

# Cloud-Native DevOps with OpenShift on IBM Z

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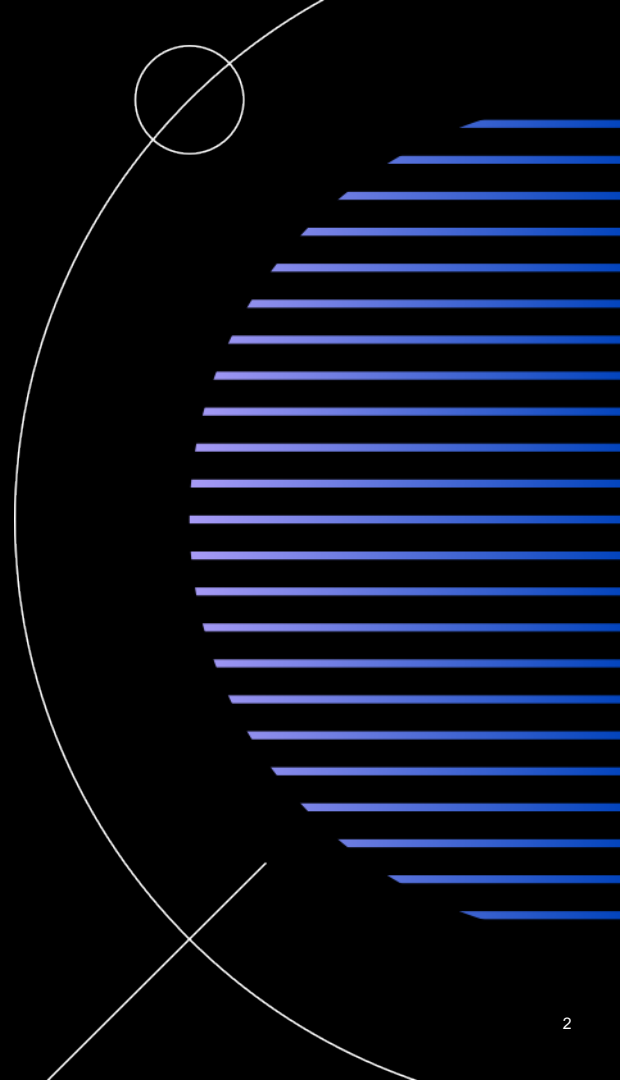
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IBM Americas Z Technical Sales



