

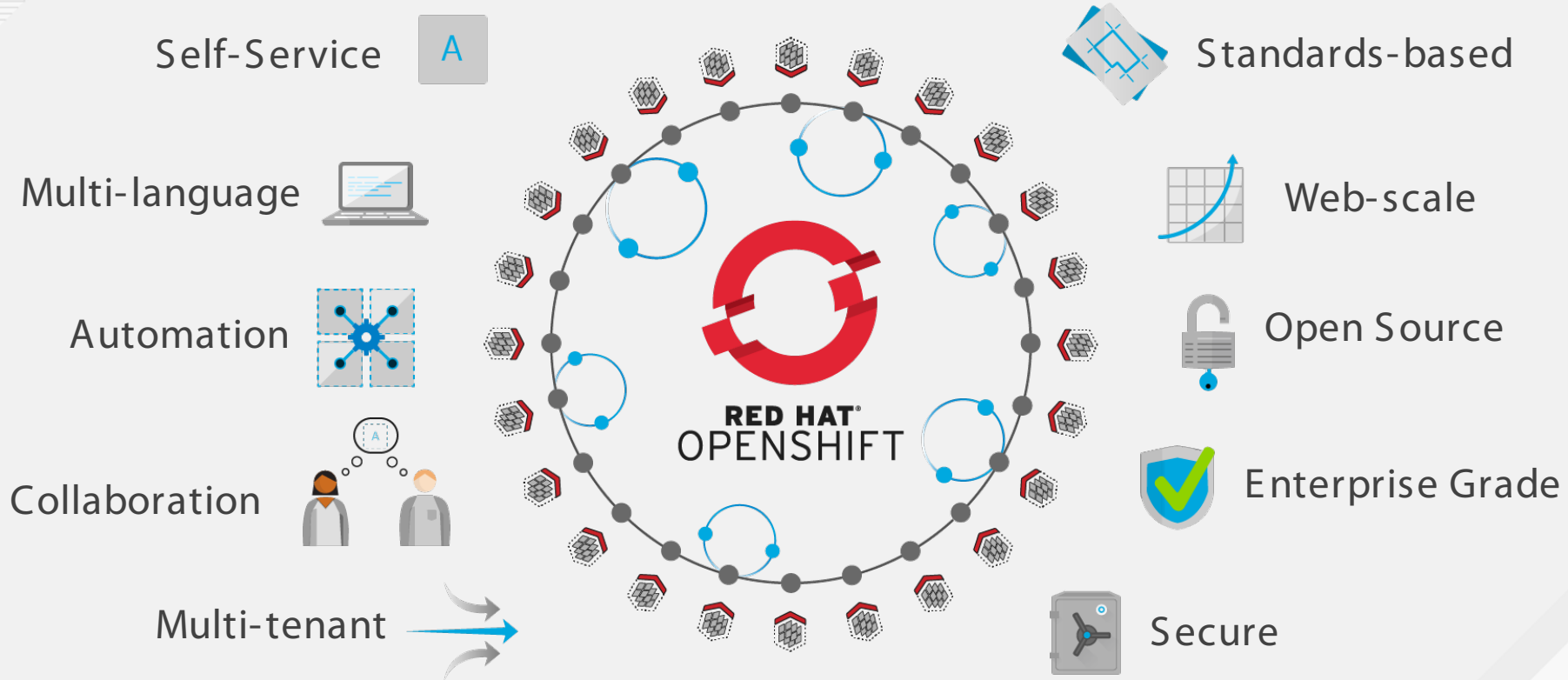


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CONTAINER & CLOUD NATIVE ROADSHOW

OPERATIONS TRACK





Agenda

- Introductions
- Linux Containers (review)
- OpenShift Architecture
- Container Native Storage / Ceph Architecture
- Labs!



LINUX CONTAINERS



WHAT ARE CONTAINERS?

It Depends Who You Ask



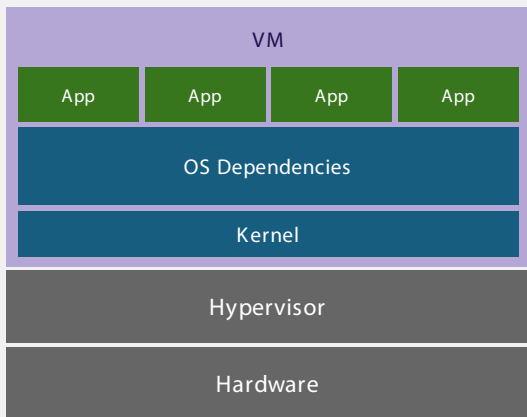
INFRASTRUCTURE

APPLICATIONS

- Application processes on a shared kernel
- Simpler, lighter, and denser than VMs
- Portable across different environments
- Package apps with all dependencies
- Deploy to any environment in seconds
- Easily accessed and shared

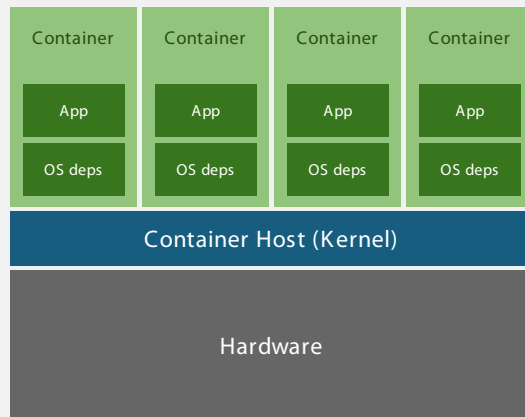
VIRTUAL MACHINES AND CONTAINERS

VIRTUAL MACHINES



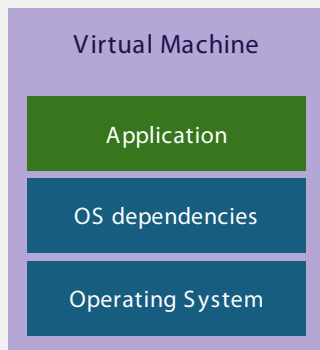
virtual machines are isolated
apps are not

CONTAINERS

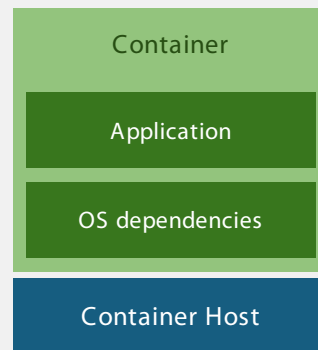


containers are isolated
so are the apps

VIRTUAL MACHINES AND CONTAINERS

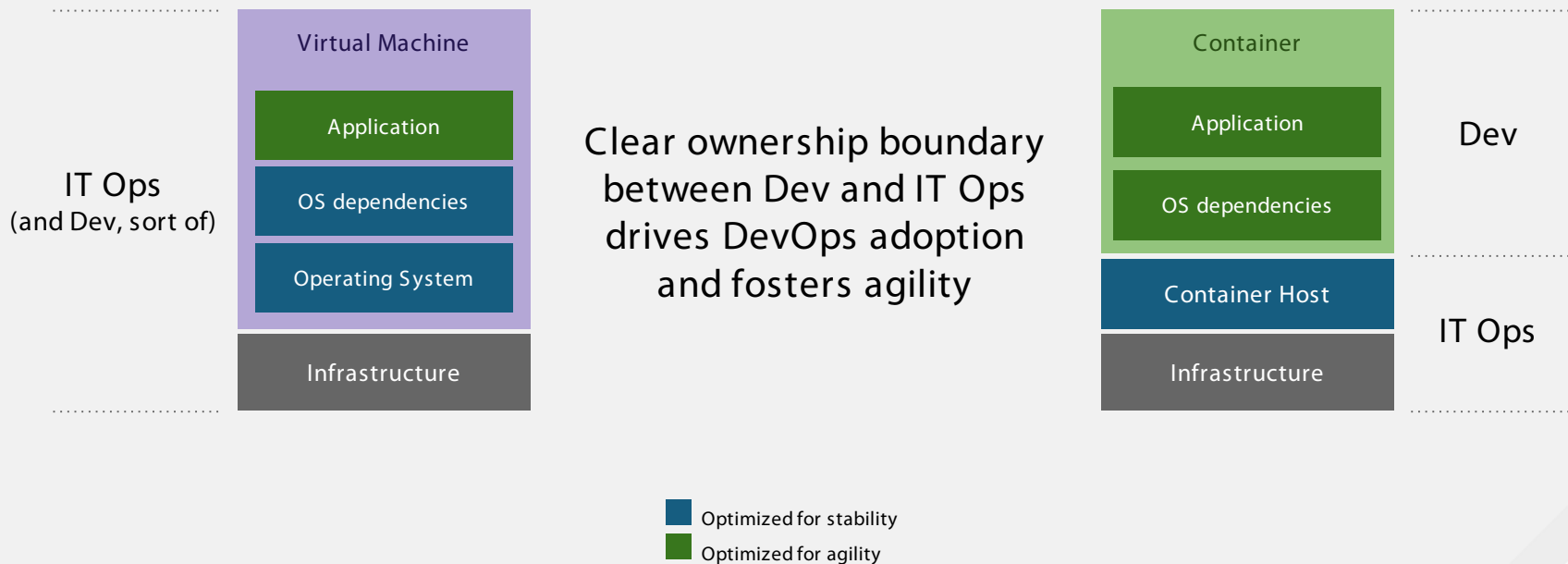


- + VM Isolation
- Complete OS
- Static Compute
- Static Memory
- High Resource Usage



