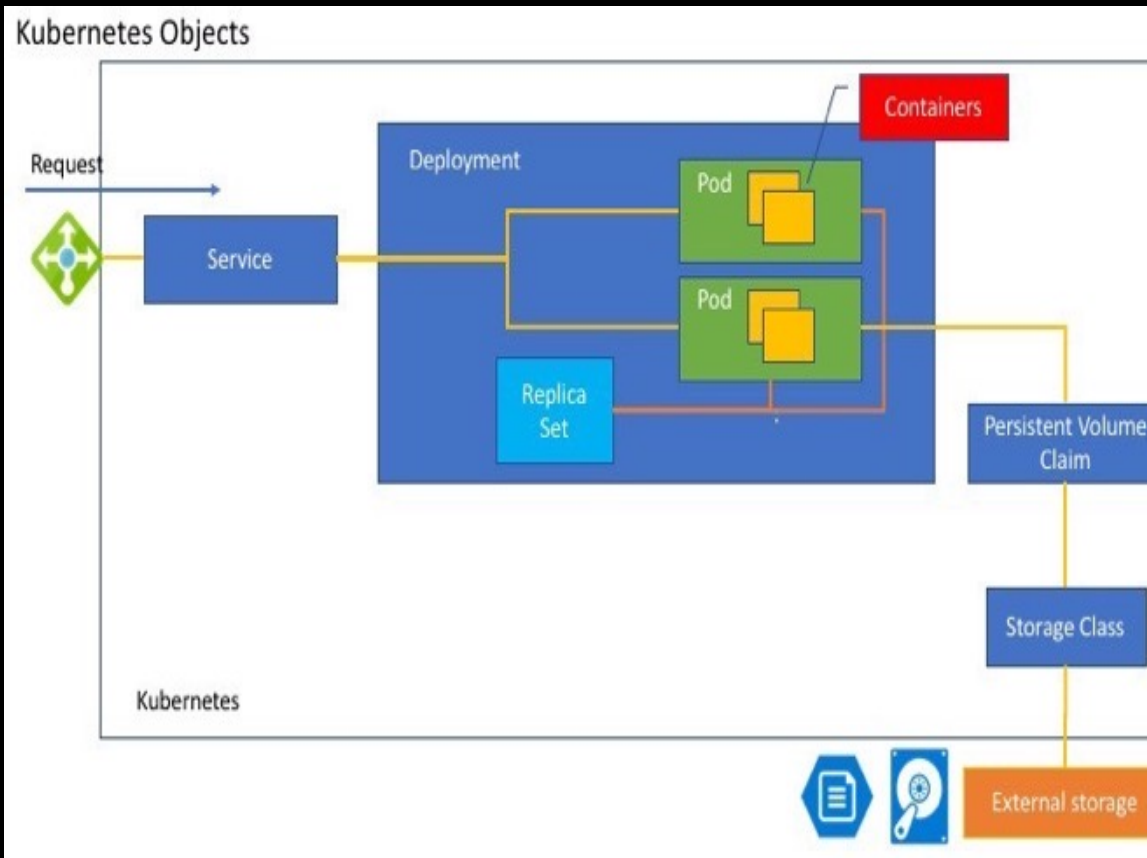
Manage Containers
At Scale

Integrate IT Operations

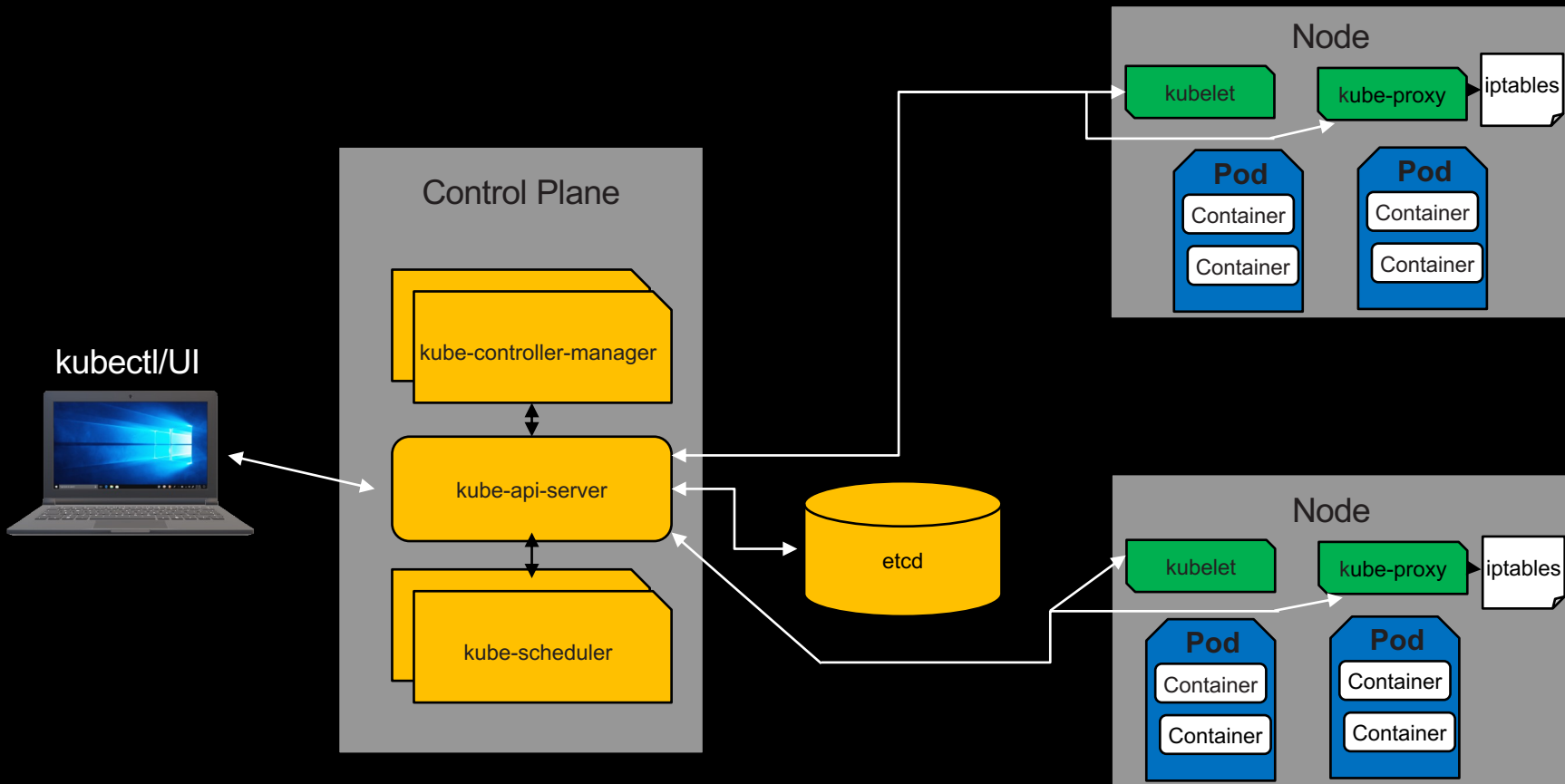
Enable Hybrid Multi-Cloud

Kubernetes– Putting the pieces together

- Pod – Set of containers running in same execution environment/context (smallest unit in kubernetes) [containers in pod share some Linux namespaces (Network, IPC, and PID if enabled) but each have own cgroup]
- ReplicaSet – makes sure correct number and types of pods are available
- Deployment –Manages replica sets for ease of new app version rollout.
- Service – Provides access point for pods/deployment as well as load balancing
- Persistent Volume Claim – provides storage volumes to container runtime (i.e. docker) by binding to persistent volumes
- Storage Class – groups storage so that it can be dynamically selected and provisioned
- Persistent Volume - Set of external storage defined to kubernetes