# Workshop Overview

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

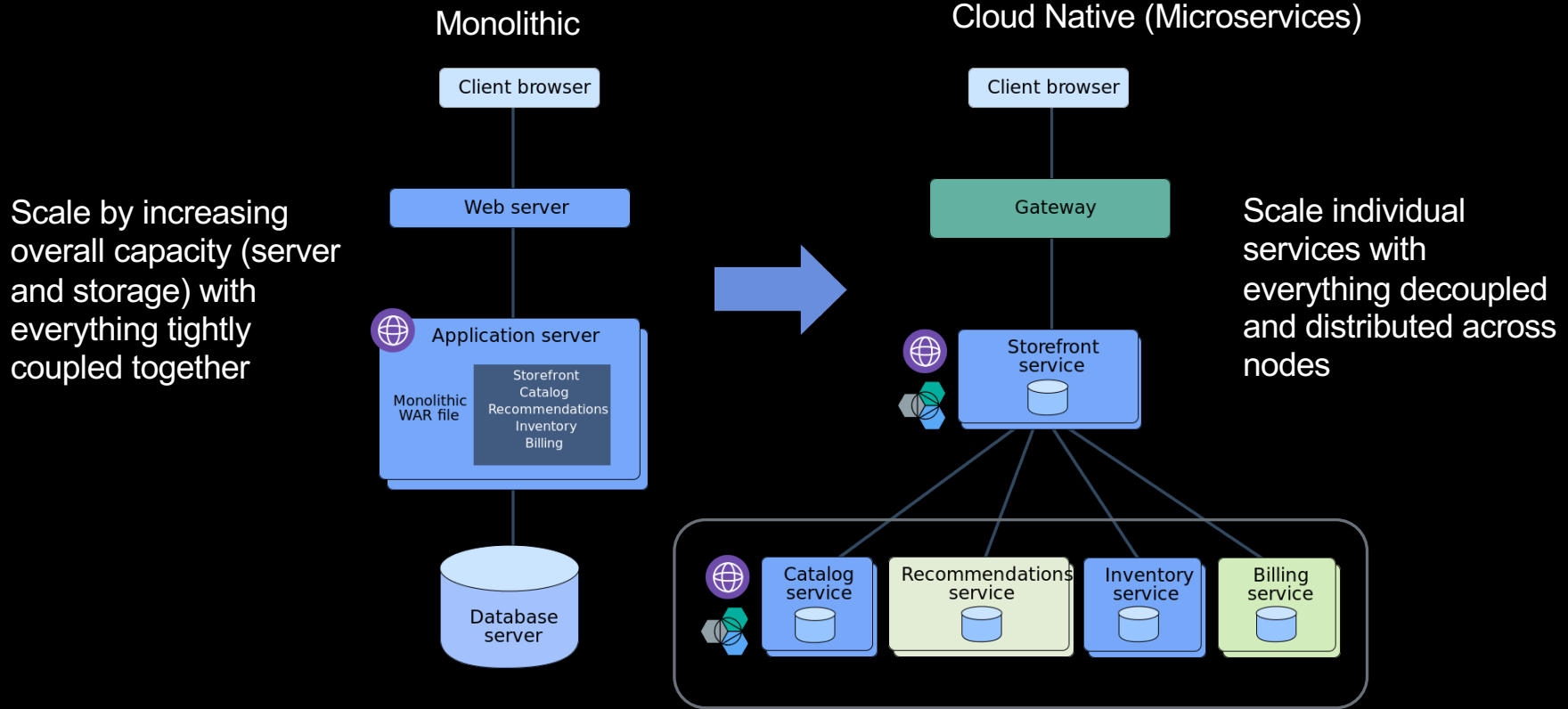
IBM's Open Hybrid  
Cloud Platform

# 1. Evolution of cloud and containerized workloads (Microservices)

# According to NIST cloud is

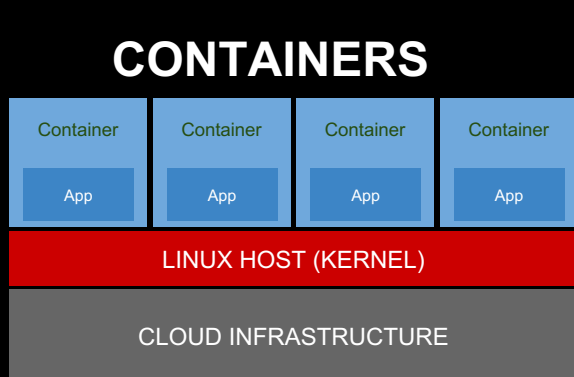


# Need Apps to match scalability and speed of cloud ...



# ... and Containers to enable this

Consistent Tools for Both Developers and IT Operations



Integrated in Linux OS  
Fully Open Source  
Secure Isolation of Applications  
Runs on Any Cloud Platform

DEVELOPERS

- Cloud-Native Applications
- Simplify Packaging
- Simplify Testing
- Increase re-use