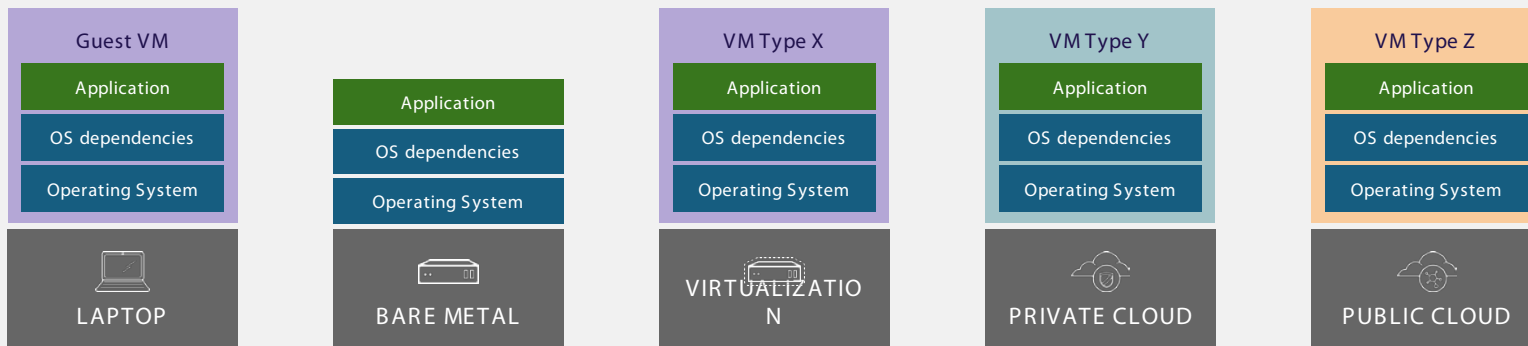
- + Container Isolation
- + Shared Kernel
- + Burstable Compute
- + Burstable Memory
- + Low Resource Usage

VIRTUAL MACHINES AND CONTAINERS



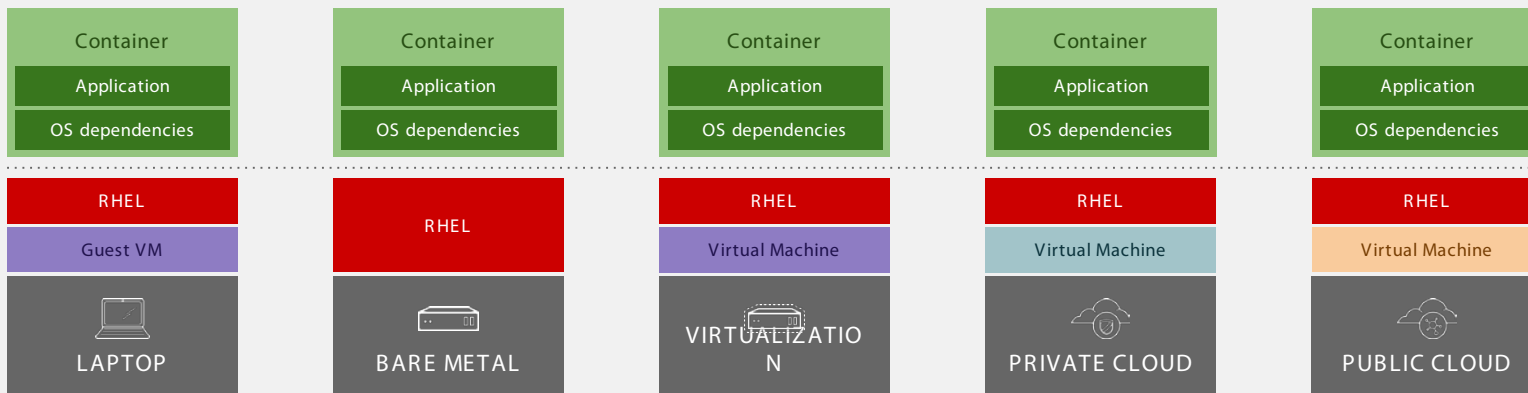
APPLICATION PORTABILITY WITH VM

Virtual machines are **NOT** portable across hypervisor and do **NOT** provide portable packaging for applications

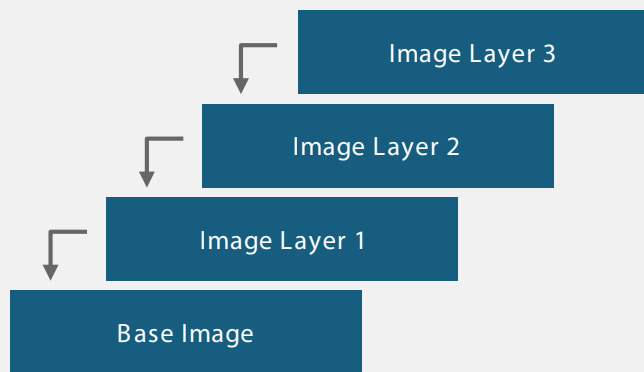


APPLICATION PORTABILITY WITH CONTAINERS

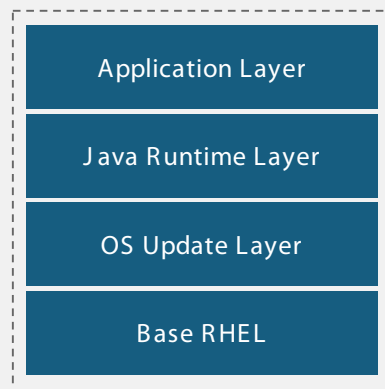
RHEL Containers + RHEL Host = Guaranteed Portability
Across Any Infrastructure



RAPID SECURITY PATCHING USING CONTAINER IMAGE LAYERING



Container Image Layers



Example Container Image



cri-o

A lightweight, OCI-compliant container runtime

Optimized for
Kubernetes

Any OCI-compliant
container from any
OCI registry
(including docker)