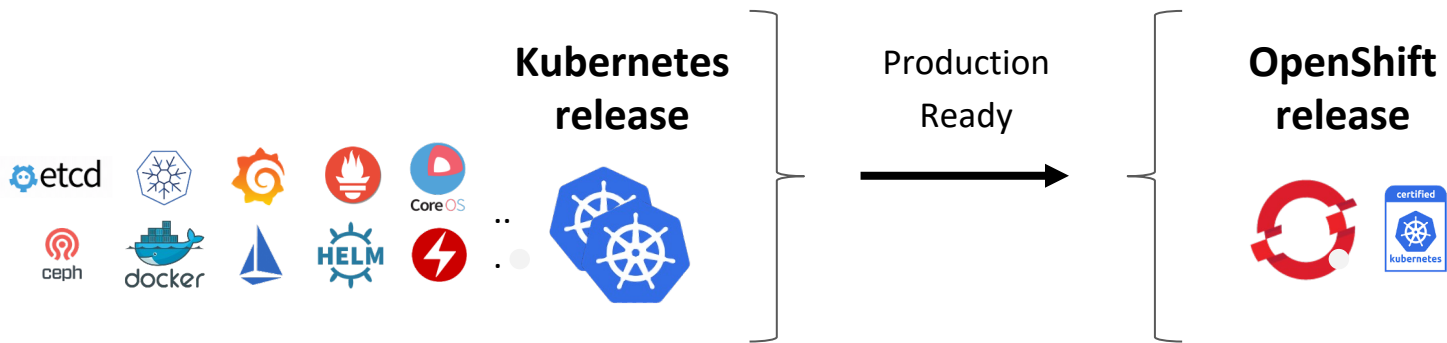


Basic “Physical” Kubernetes Cluster Architecture

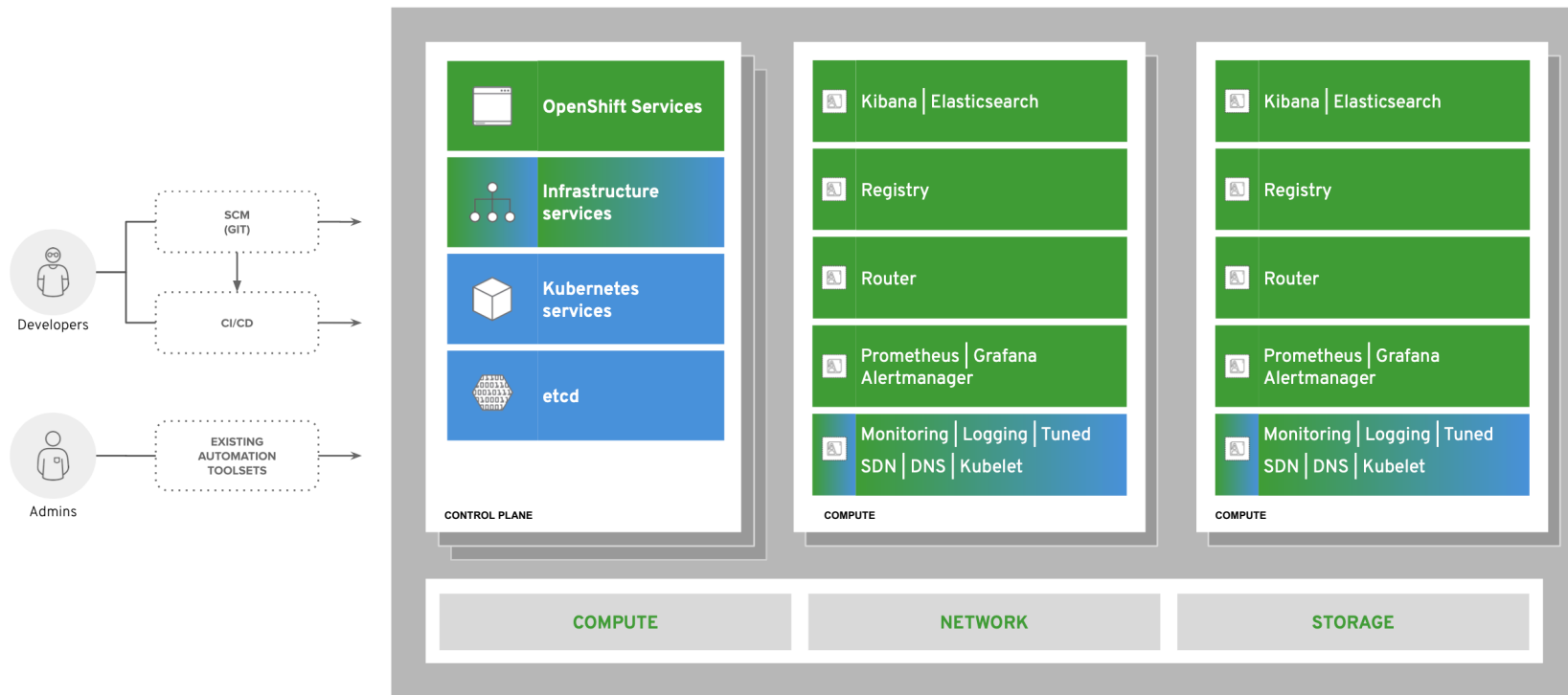