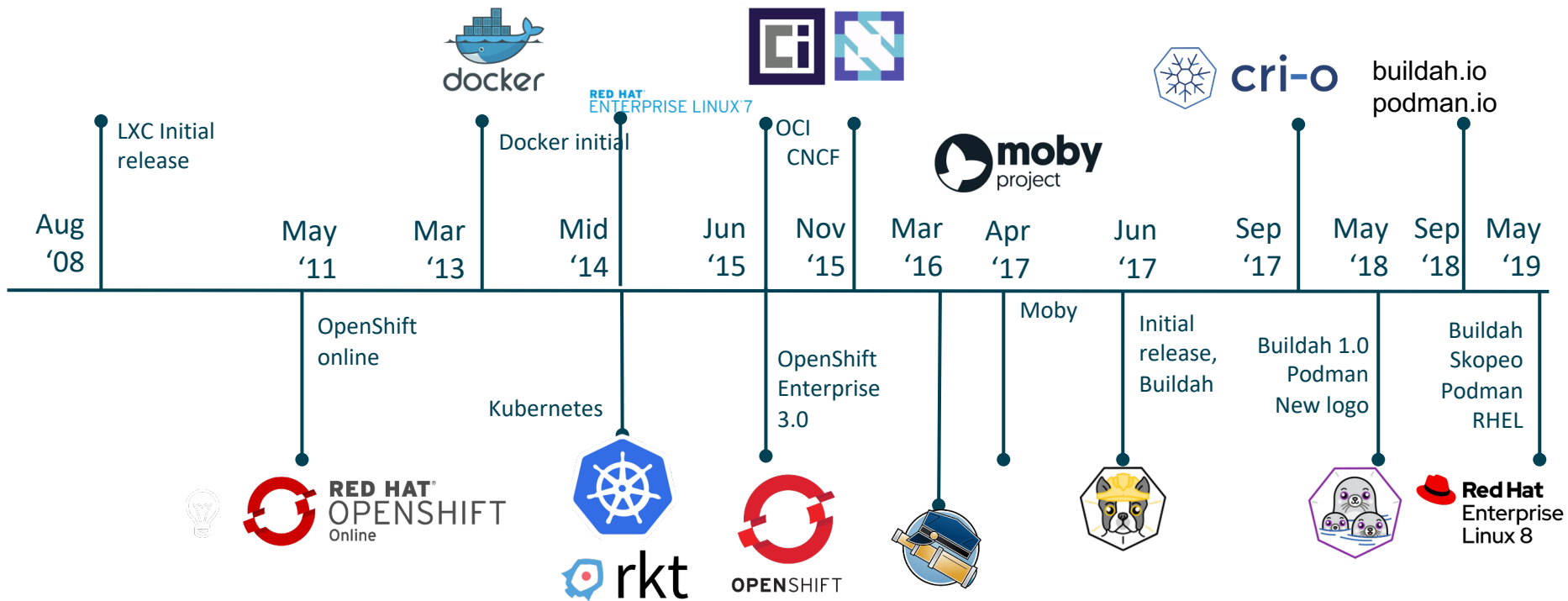
IT OPERATIONS

- Consistent Application Deploys
- Automated Application Deploys
- Improved Application Performance
- Multi-Cloud Consistency

BUSINESS  
LEADERS

- Enable DevOps Culture
- Achieve Business Agility
- Reduce Operational Cost
- Accelerate App-Dev Cycles

# CONTAINER INNOVATION CONTINUES ....







# Why Orchestration (short)

# Why Orchestration (long) ?

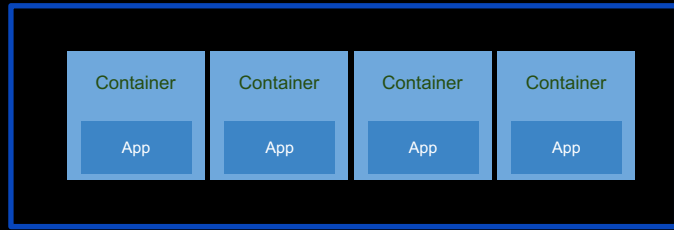
Scaling Out Containers (especially for microservices) leads to management issues