Improve Security and
Performance at scale



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OPENSIFT ARCHITECTURE

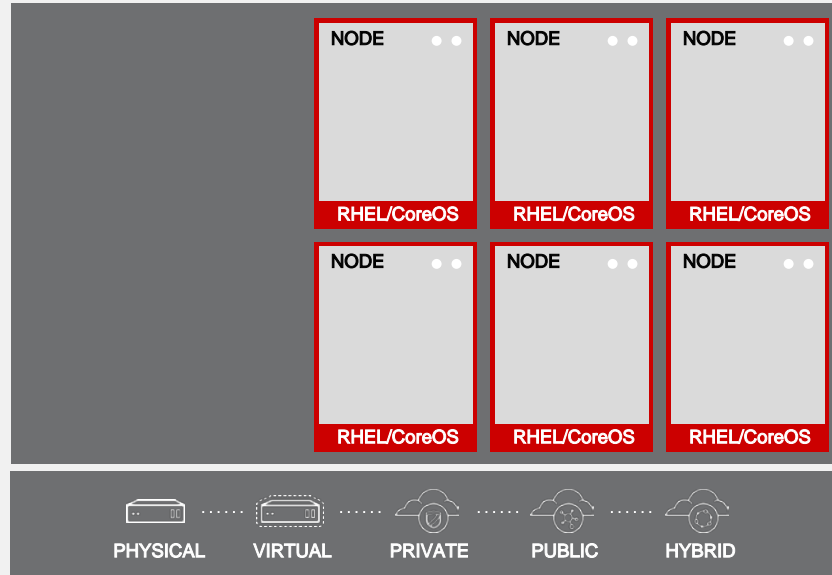


Red Hat

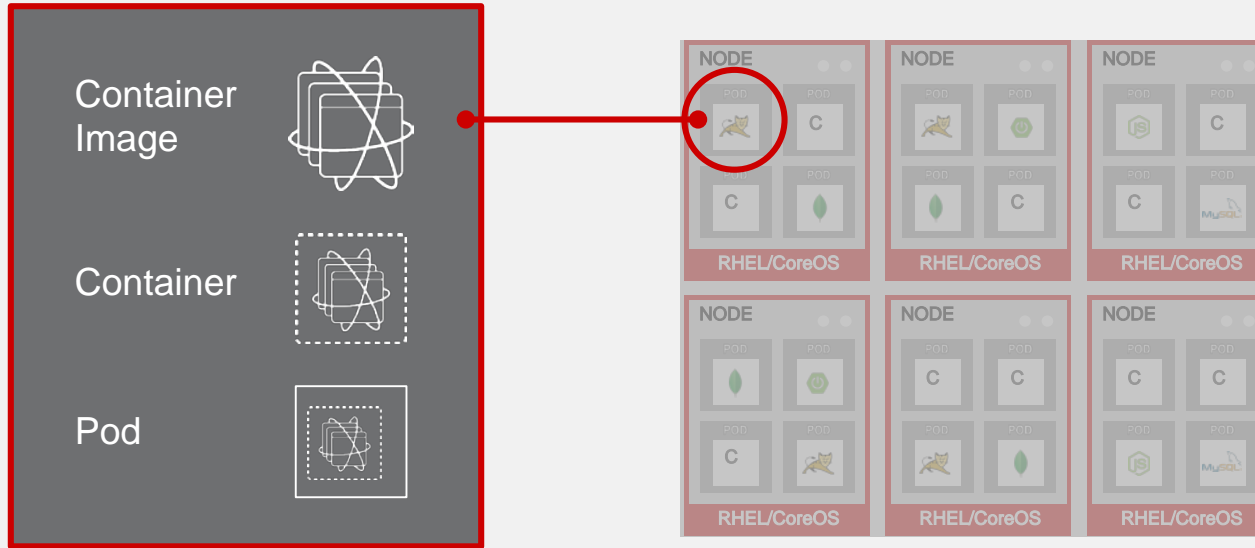
YOUR CHOICE OF INFRASTRUCTURE



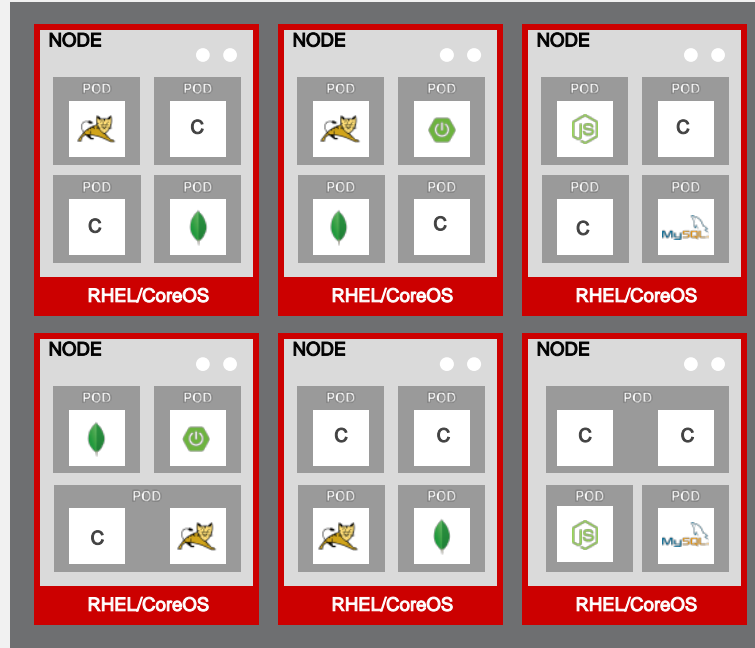
NODES RHEL INSTANCES WHERE APPS RUN



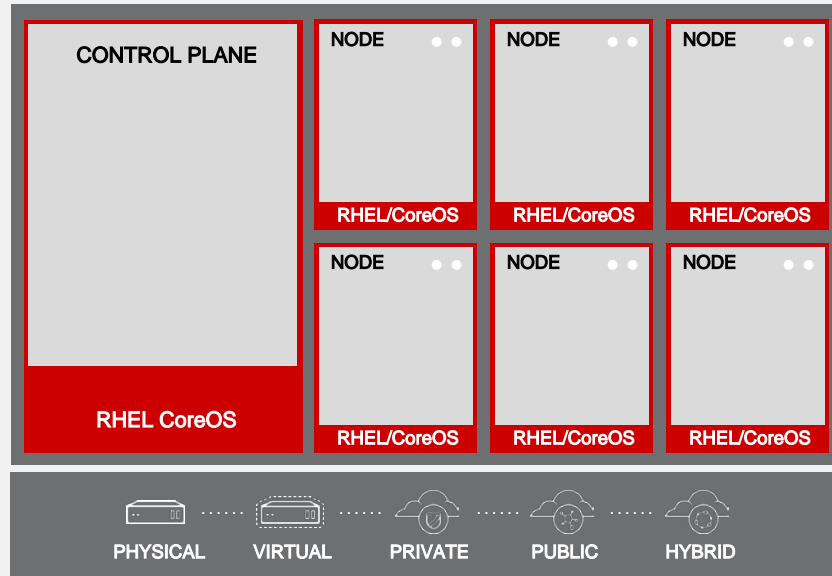
APPS RUN IN CONTAINERS



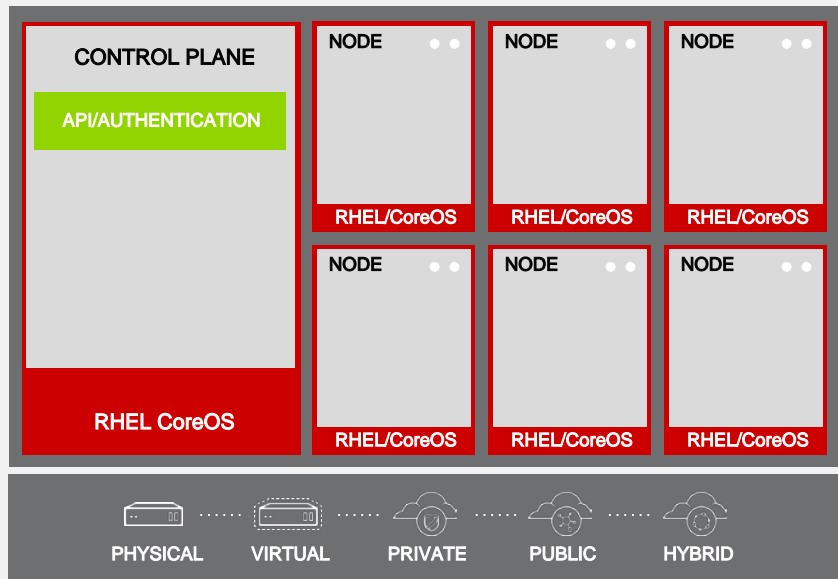
PODS ARE THE UNIT OF ORCHESTRATION



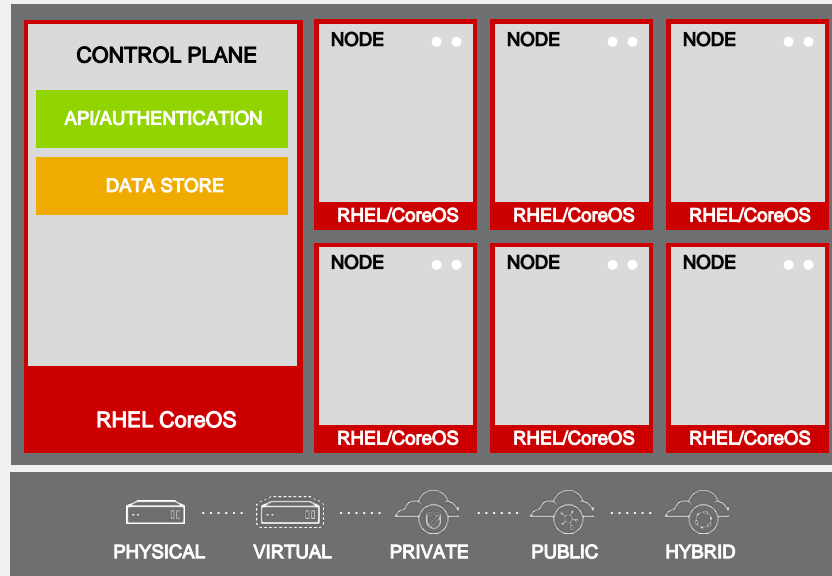