3. What is Red Hat OpenShift Container Platform?

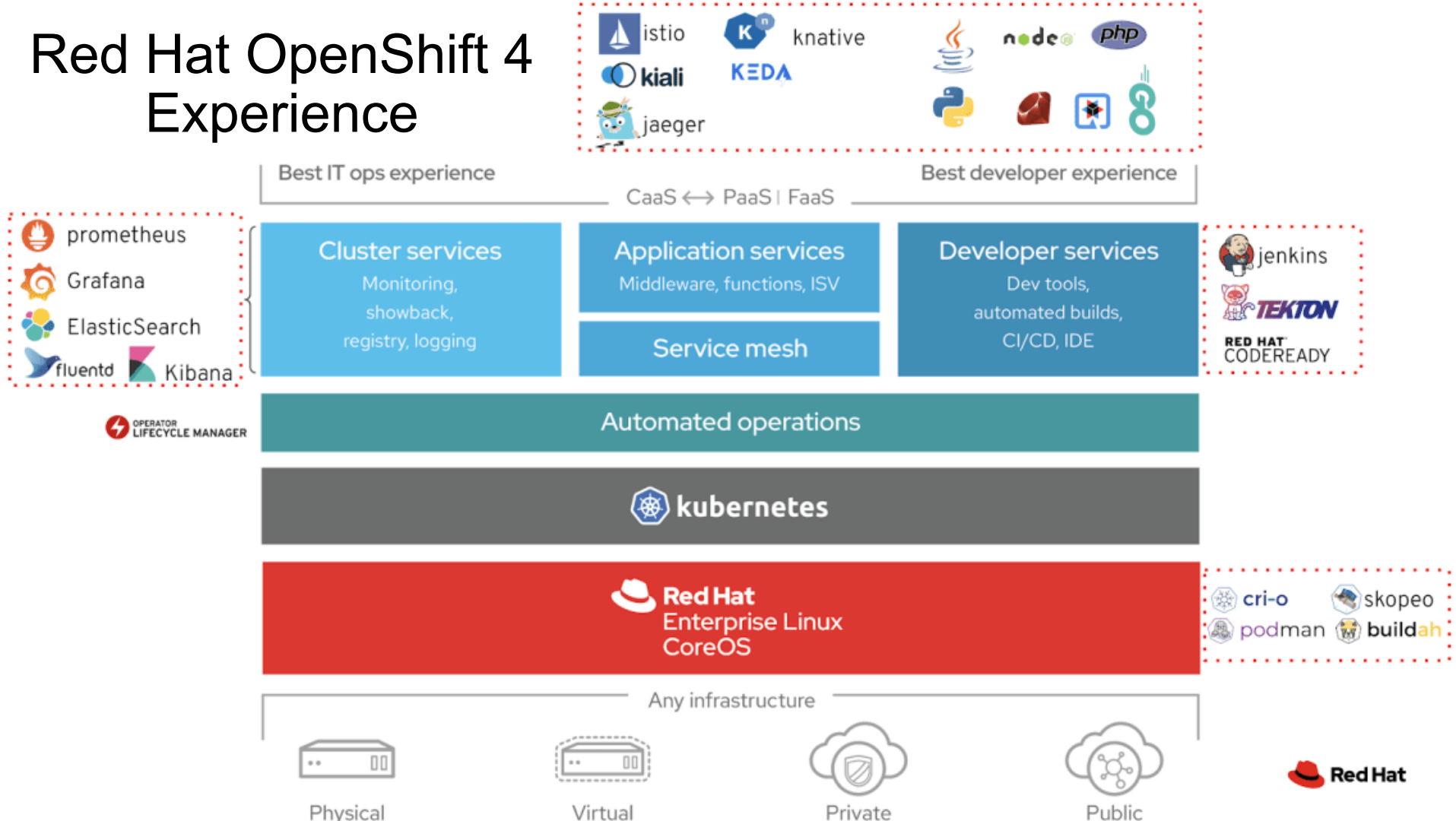
OpenShift is trusted enterprise Kubernetes