- 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

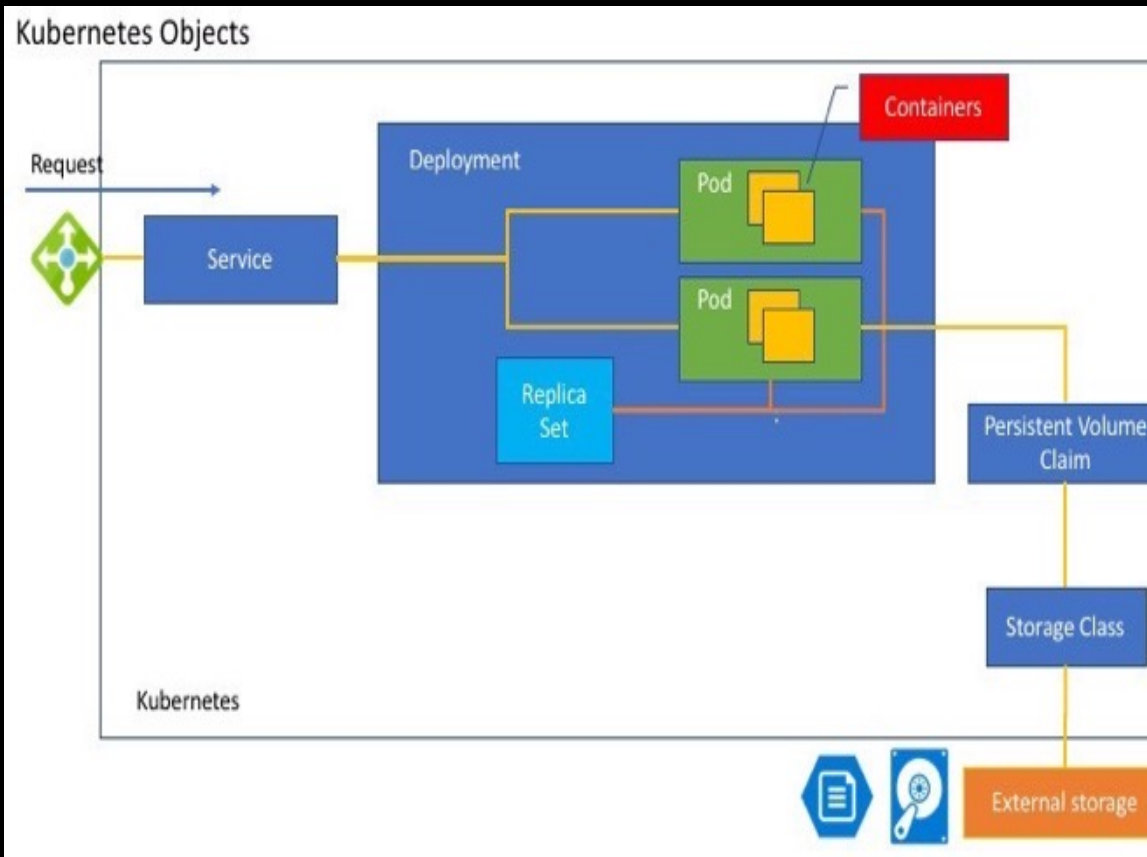
Manage Containers  
At Scale

Integrate IT Operations