THE CONTROL PLANE



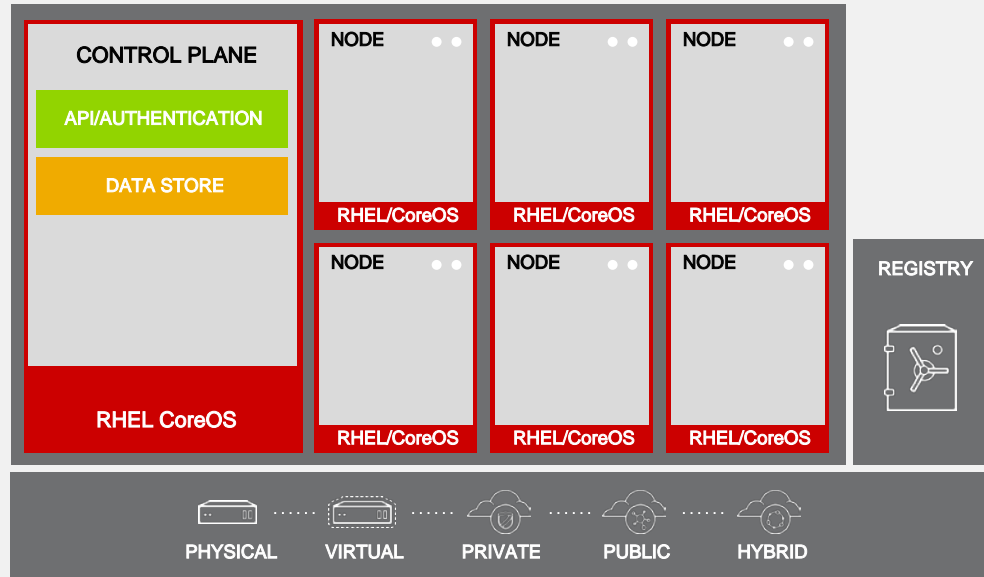
API AND AUTHENTICATION



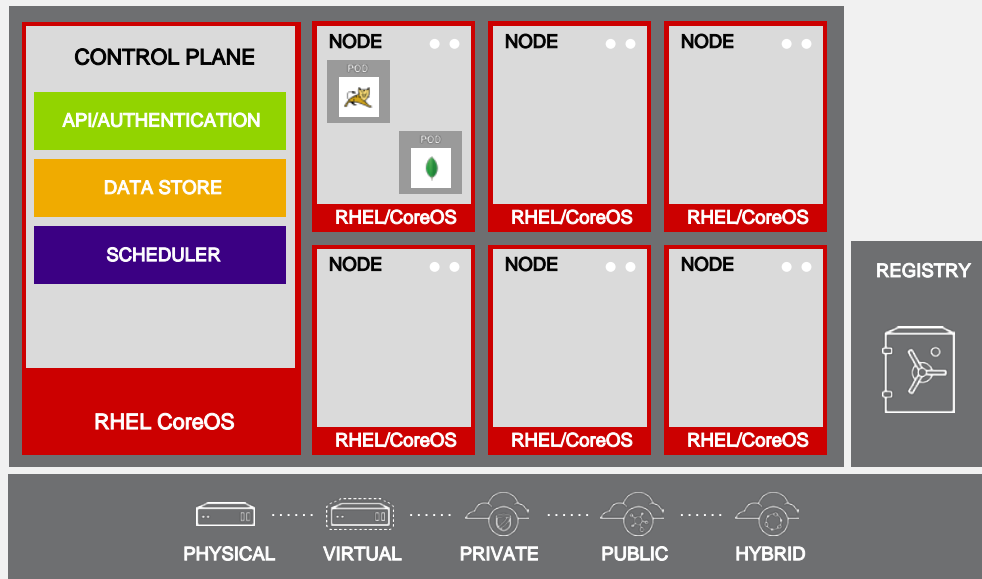
DESIRED AND CURRENT STATE



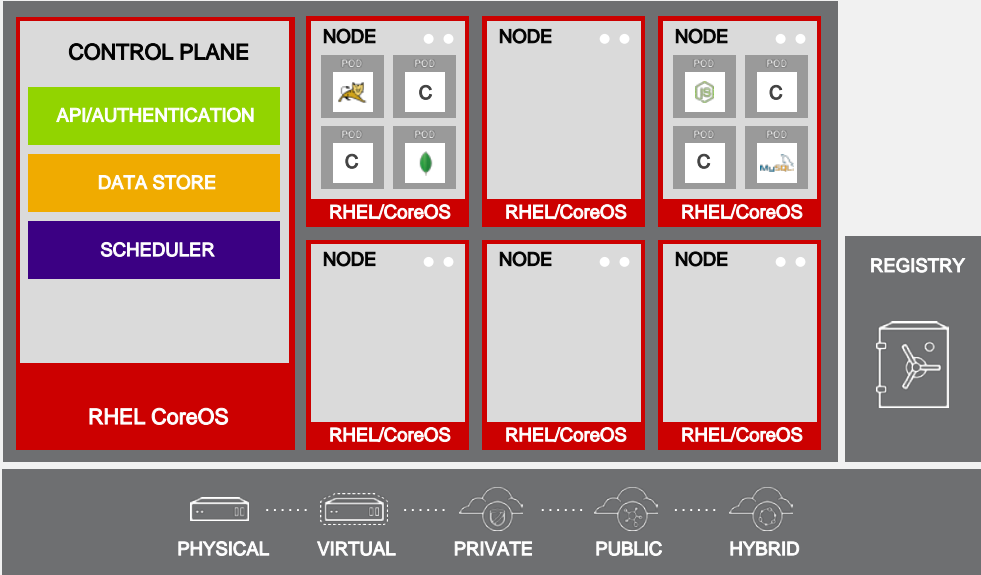
INTEGRATED CONTAINER REGISTRY



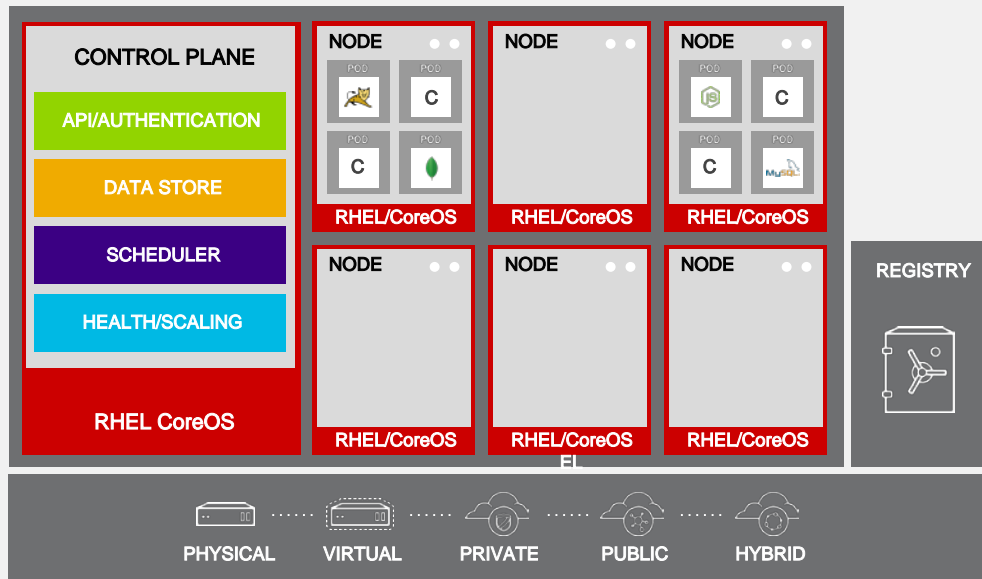
ORCHESTRATION AND SCHEDULING



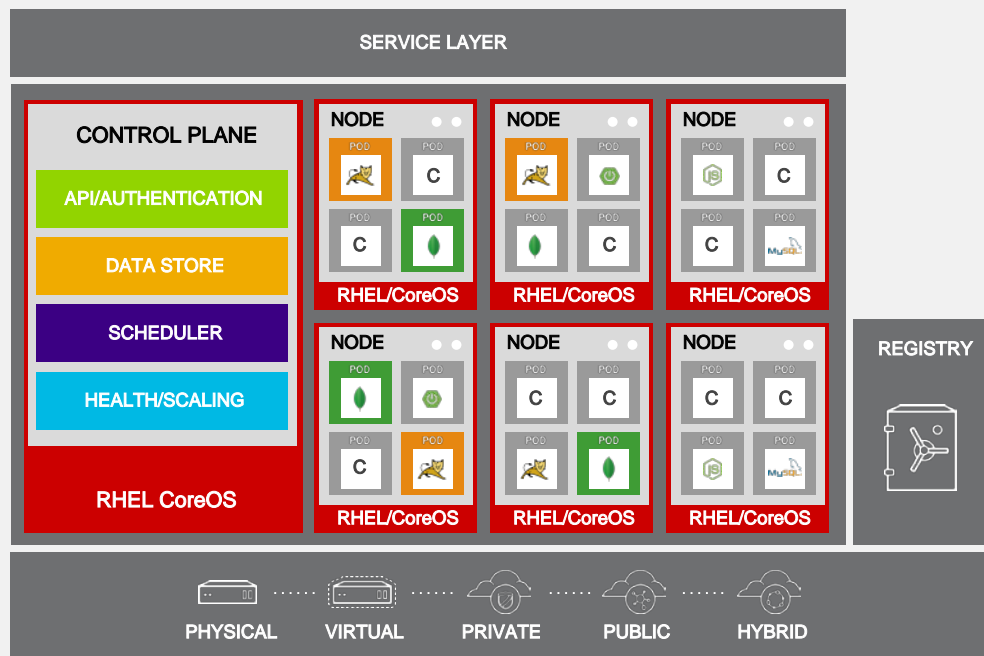
PLACEMENT BY POLICY



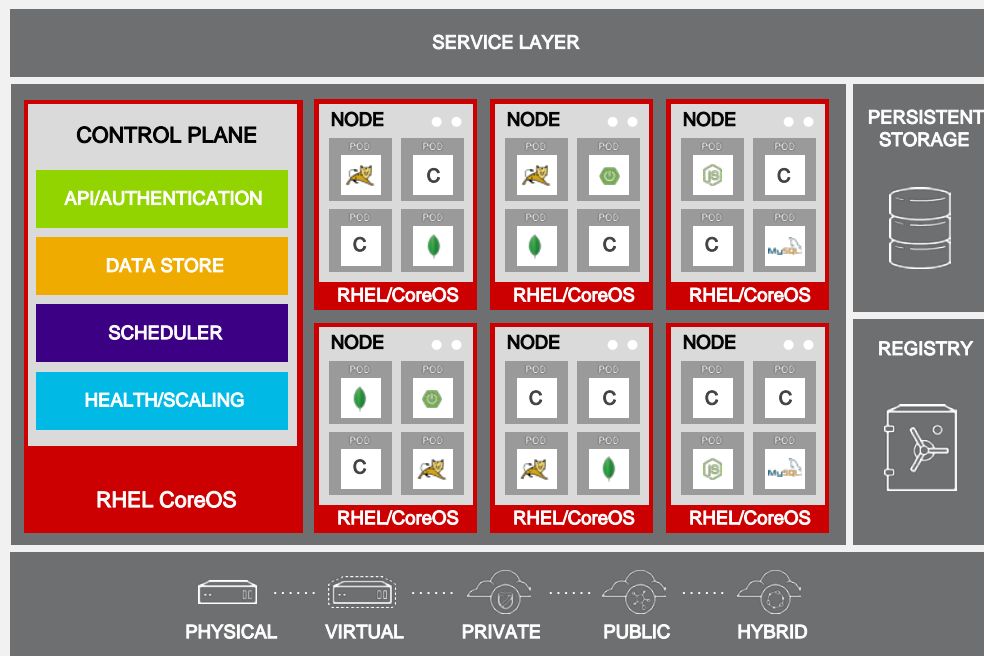
AUTOSCALING PODS



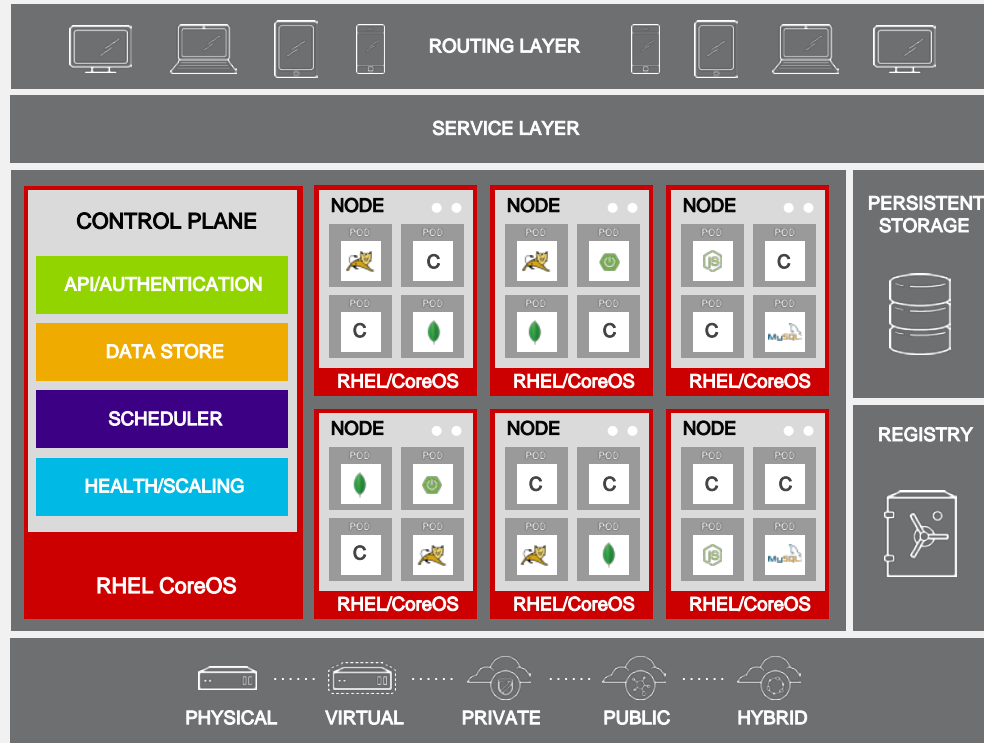
SERVICE DISCOVERY



