



RED HAT
FORUM
Europe, Middle East & Africa



RED HAT CNS CONTAINER NATIVE STORAGE

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Senior Specialist Solution Architect

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AGENDA

- **Introduction**
- **Red Hat Storage product portfolio**
- **Runtime Environments for Red Hat Storage**
- **Containers and running containerized workloads**
- **Storage needs and options with containers**
- **Containers, Storage and OpenShift**
- **Storage provisioning**
- **Storage provider options for OpenShift**
- **Red Hat Container Native Storage v3.6**

RED HAT STORAGE PRODUCT PORTFOLIO

- **RED HAT®
GLUSTER STORAGE**

Scale-Out File Storage (NAS)

Hyperconverged Storage for Red Hat Virtualization (RHVI)

Multi-Protocol File service (FUSE/NFS/CIFS/Object/API)

Container Native Storage (CNS)

RED HAT STORAGE PRODUCT PORTFOLIO

- **RED HAT[®]**
CEPH STORAGE

OpenStack Storage (Cinder/Glance/Swift/Nova)

S3 scale-out Object Storage (AWS Compatible S3)

Elastic Data Lake Storage (S3A)

Easy tools to ingest data, NFS gateway for RADOS-GW

WHERE TO RUN RED HAT CEPH STORAGE ON

- **RED HAT[®]
CEPH STORAGE**

Typically runs on Physical Hardware

Can run co-resident with OpenStack components

Hardware needs to be sized to workload specifics

(Capacity/Performance/Workload Type)

WHERE TO RUN RED HAT GLUSTER STORAGE ON

- **RED HAT[®]**
GLUSTER STORAGE

Runs on Physical HW, Virtualized, Public Cloud or Container

Can run HyperConverged along with Red Hat Virtualization

Hardware needs to be sized to workload specifics

(Capacity/Performance/Workload Type)

CONTAINERS

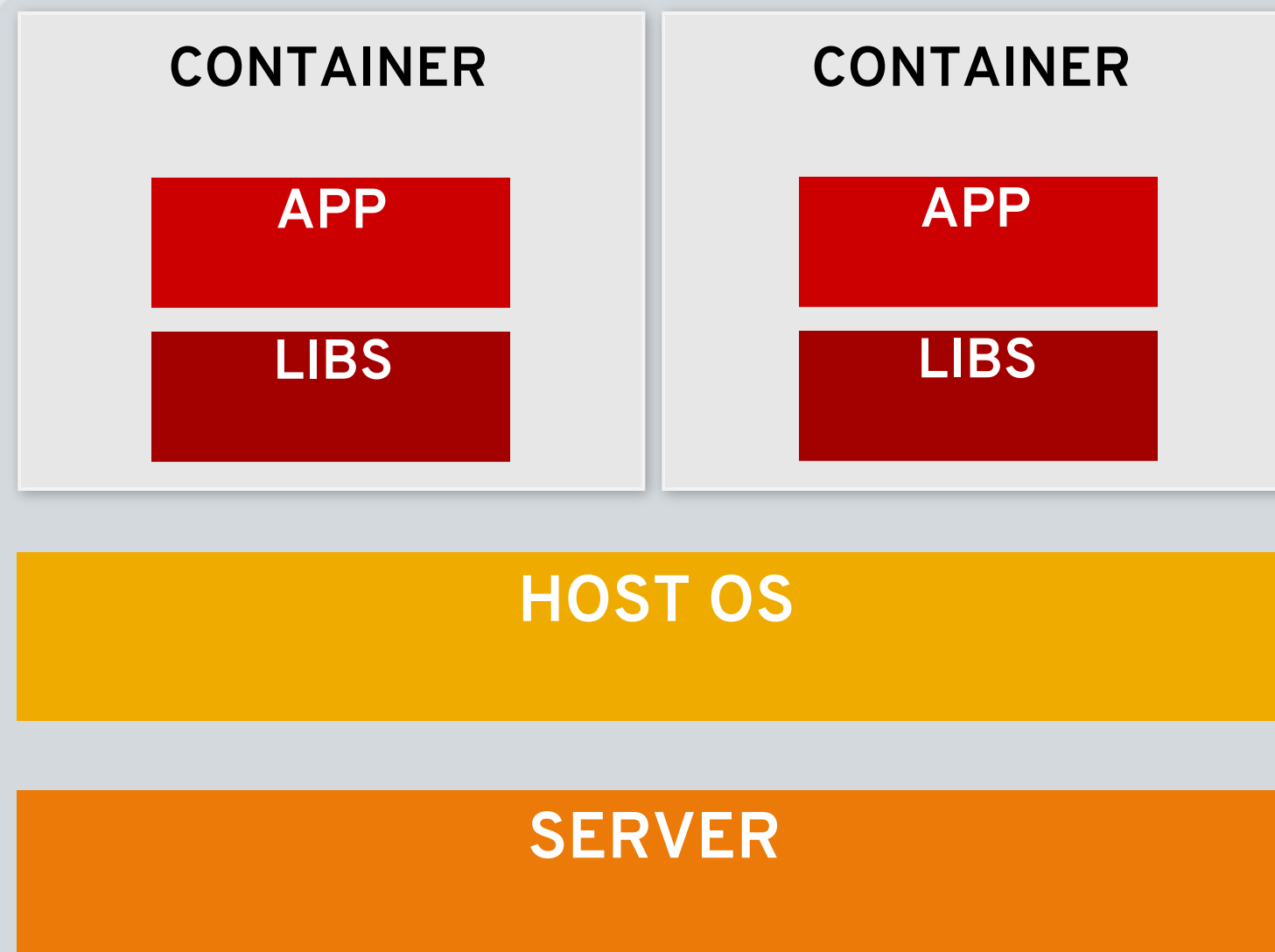
A container image is a lightweight, stand-alone, executable package of a piece of software that includes everything needed to run it: code, runtime, system tools, system libraries, settings.

- Isolation of processes
- Portable Application Runtime
- Low footprint compared to Virtual Machine
- Lightweight, Standard, Secure



LINUX CONTAINERS:

Software packaging concept that typically includes an application and all of its runtime dependencies