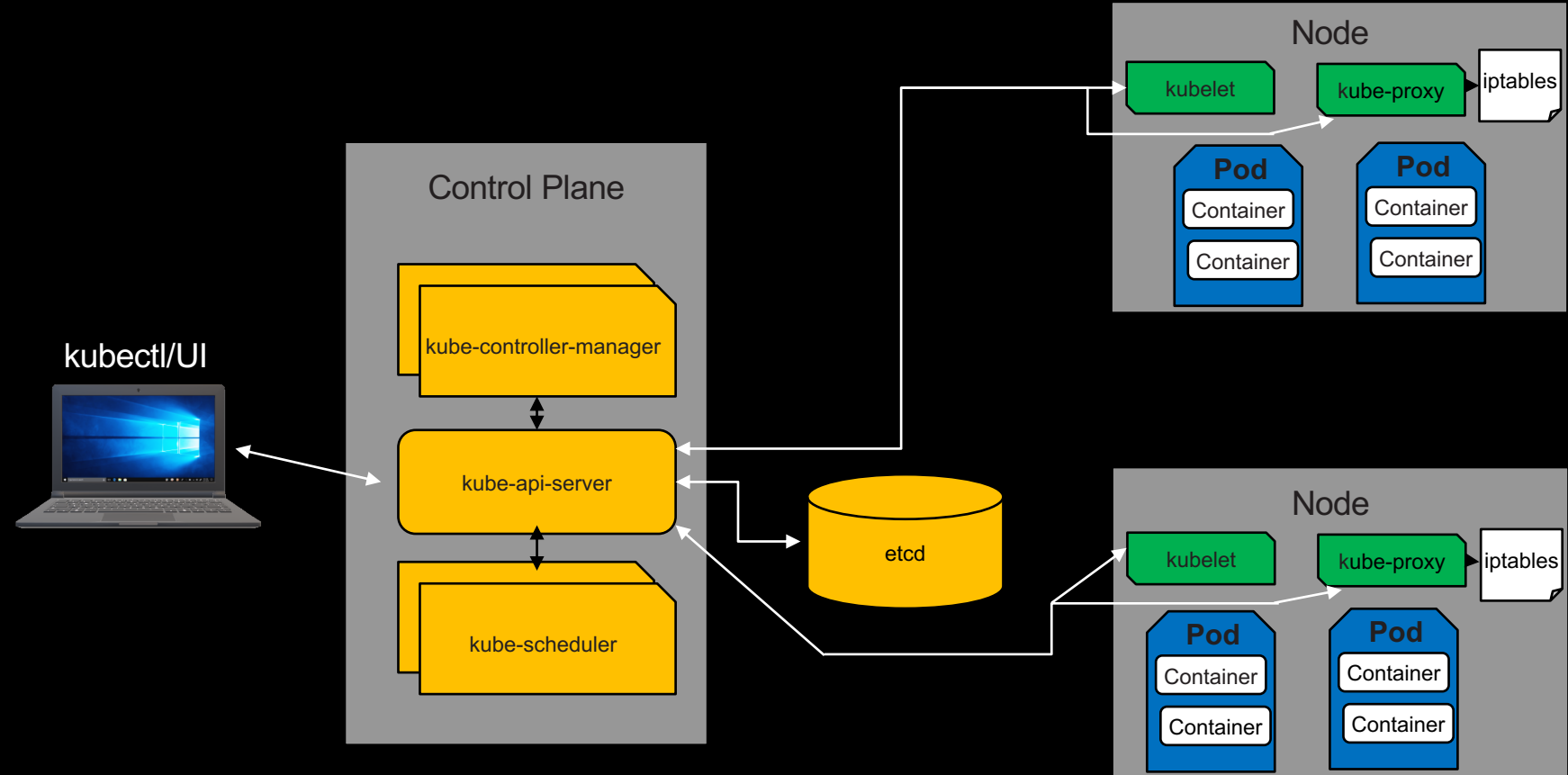
Enable Hybrid Multi-Cloud

# 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

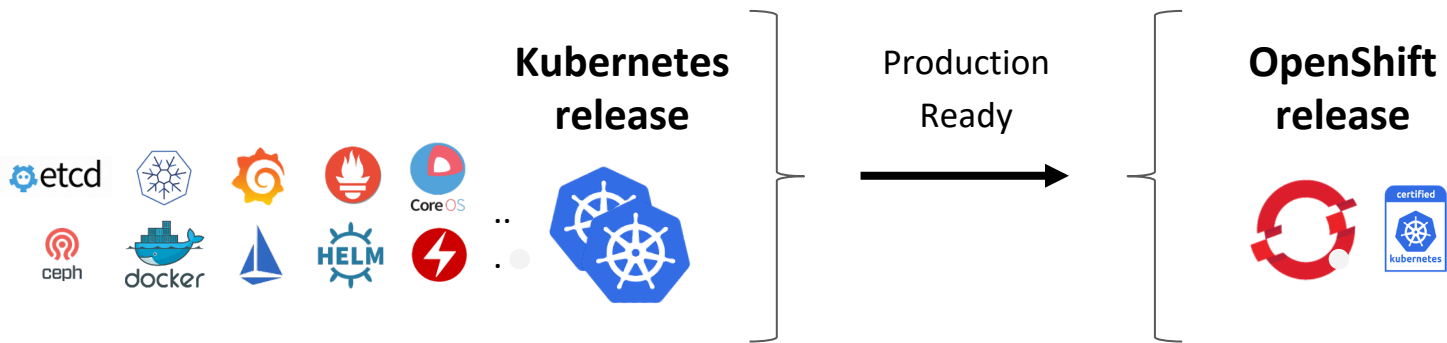