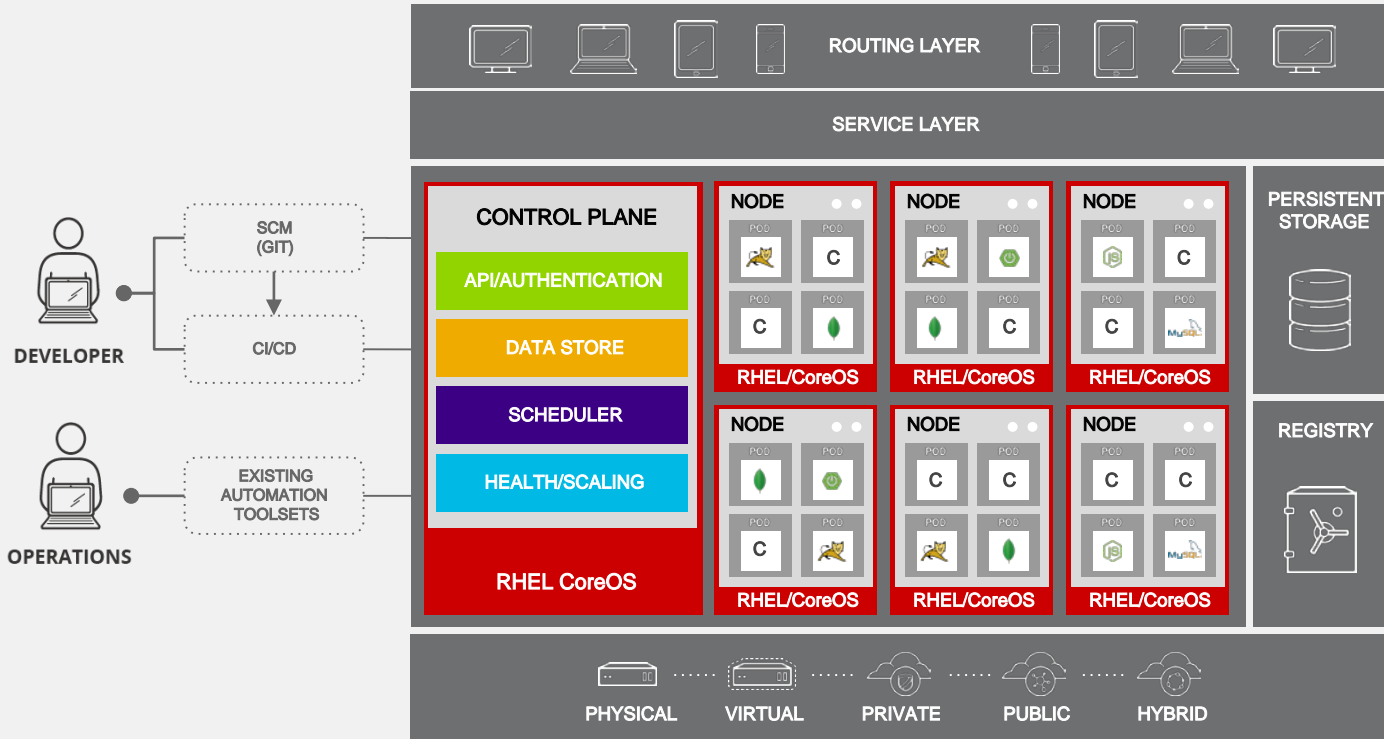
PERSISTENT DATA IN CONTAINERS



ROUTING AND LOAD-BALANCING



ACCESS VIA WEB, CLI, IDE AND API

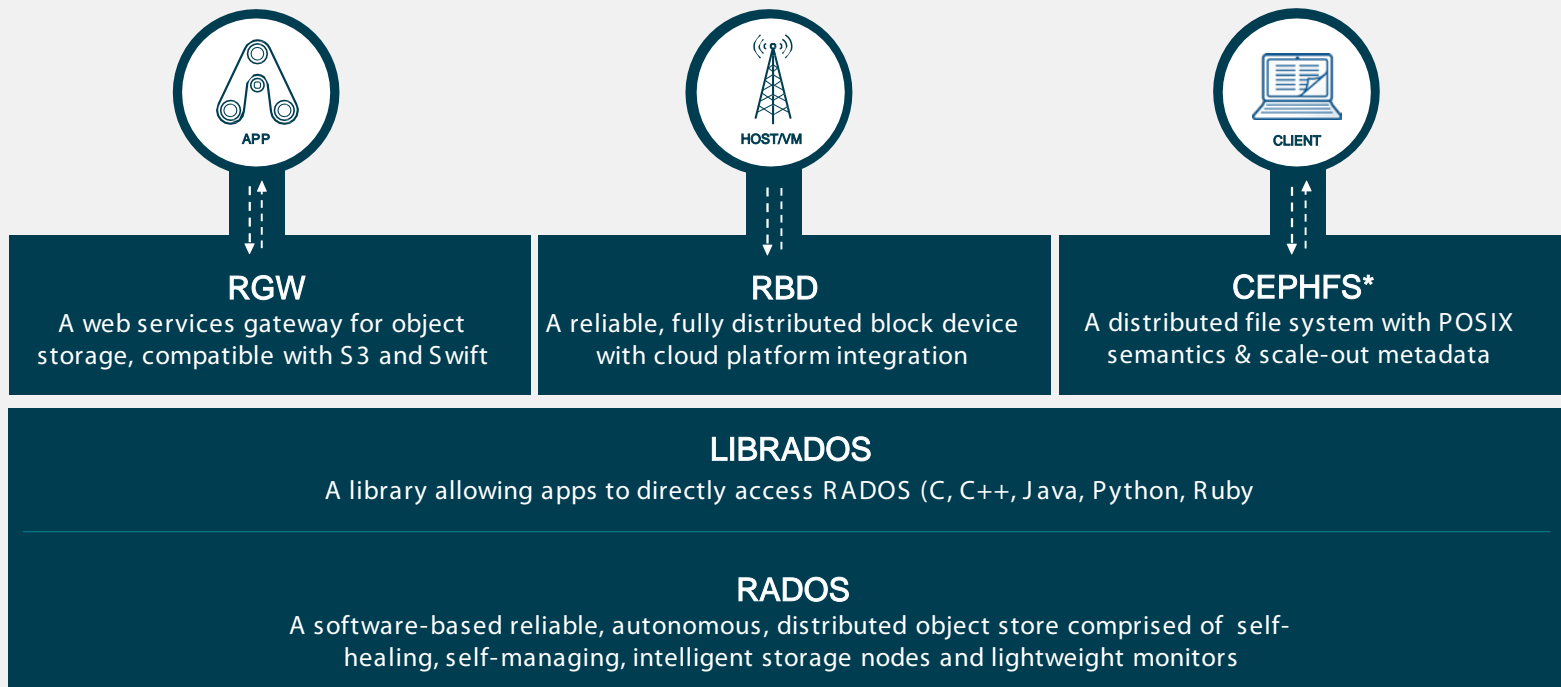




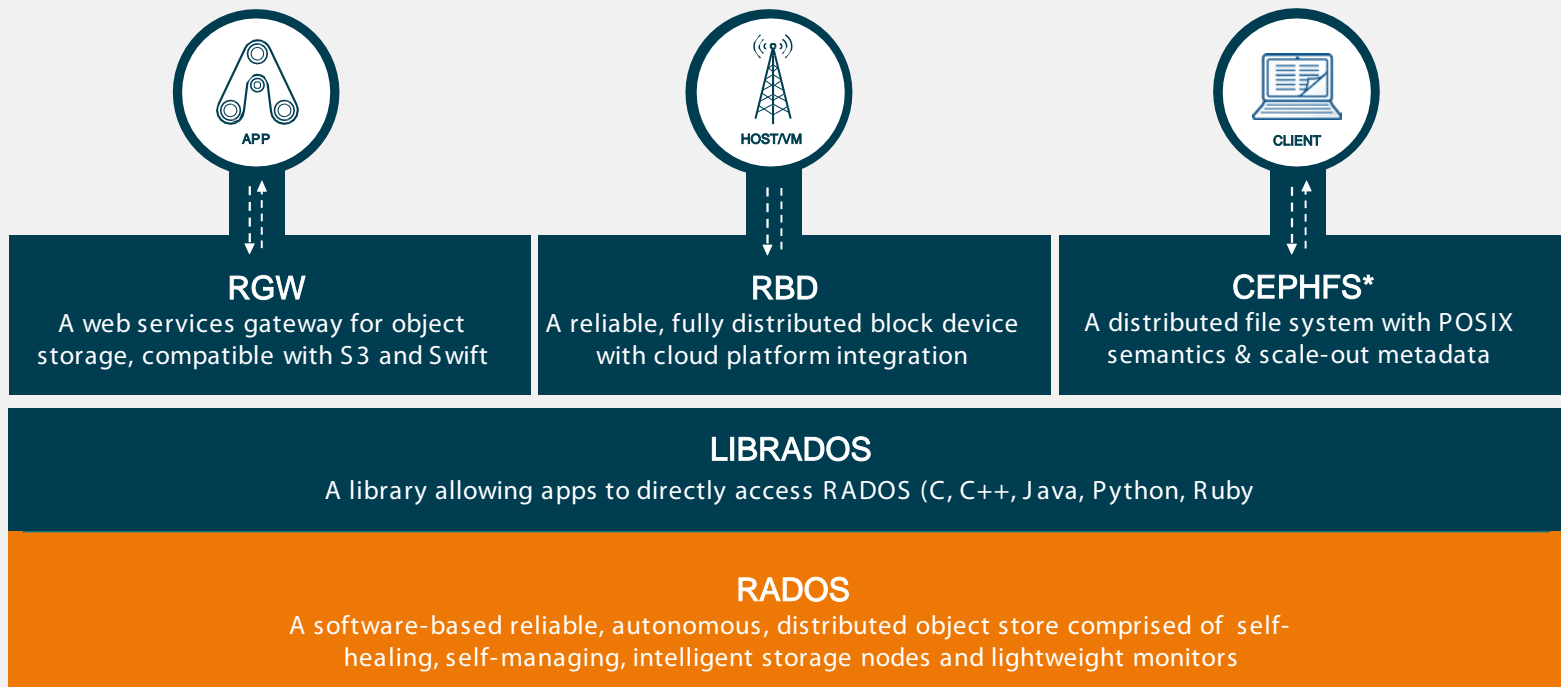
CONTAINER NATIVE STORAGE



RED HAT CEPH STORAGE ARCHITECTURAL COMPONENTS



RED HAT CEPH STORAGE ARCHITECTURAL COMPONENTS



* CephFS is Tech Preview in RHCS2

RADOS

RELIABLE AUTONOMOUS DISTRIBUTED OBJECT STORE



OSDs (Object Storage Daemons)

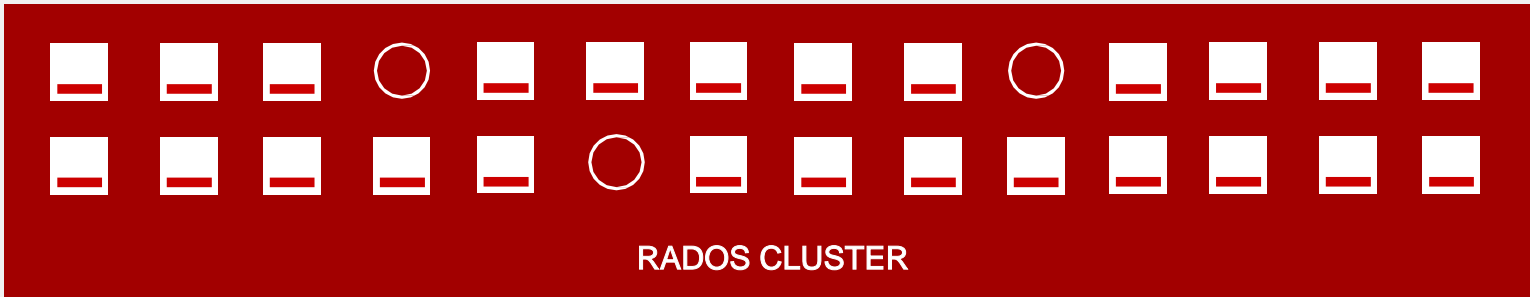