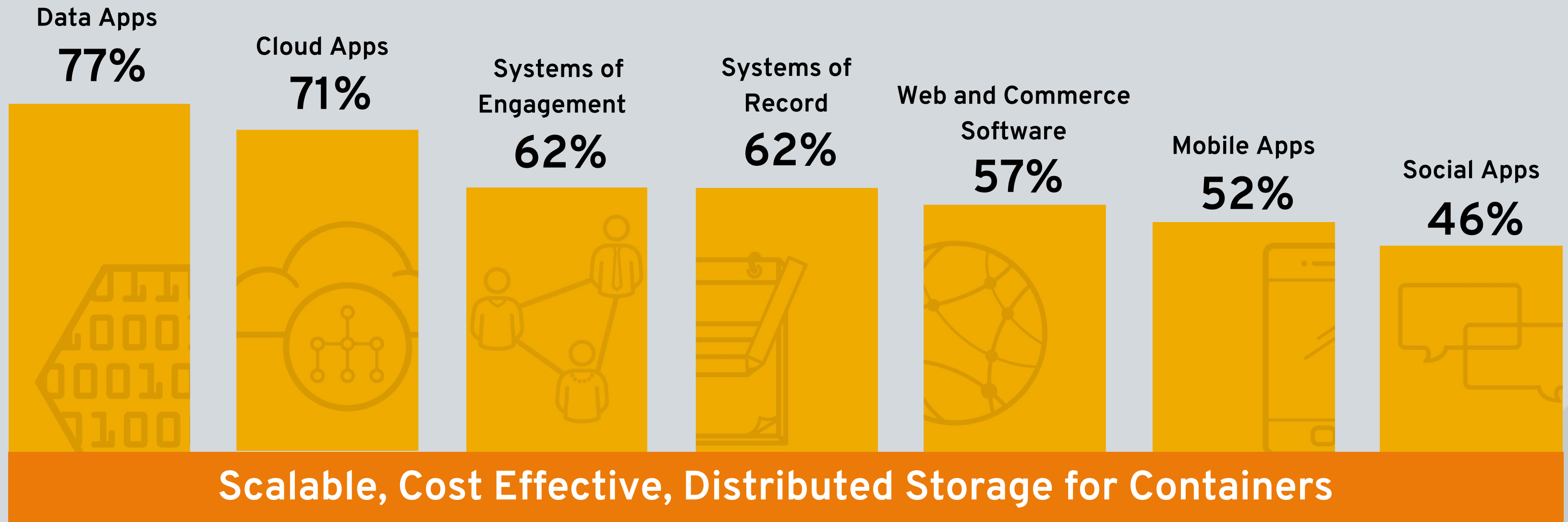


BENEFITS

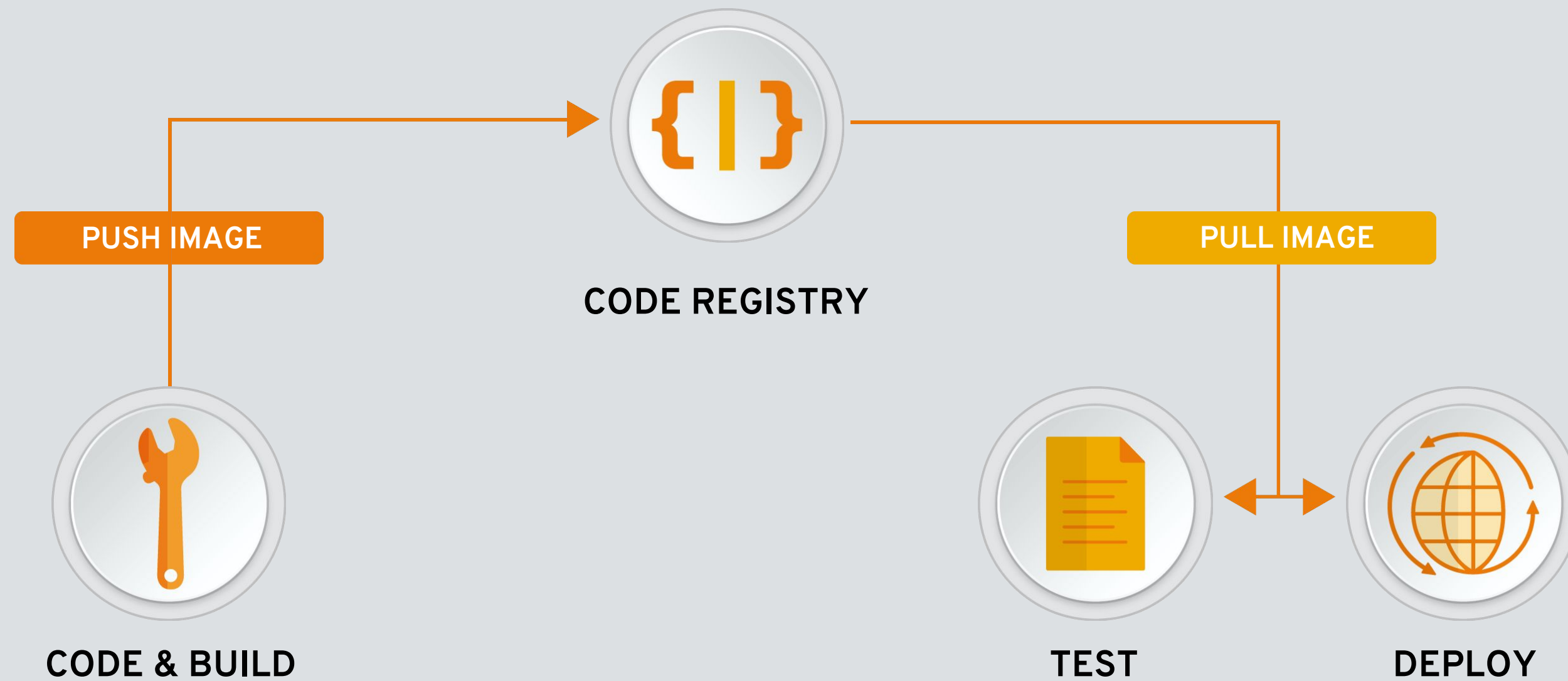
- **HIGHER** quality software releases
- **SHORTER** test cycles
- **EASIER** application management

WHY PERSISTENT STORAGE FOR CONTAINERS?

“For which workloads or application use cases have you used/do you anticipate to use containers?”



GREATER PORTABILITY, AUTOMATION AND INTEGRATION

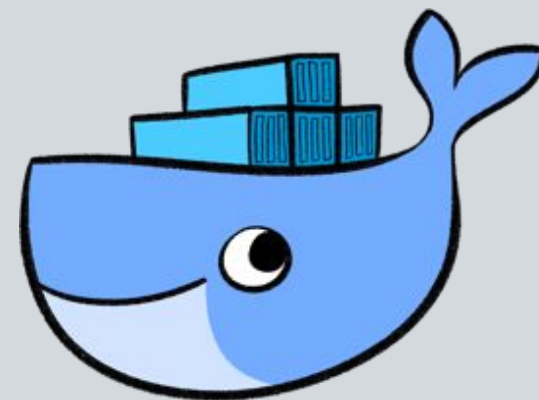


RUNNING CONTAINERS



HOW TO RUN YOUR CONTAINER ?

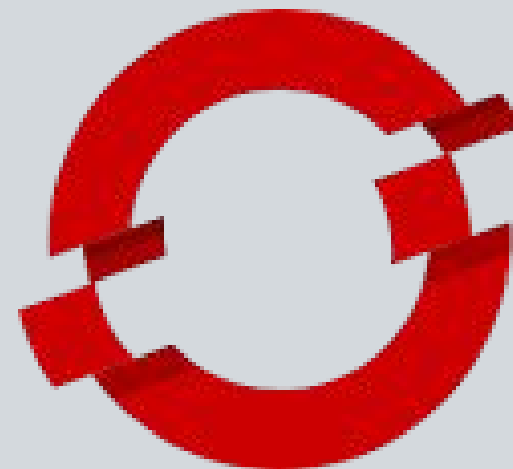
DOCKER ?



KUBERNETES ?



OPENSIFT ?



CONTAINER RUNTIME PLATFORM



DOCKER:

Container enablement platform
Runs containers

KUBERNETES

Container Management platform
Manages huge amounts of containers into PODs

OPENSIFT CONTAINER PLATFORM

Kubernetes enriched with Enterprise capabilities and support

OPENSIFT = KUBERNETES + MORE



OPENSIFT[®]
by Red Hat[®]



DevOps Tools and User Experience

Web Console, CLI, REST API, SCM integration

Containerized Services

Auth, Networking, Image Registry

Runtimes and xPaaS

Java, Ruby, Node.js and more

Kubernetes

Container orchestration
and management

Etcd

Cluster state and configs

OCP-kubernetes Extensions

Docker

Container API and packaging format

RHEL

Container optimized OS

CONTAINER STORAGE NEEDS



CONTAINER REGISTRY

(Secure) Store for container images

EPHEMERAL STORAGE

**Storage for the container process, also named EmptyDir
Storage consumed by the container images that become in
running state, originating from a container image**

PERSISTENT STORAGE FOR CONTAINERS

**Containers don't have a built-in feature to persist the "state"
of applications. When containers die, application data
vanishes**

STORAGE FOR CONTAINERIZED APPLICATIONS



RED HAT ATOMIC



RED HAT
OPENSIFT
Container Platform

RED HAT
ENTERPRISE LINUX[®] 7

GlusterFS

Ceph RBD

Amazon EBS

Fiber Channel

GCE

iSCSI

NFS

AUTOMATED CONFIGURATION

SINGLE CONTROL PANEL

CHOICE OF PERSISTENT STORAGE

CONTAINER STORAGE PROVISIONING



STATIC PROVISIONING

Admin interactions are required

Less efficient storage usage:

OpenShift Provisioner picks nearest close capacity

Manual housekeeping/cleanup required

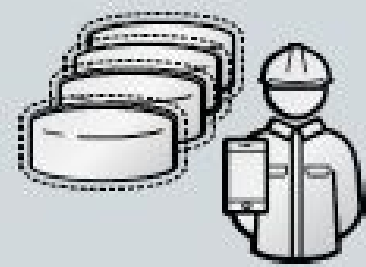
DYNAMIC PROVISIONING

Automated Storage provisioning

Storage capacity precisely delivered, not approximately

Housekeeping complete automated

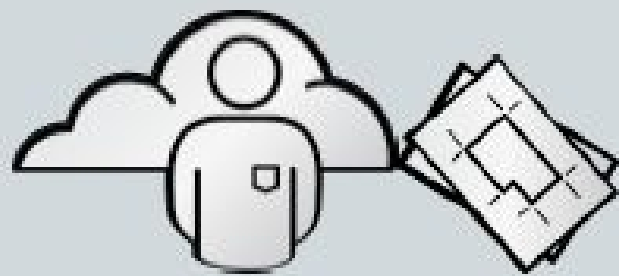
Static Provisioning workflow



1 Multiple volumes created and registered with OpenShift

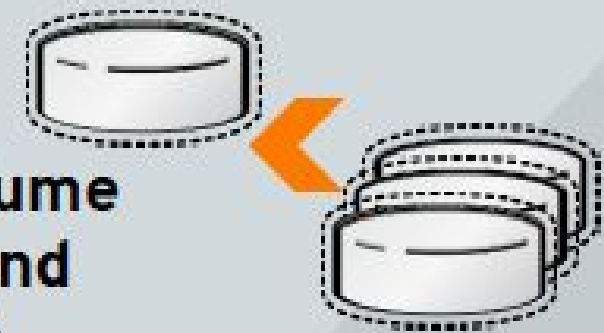


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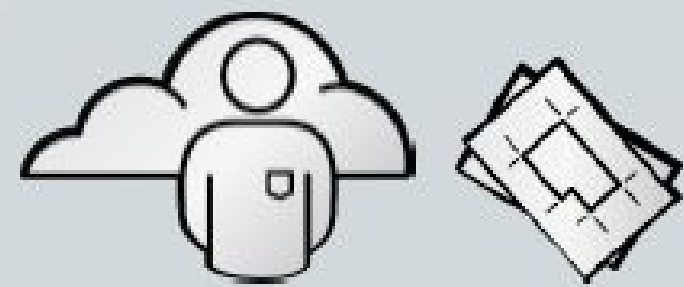
2 Submit
Persistent
Volume Claim

3 An available persistent volume
is picked out of the pool and
bound to the persistent
volume claim



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Dynamic Provisioning (CNS)



1 Submit Persistent Volume Claim

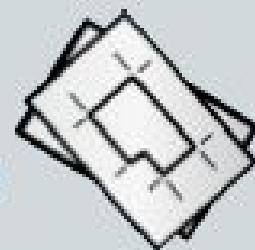


2 OpenShift requests volume to be created

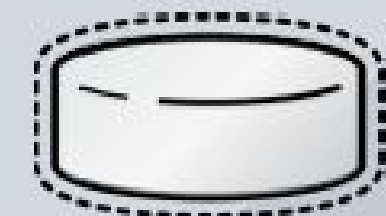


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4 OpenShift binds persistent volume to persistent volume claim request



3 Persistent volume is created by storage system and registered with OpenShift



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STORAGE PROVISIONER HEKETI

HEKETI

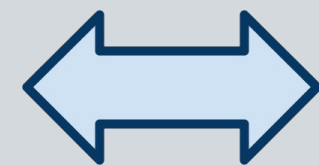
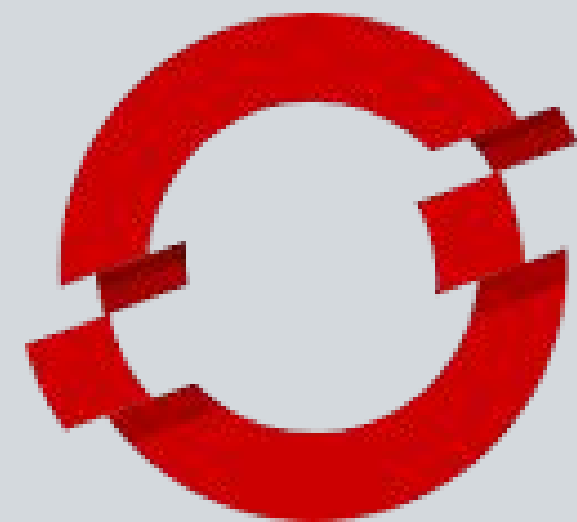
Provisioner for persistent storage volumes

RESTful API service

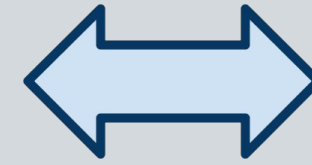
Service Broker between OCP and Gluster CNS

Runs as a container inside OpenShift

BoltDB Database – Safely stored on CNS



Heketi
dynamic storage provisioner



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GLUSTER STORAGE



CNS

STORAGE

TWO FLAVORS OF CONTAINER STORAGE

CONTAINER-READY STORAGE

STORAGE FOR OPENSIFT



- Leverages existing investment in traditional storage, managed by storage admin
- Attach to stand alone Red Hat Gluster storage