- Hundreds of defect and performance fixes
- 200+ validated integrations
- Certified container ecosystem
- 9-year enterprise life-cycle management
- Red Hat is a leading Kubernetes contributor since day 1



Red Hat OpenShift 4 Experience



4. IBM's Open Hybrid Cloud Platform

IBM's hybrid cloud and AI platform approach

IBM Consulting

Business Transformation • Technology Consulting •
Application Operations



System Integrator Partners

IBM Software

IBM Cloud Paks®

Automation • Data & AI • Security • Transaction
Processing



Software and SaaS Partners

Red Hat® Hybrid Cloud Platform

Development, Security and Operational Services

OpenShift® • Red Hat Enterprise Linux • Ansible® Automation Platform



IBM Infrastructure

IBM zSystems® / IBM LinuxONE • Distributed Infrastructure (IBM
Cloud®, Power®, Storage) • Infrastructure Support



Public Clouds

AWS • Azure • Others



Enterprise Infrastructure



Edge



Try It Yourself!

1. Learn OpenShift for free on the [Interactive Learning Portal](#) with tutorials that spin up an OpenShift cluster for you to go through the exercises hands-on
2. [Try Red Hat OpenShift Local \(formerly Red Hat CodeReady Containers\) locally \(with free Red Hat online account\)](#) which lets you manage your own OpenShift cluster using minishift to develop things on your local workstation
3. [Install on Linux on IBM Z with trial](#)
4. [Installing OpenShift Container Platform on Linux on IBM Z Documentation](#)
5. [Try OpenShift on the LinuxONE Community Cloud](#)

What permissions do I need as a developer in OpenShift in order to run through the lab (if using my own OpenShift cluster)?

Lab: <https://ibm-wsc.github.io/cloud-native-linuxone/>

Need cluster admin to install the OpenShift Pipelines operator

this is a general user's rolebindings of user's own project

NAME	ROLE	AGE
admin	ClusterRole/admin	11d
admin-0	ClusterRole/admin	11d
edit	ClusterRole/edit	11d
pipelines-scc-rolebinding	ClusterRole/pipelines-scc-clusterrole	11d
system:deployers	ClusterRole/system:deployer	11d
system:image-builders	ClusterRole/system:image-builder	11d
system:image-pullers	ClusterRole/system:image-puller	11d

Depending on resource quotas/limit ranges in your cluster you may need the cluster admin to change some of the default cluster tasks for OpenShift Pipelines to add resource requests/limits to them

Thank you!

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