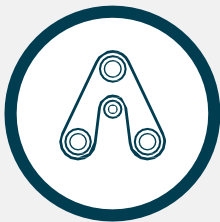
- 10s to 10000s in a cluster
- One per disk (or one per SSD, RAID group...)
- Serve stored objects to clients
- Intelligently peer for replication & recovery
- Minimum 3 per cluster



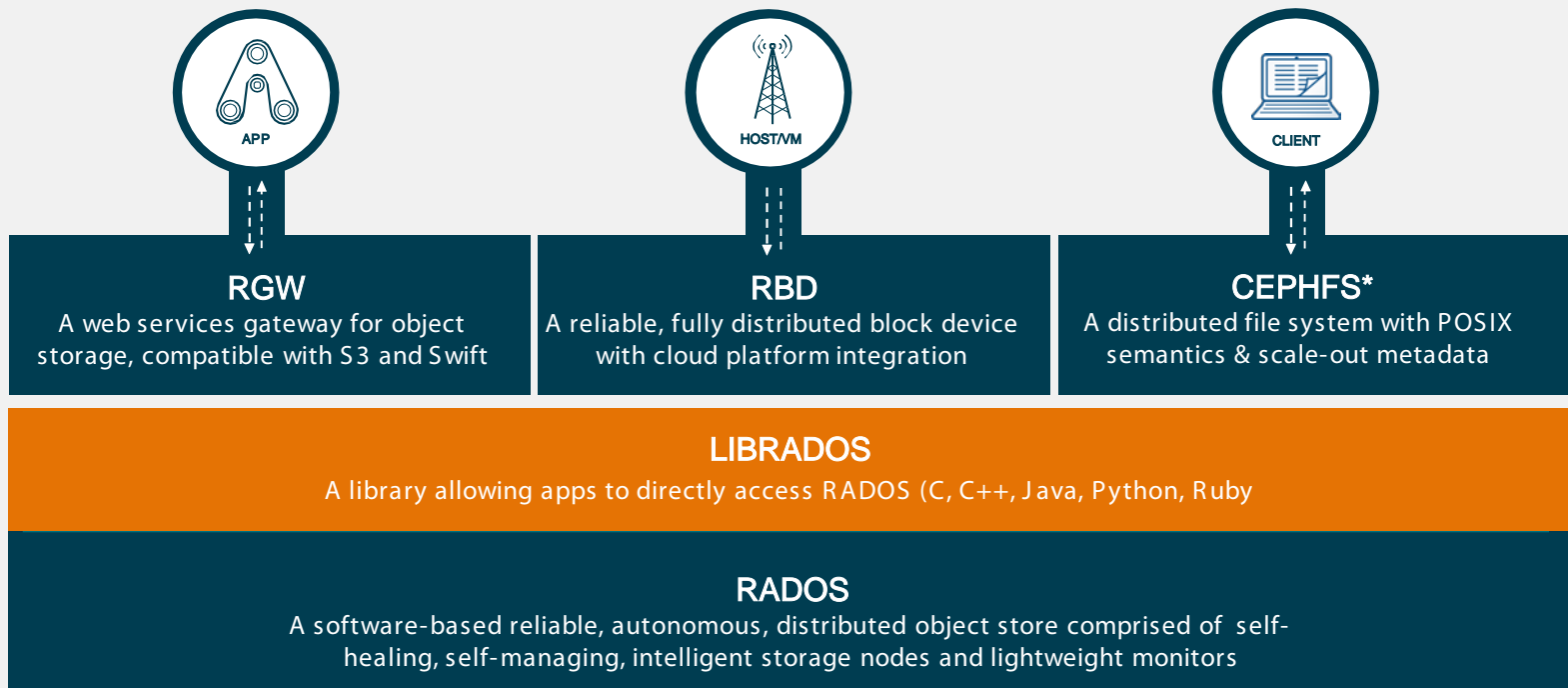
MONs (Monitors)

- Maintain cluster membership and state
- Track health of the cluster
- Provide consensus for distributed decision-making
- Small, odd number
- These do not serve stored objects to clients (not in the data path)
- Minimum 3 per cluster