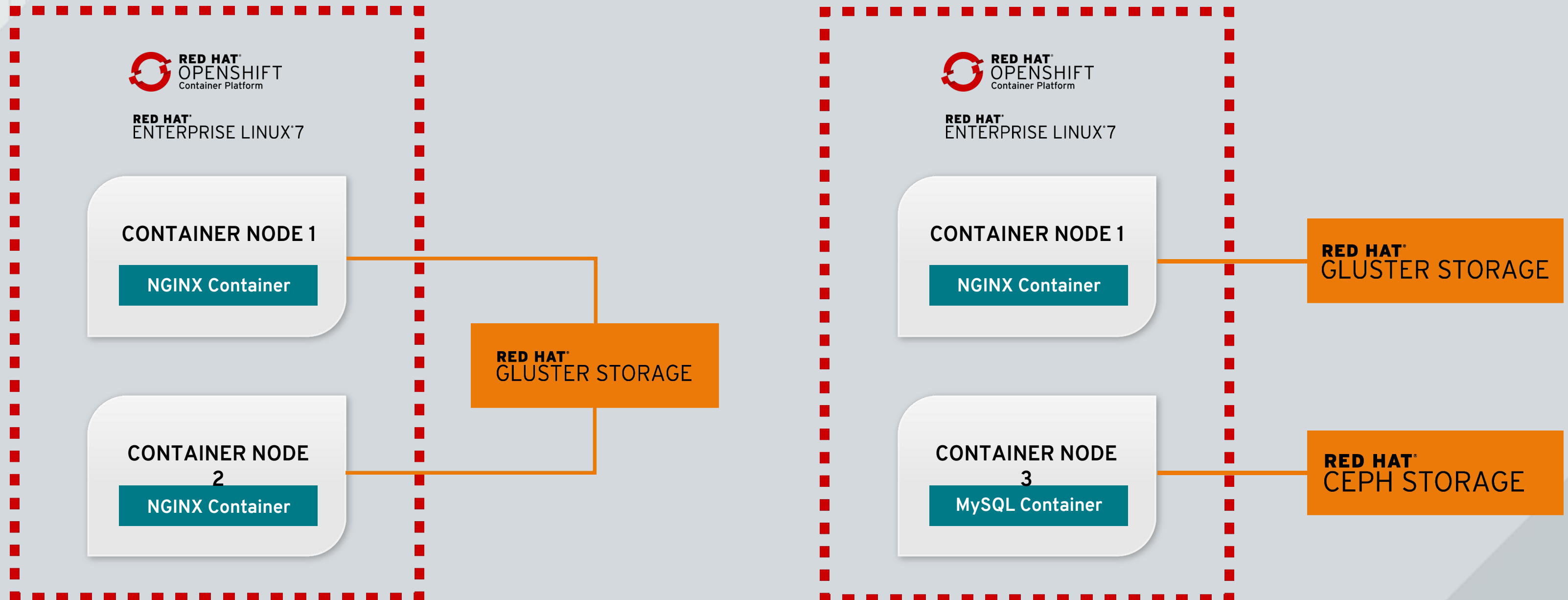
CONTAINER-NATIVE STORAGE

STORAGE IN OPENSIFT

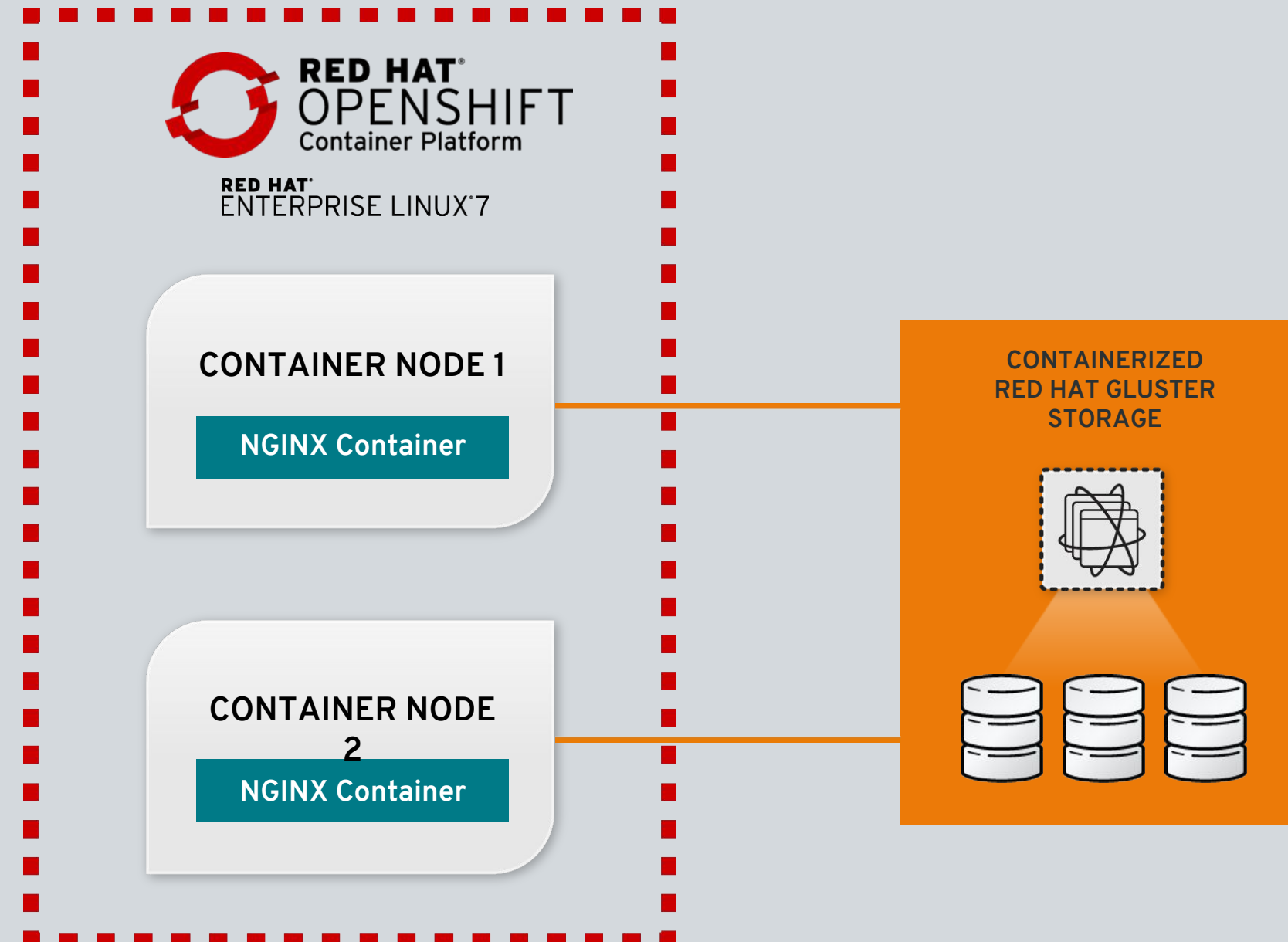


- Highly scalable, enterprise-grade storage, fully integrated into OpenShift Container Platform