# Basic “Physical” Kubernetes Cluster Architecture



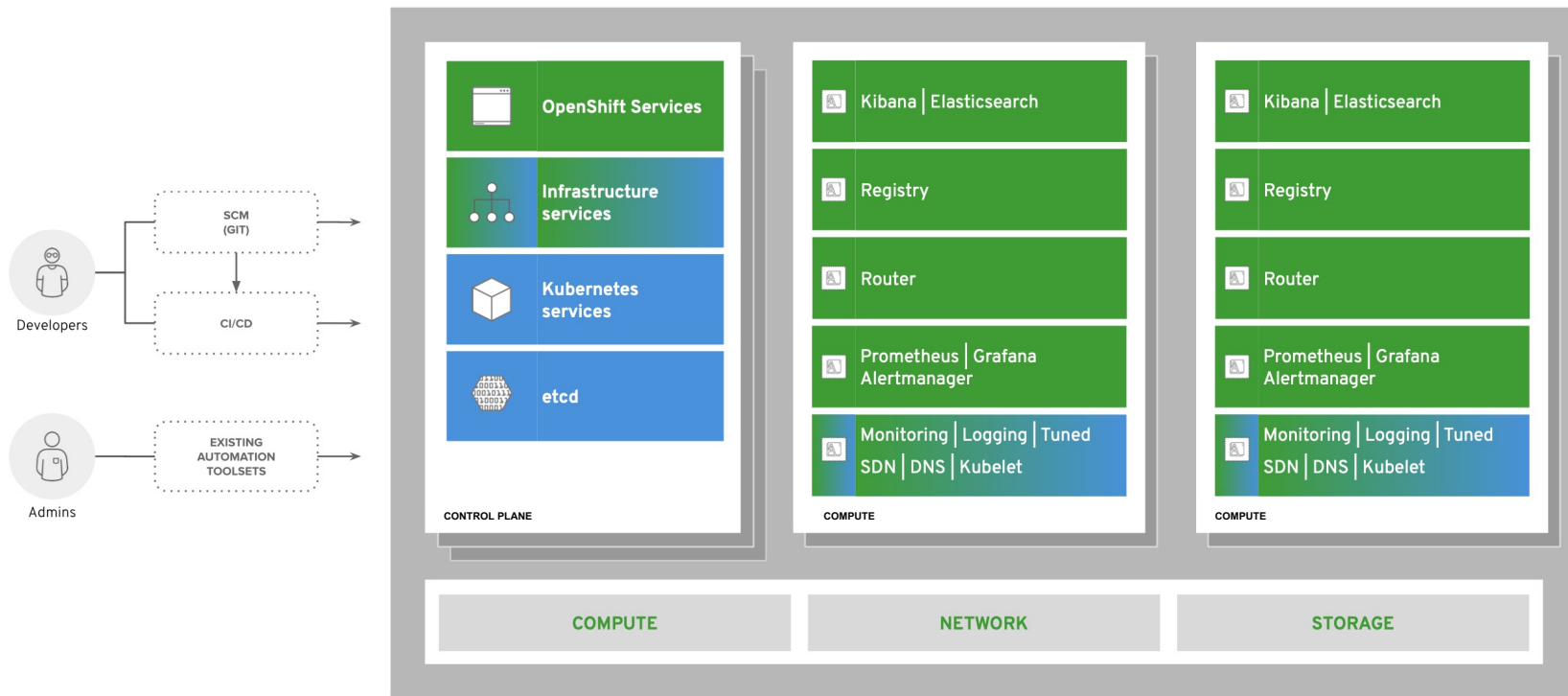
### 3. What is Red Hat OpenShift Container Platform?