RADOS CLUSTER



RED HAT CEPH STORAGE ARCHITECTURAL COMPONENTS



* CephFS is Tech Preview in RHCS2

OPENSIFT TECHNICAL OVERVIEW

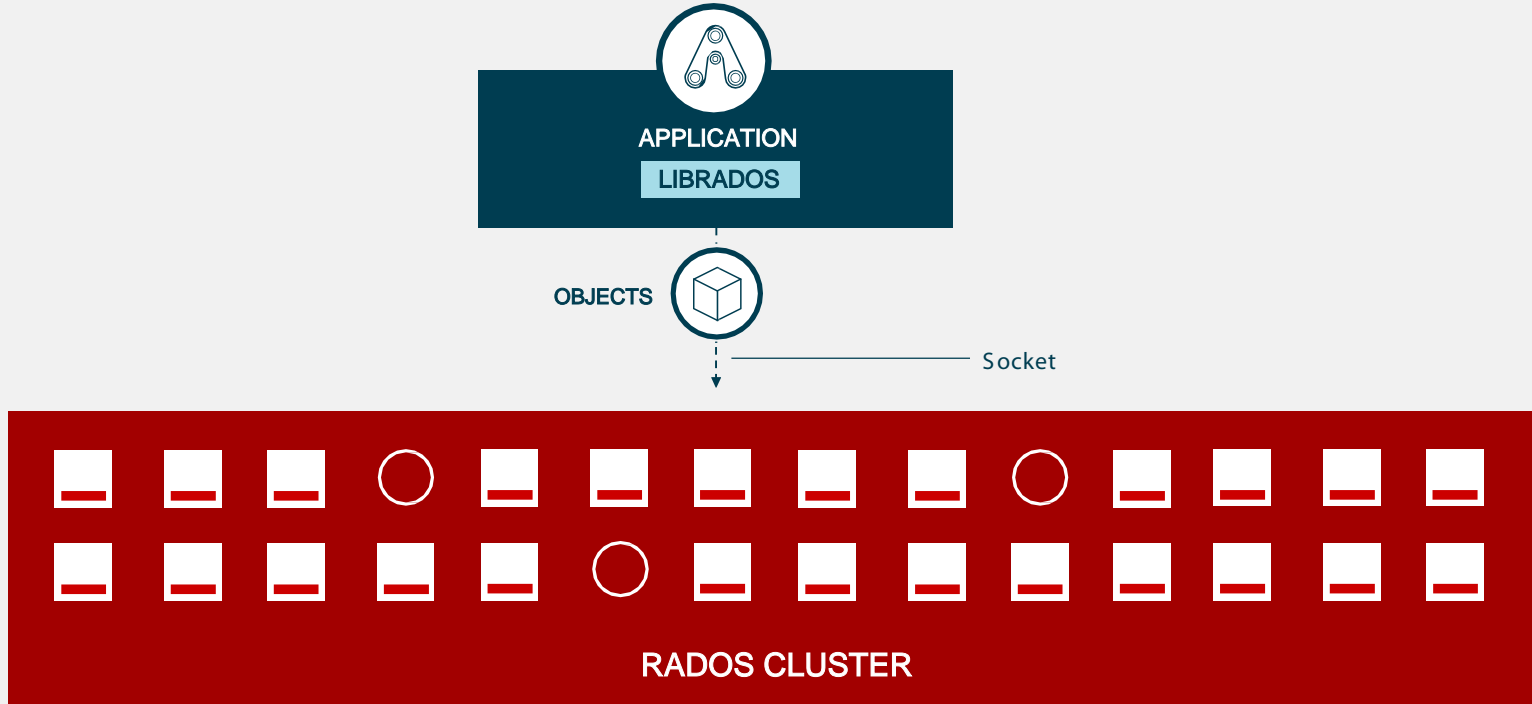
LIBRADOS - RADOS ACCESS FOR APPS



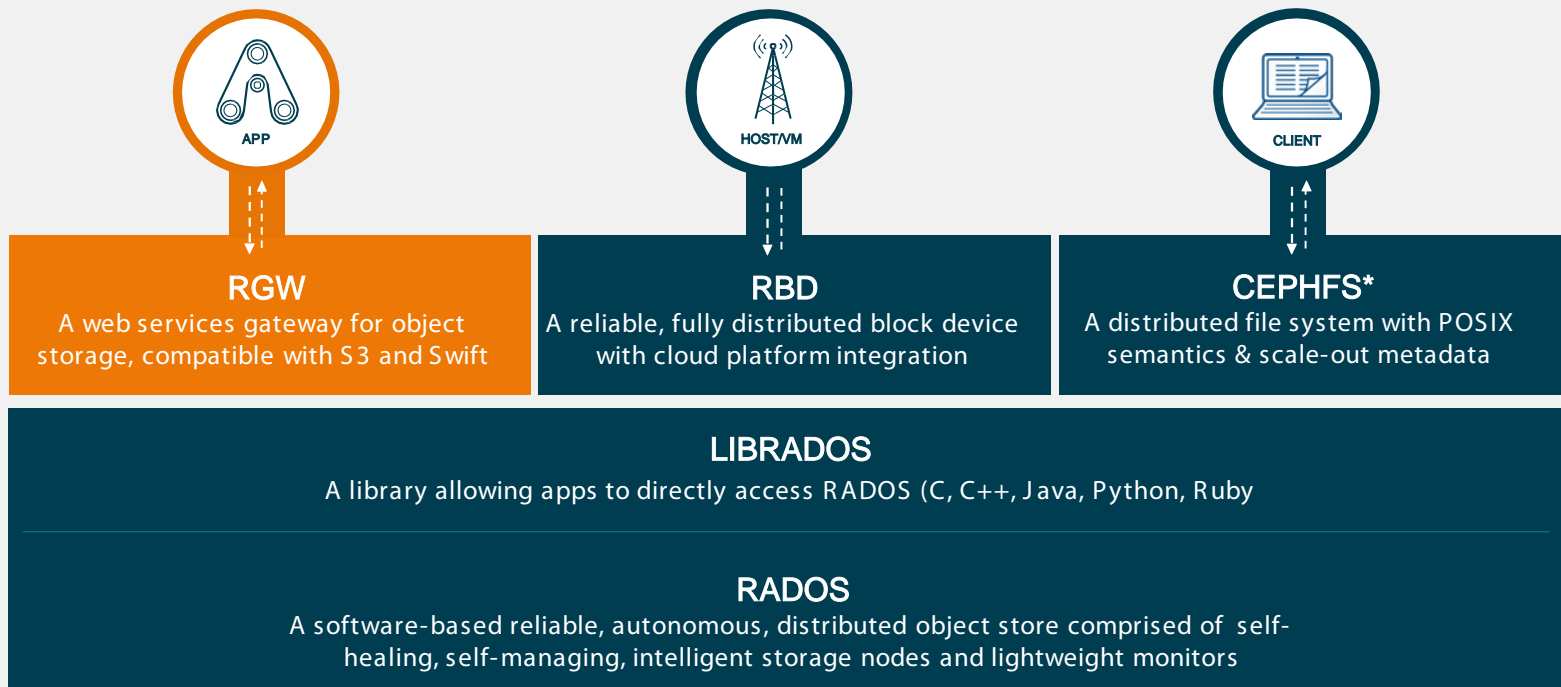
LIBRADOS

- Direct access to RADOS for applications (C, C++, Python, PHP, Java, Erlang)
- Direct access to storage nodes
- No HTTP overhead – fast, socked-based connection