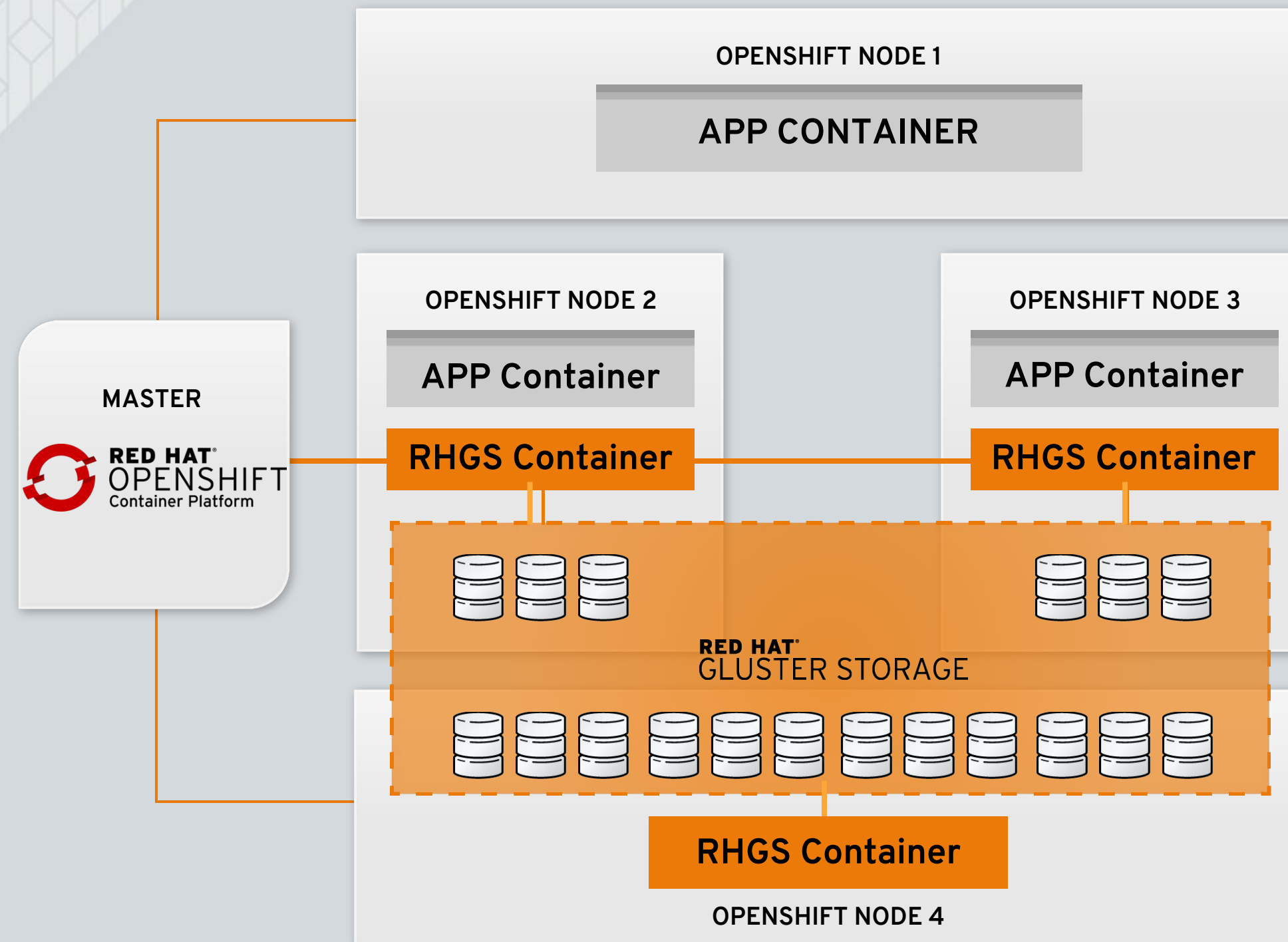
CONTAINER READY STORAGE



CONTAINERIZED RED HAT GLUSTER STORAGE



CONTAINER-NATIVE STORAGE



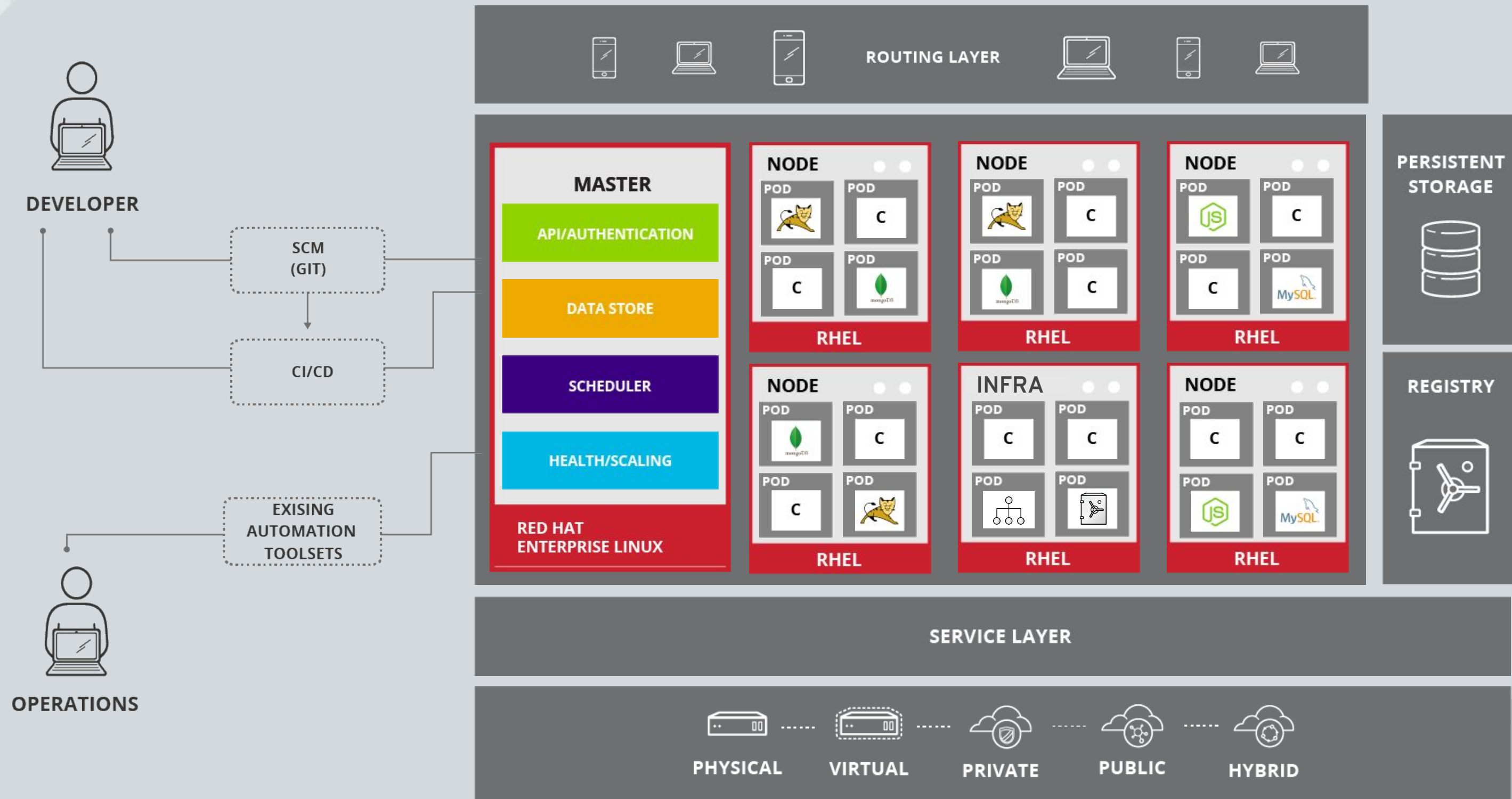
Co-Locate Storage and Apps

Dynamic Provisioning