# OpenShift is trusted enterprise Kubernetes

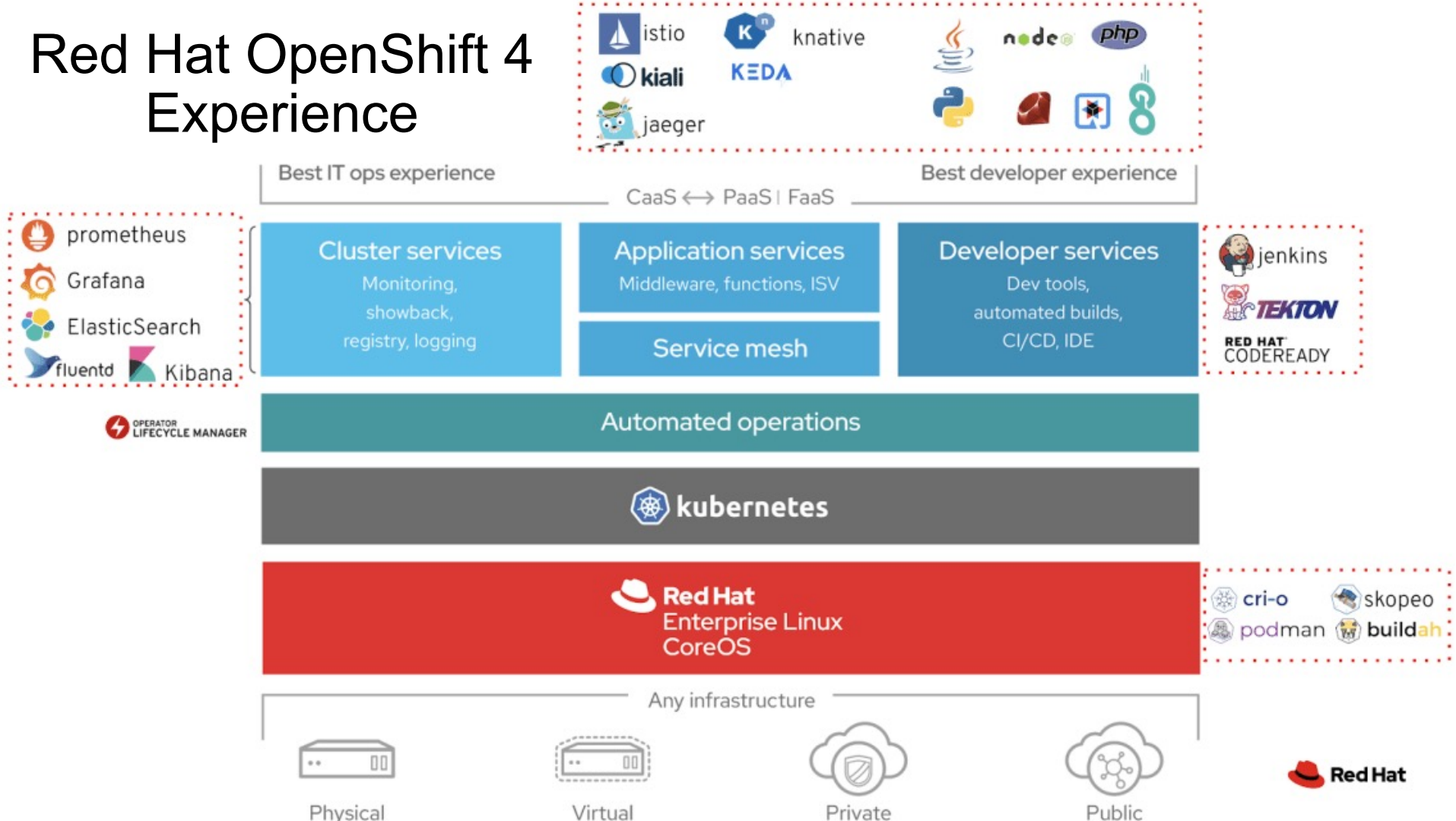


- Hundreds of defect and performance fixes
- 200+ validated integrations
- Certified container ecosystem
- 9-year enterprise life-cycle management
- Red Hat is a leading Kubernetes contributor since day 1





# Red Hat OpenShift 4 Experience



## 4. IBM's Open Hybrid Cloud Platform

# IBM Hybrid Cloud and AI Solutions

Business Transformation  
and Hybrid Cloud Services

**IBM Services**

Digital Transformation • Application Modernization •  
Intelligent Workflows



**System Integrator  
Partners**

Hybrid Cloud Software

**IBM Software**

IBM Cloud Paks

Automation • Data and AI • Integration •  
Networking • Security • Industry Capabilities



**Software and  
SaaS Partners**

Hybrid Cloud Platform

**Red Hat Hybrid Cloud Platform**

Development, Security and Operational Services



Infrastructure

**IBM Cloud**



**Public Clouds**

AWS • Azure •  
Others



**IBM Systems**



**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 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 for them

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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