ACCESSING A RADOS CLUSTER



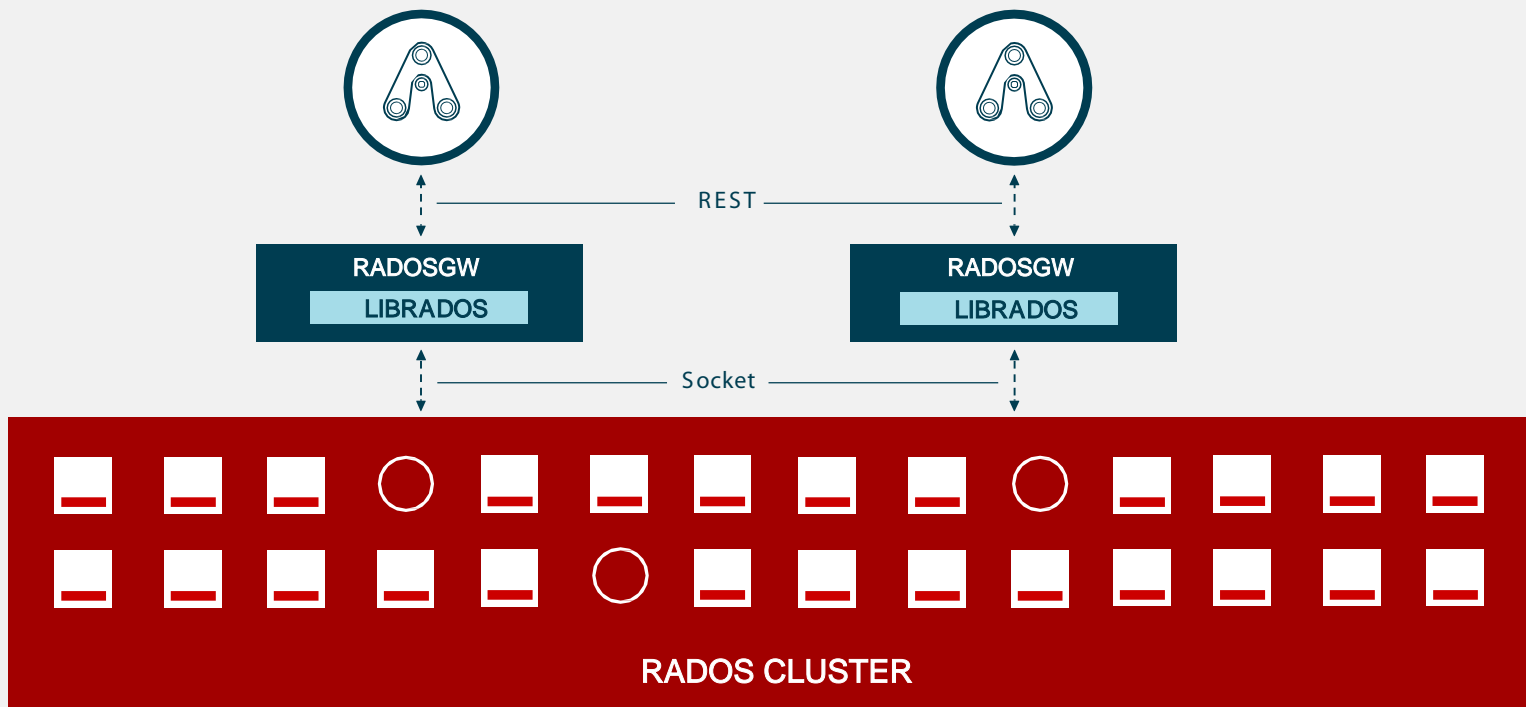
RED HAT CEPH STORAGE ARCHITECTURAL COMPONENTS



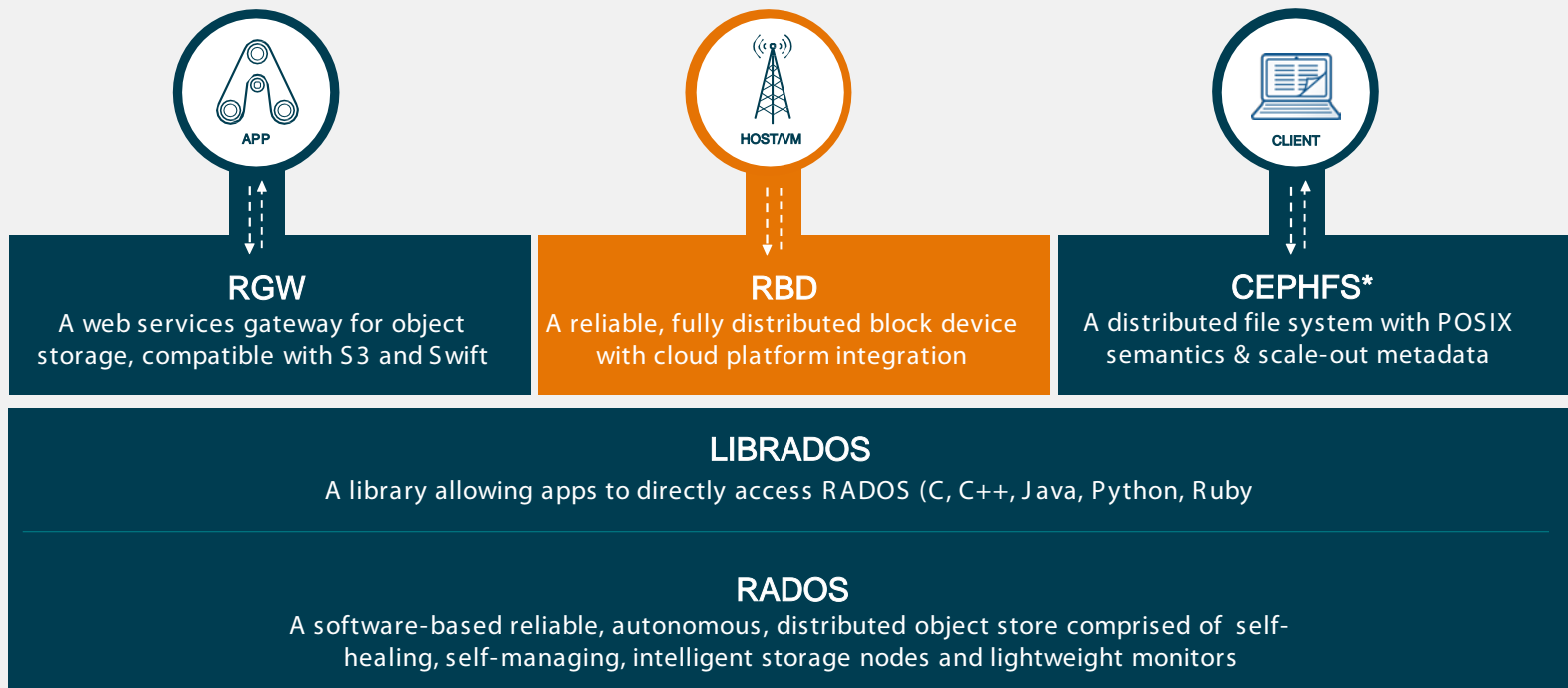
* CephFS is Tech Preview in RHCS2

OPENSIFT TECHNICAL OVERVIEW

THE RADOS GATEWAY (RGW)



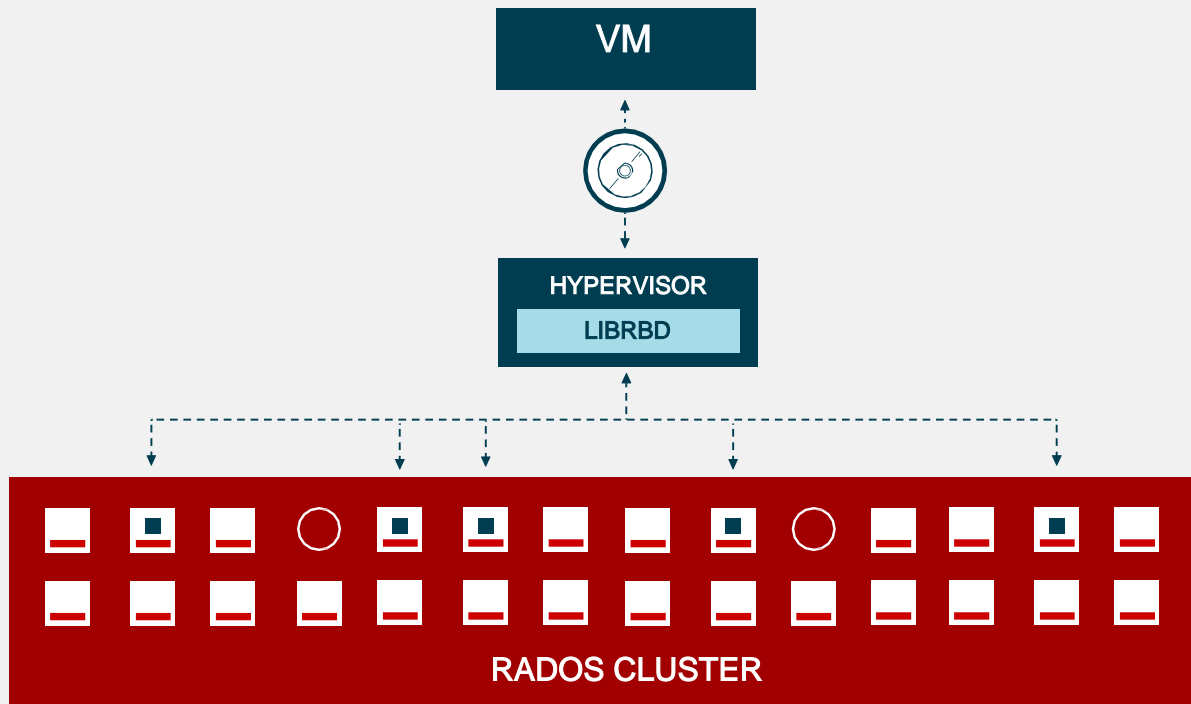
RED HAT CEPH STORAGE ARCHITECTURAL COMPONENTS



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OPENSIFT TECHNICAL OVERVIEW

STORING VIRTUAL DISKS



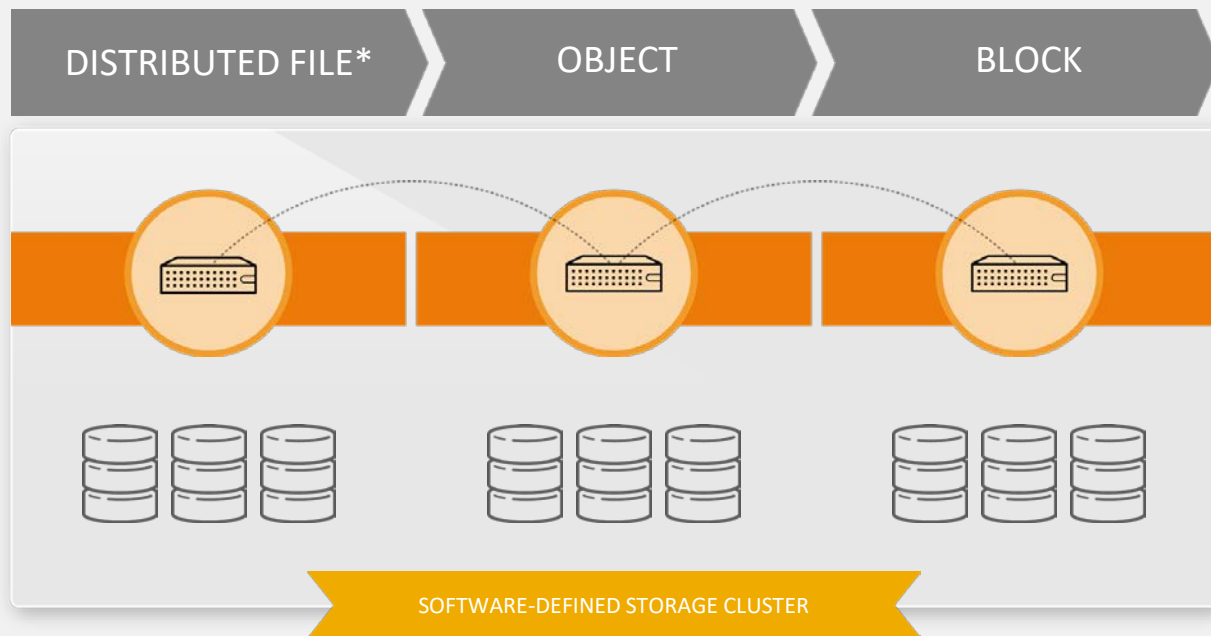
SCALABLE METADATA SERVERS



METADATASERVER

- Manages metadata for a POSIX-compliant shared filesystem
- Directory hierarchy
- File metadata (owner, timestamps, mode, etc.)
- Stores metadata in RADOS
- Does not serve file data to clients
- Only required for shared filesystem

RED HAT CEPH STORAGE ACCESS METHODS





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NEW in OpenShift 4



What's new in OpenShift 4



- Installation modes: IPI and UPI
- Cluster Upgrades over the Air
- CRI-O and quay instead of Docker
- Completely new WebUI
- Operator Framework
- Developers focus with odo and CodeReady
- Service Mesh and Knatives Framework
- Serverless



OpenShift Operations and Container Native Storage Test Drive

GUID Grabber: [https:// bit.ly /37riwJM](https://bit.ly/37riwJM)

Lab Code: **196b**

Activation key: **121b8**

E-Mail Address: **Login with the email you
used for the event registration**

Get hands on!



Red Hat

Try it and see!



LABS!