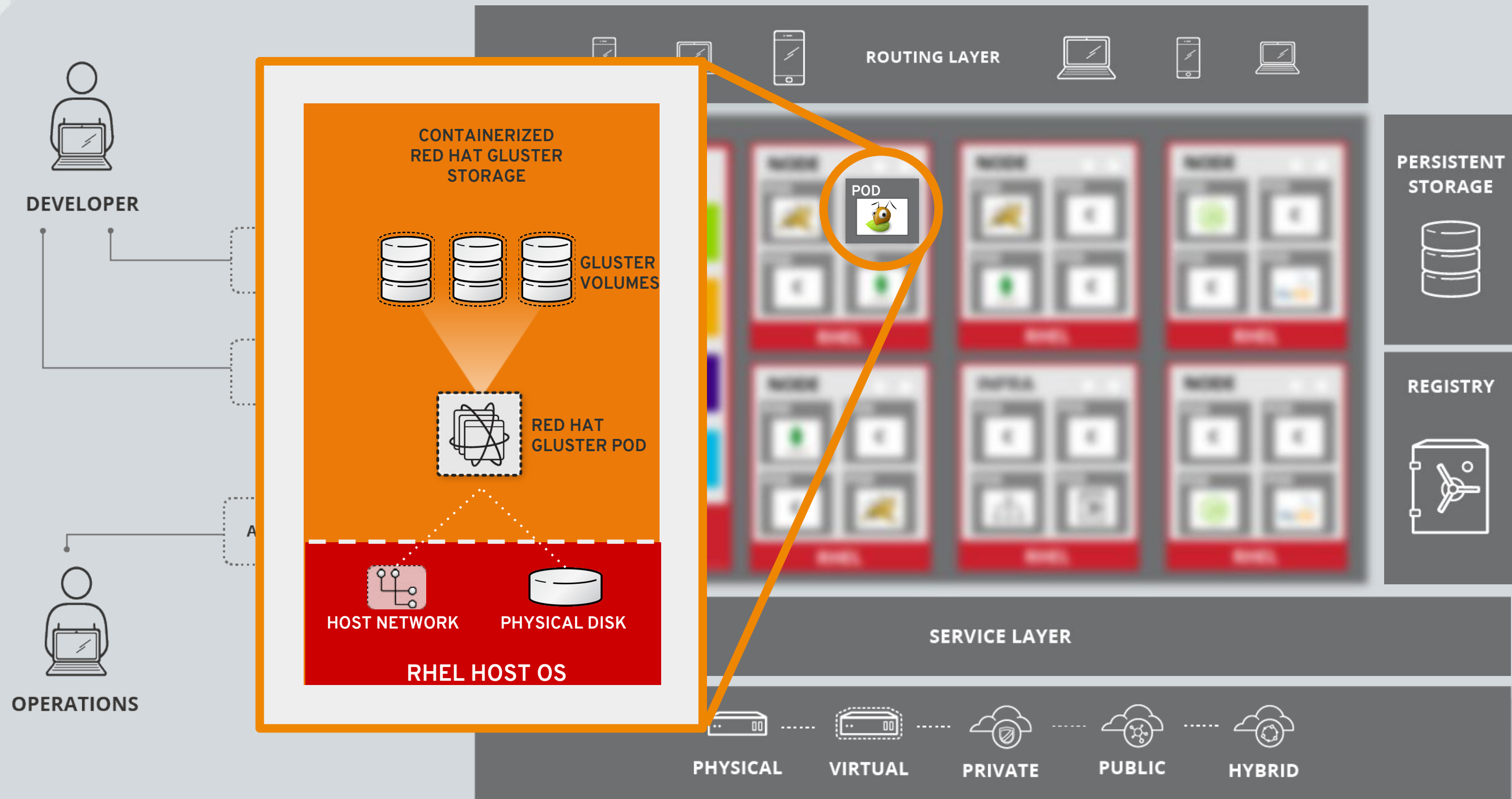
Managed by OpenShift

Infrastructure-Agnostic

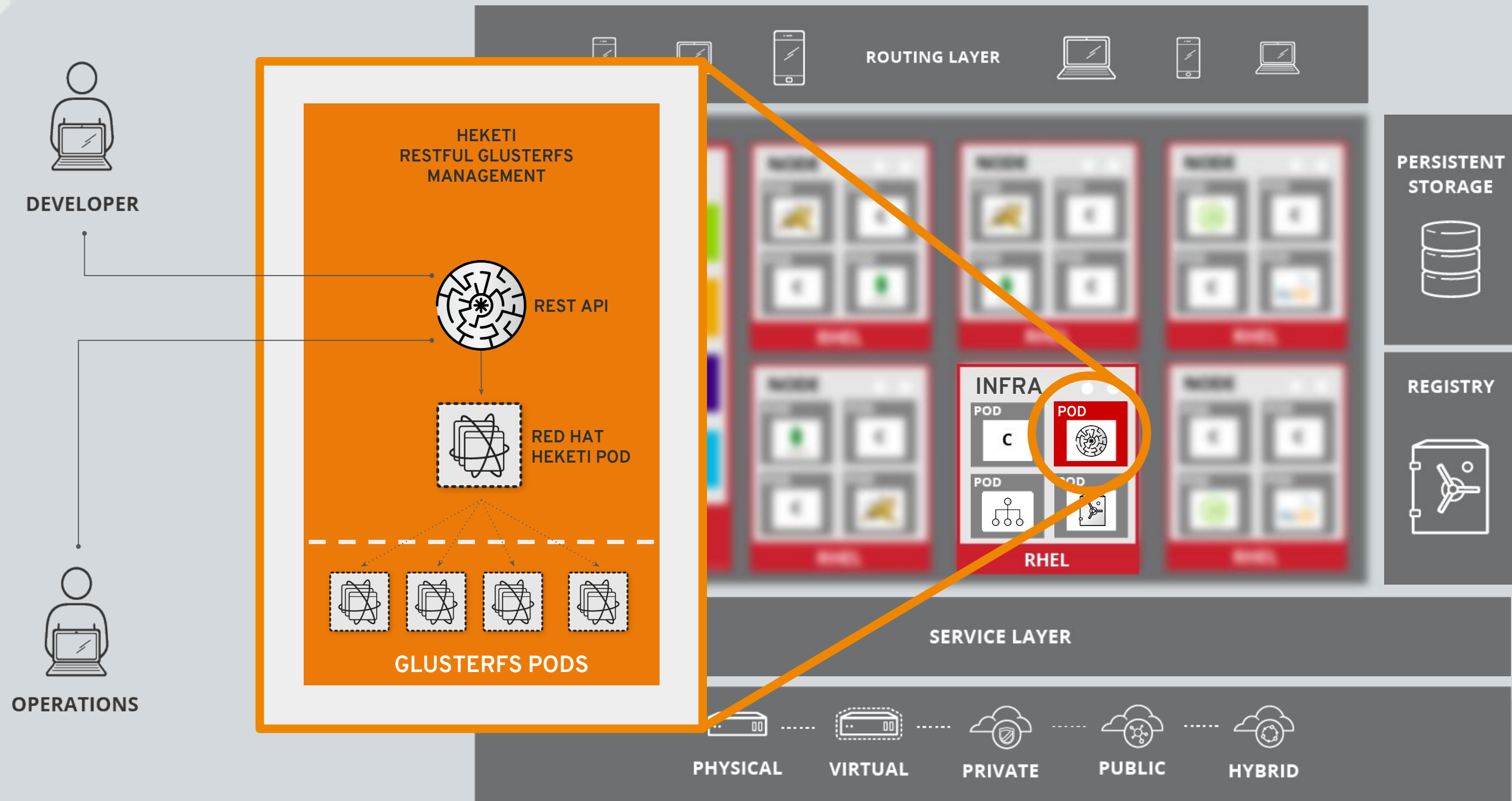
CONTAINER-NATIVE STORAGE ON OPENSHIFT



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CONTAINER-NATIVE STORAGE ON OPENSHIFT

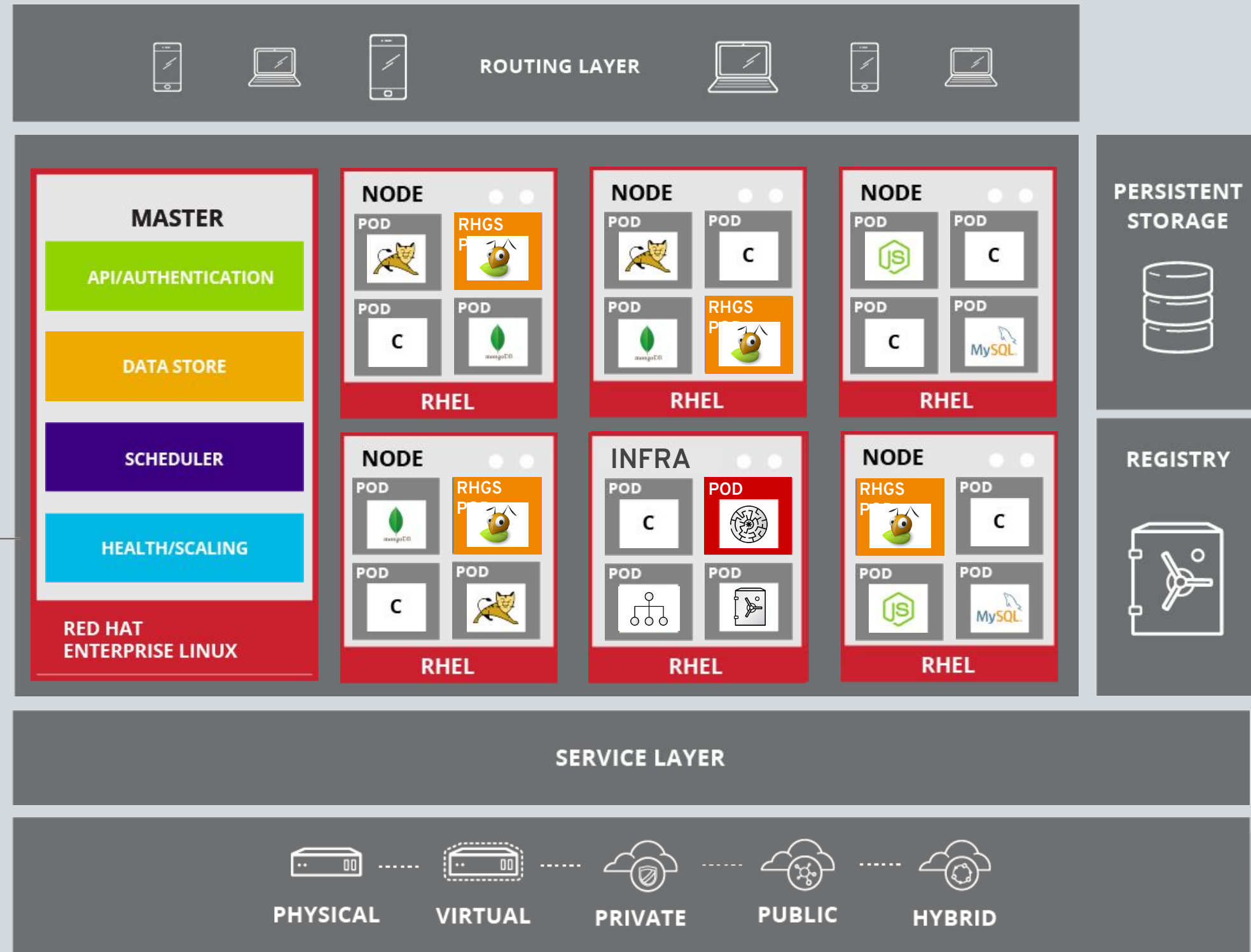


DEVELOPER

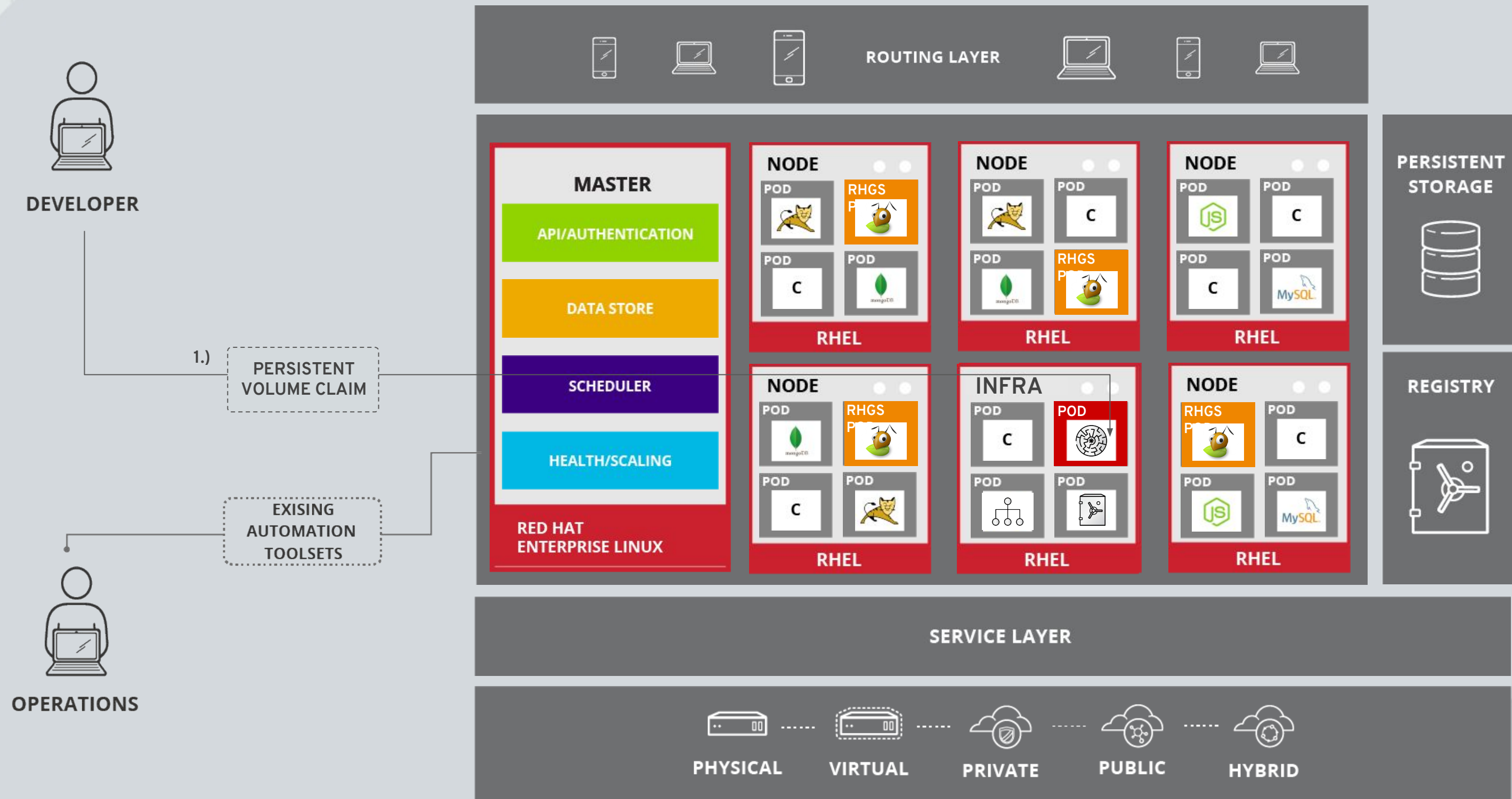


OPERATIONS

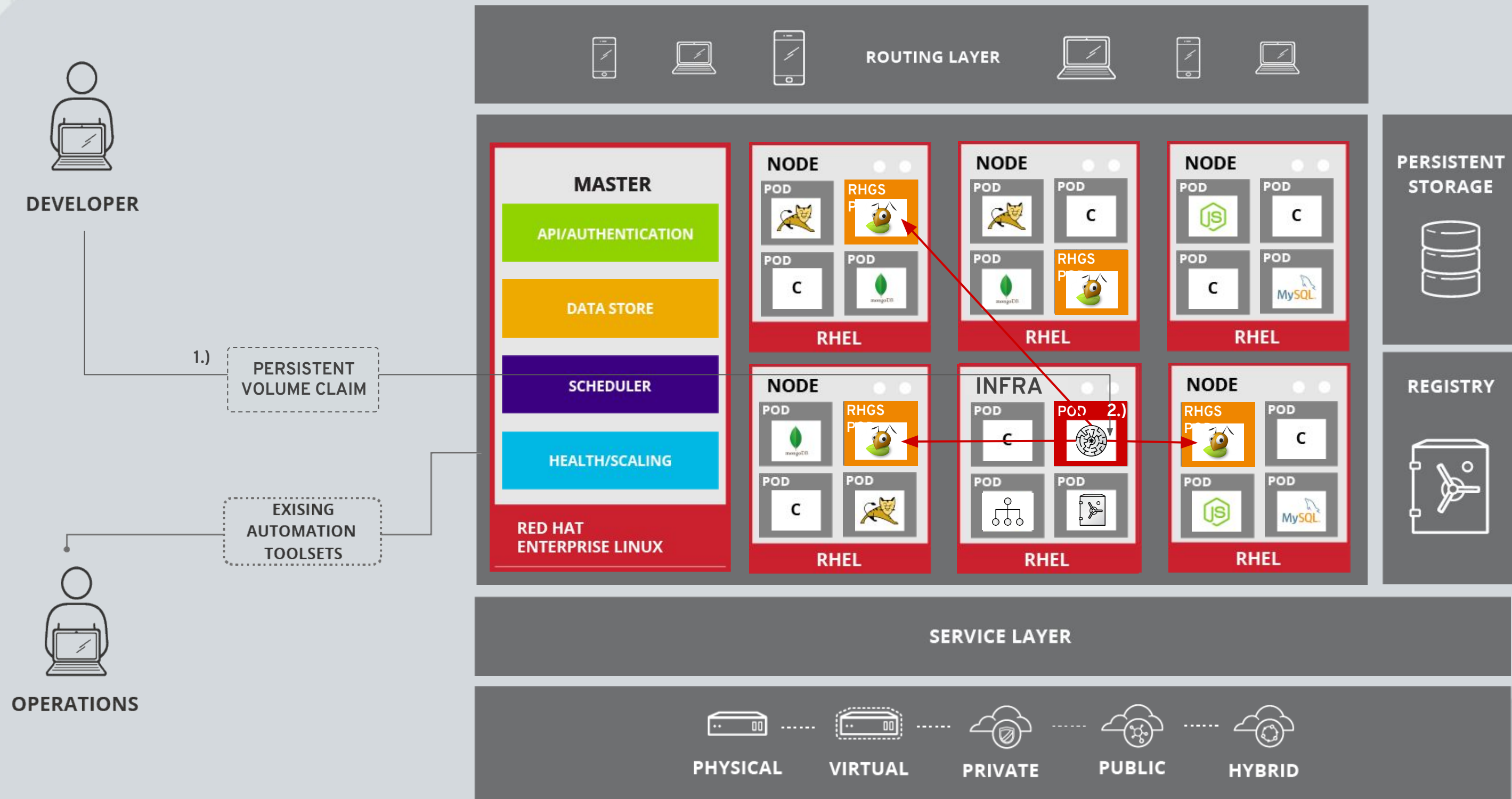
EXISTING
AUTOMATION
TOOLSETS



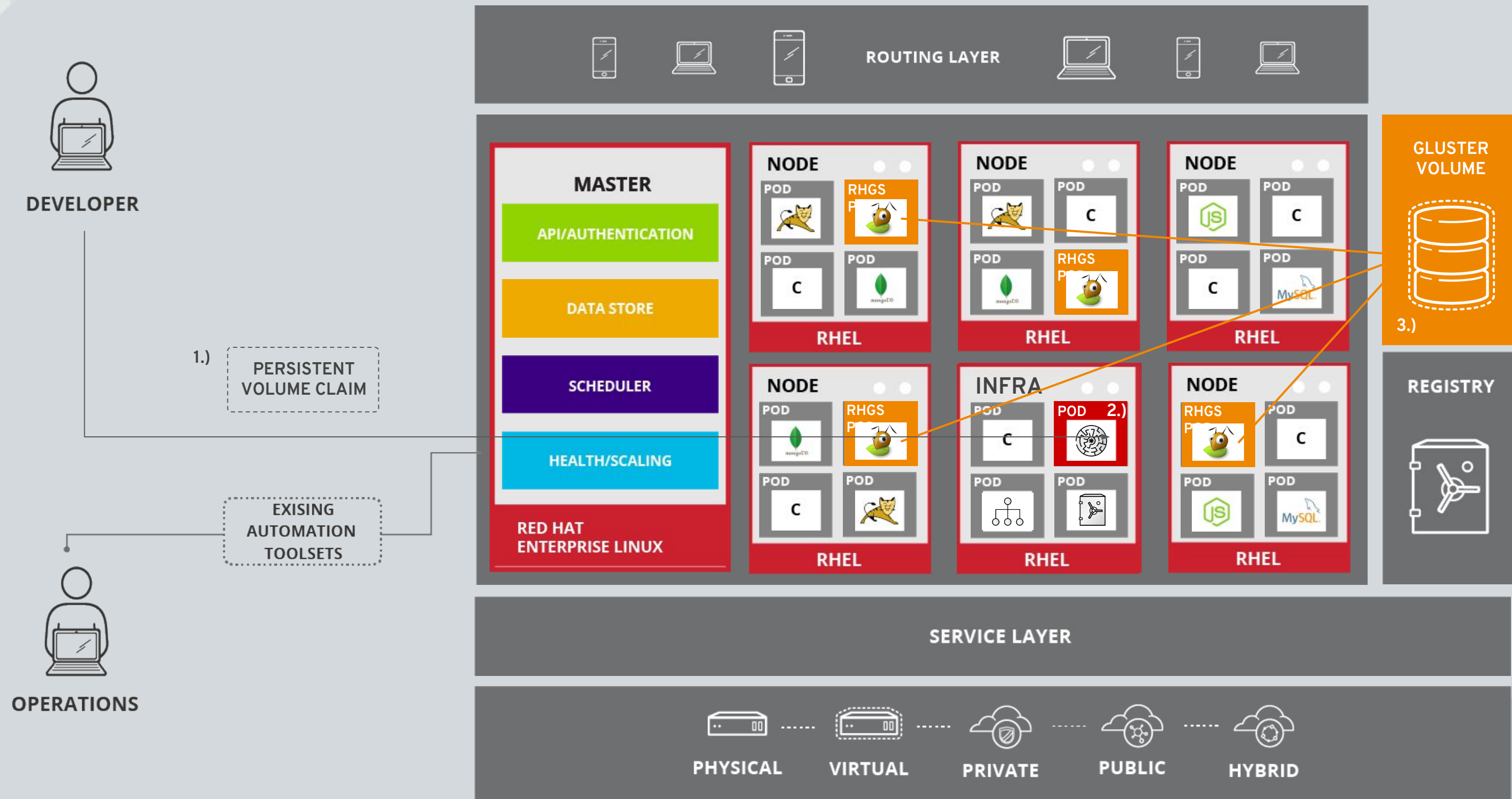
CONTAINER-NATIVE STORAGE ON OPENSHIFT



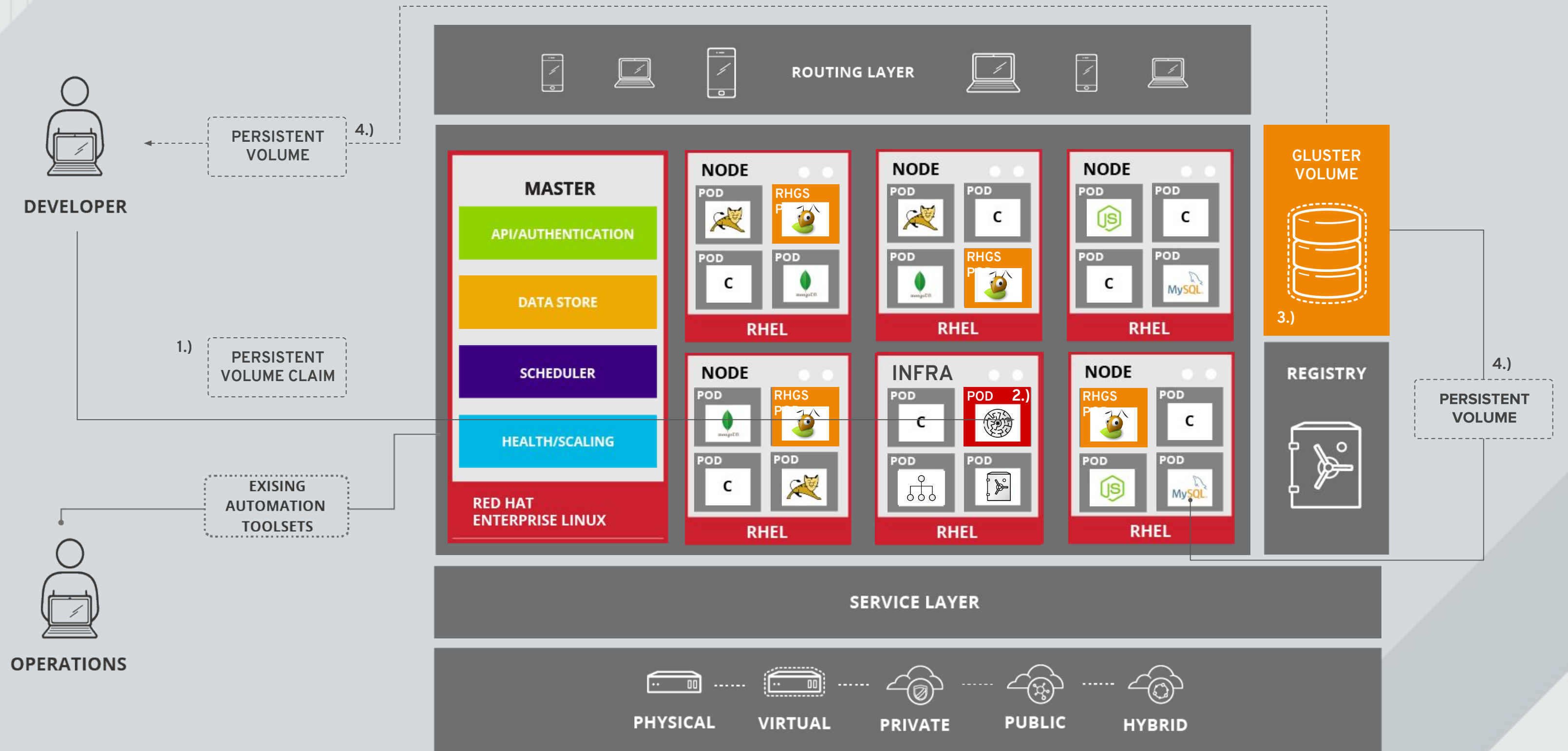
CONTAINER-NATIVE STORAGE ON OPENSHIFT



CONTAINER-NATIVE STORAGE ON OPENSHIFT



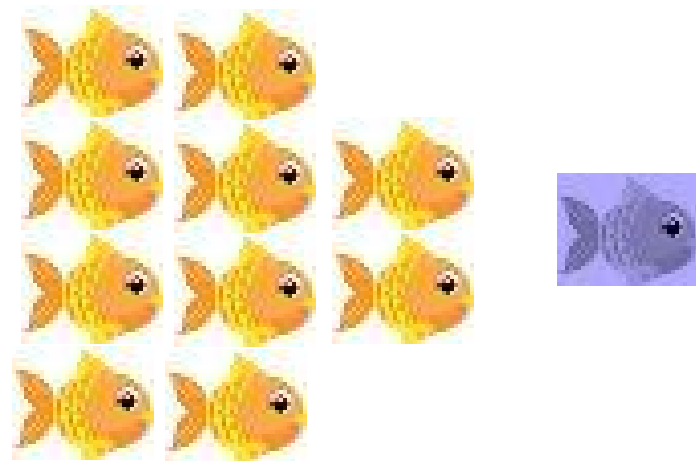
CONTAINER-NATIVE STORAGE ON OPENSHIFT



Why Bother?



Most enterprise apps need to persist their “state”, even when running in transient, ephemeral containers



Container native storage is truly differentiated from traditional and sw-defined storage vendors



Red Hat Gluster Storage is fully integrated and supported by OpenShift Container Platform for a seamless developer experience

WHY CONTAINER-NATIVE STORAGE

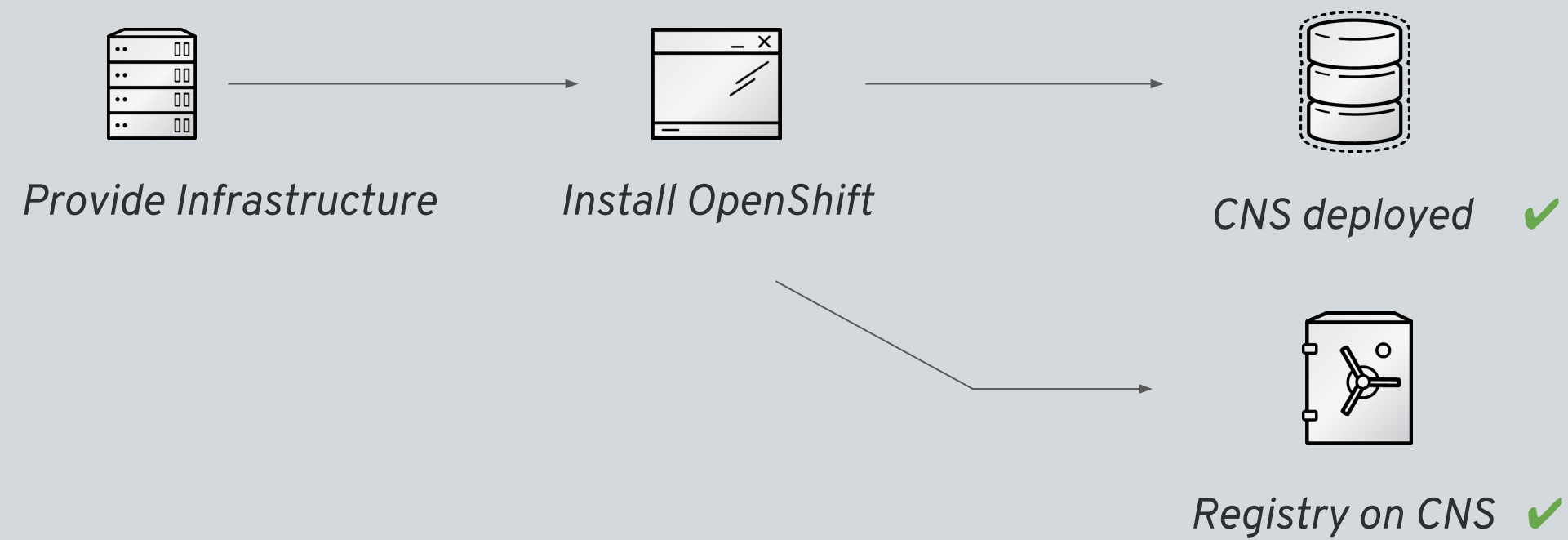


VS.



UNIFIED CLUSTER | UNIFIED SCHEDULER | UNIFIED MANAGEMENT PANE
CONSISTENT UPGRADE | SINGLE POINT OF SUPPORT

ACHIEVING AN INTEGRATED STORAGE EXPERIENCE





THANK YOU



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