



redhat.

STORAGE FOR OPENSHIFT

Container-Native Storage (CNS) v3.6 Technical
Presentation

Sergey Goncharov
Solution Architect, Red Hat

Fall 2017

STORAGE FOR OPENSIFT

Why Do Containers Need Storage?

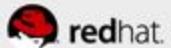
- Containers are not persistent by default. App data is lost when containers die.

Why is container storage a pain point?

- Complex. Even more complicated when container orchestration is involved and applications need to be scaled out

Why Red Hat Container-Native Storage (CNS)?

- Advanced storage capabilities, deeper integration with OpenShift, better price/performance than traditional storage
- CNS is open, scalable and has consistent user experience across the hybrid cloud (compliments the OpenShift value proposition).



WHAT STORAGE OPTIONS DO CUSTOMERS HAVE?

Choose the path of least resistance for you and your customers. Pitch CNS. Early.



Outdated Storage
Arrays and Appliances

NetApp NTAP, EMC, NFS

- Scalability and high availability fall short of customer requirements
- Vendor lock in and high TCO
- Monolithic appliance model



Siloed or point play
storage solutions

NetApp Trident, Portworx

- Plug in to legacy or cloud only
- No unified control plane (K8s)
- Lack of support for enterprise data services or hybrid cloud



Portable storage across on-prem
and multiple public clouds

Red Hat CNS

- Runs everywhere OpenShift does - across on-prem to all 3 public clouds
- Single vendor support model
- Seamless user experience for developers and DevOps

GREATER OPTIMIZATION FOR & INTEGRATION WITH CONTAINERS

TWO FLAVORS OF CONTAINER STORAGE

Lead with Container-Native Storage

STORAGE FOR OPENSHIFT

CONTAINER-READY STORAGE



- Leverage existing investment in traditional storage, managed by storage admin
- Attach to stand alone storage

STORAGE IN OPENSHIFT

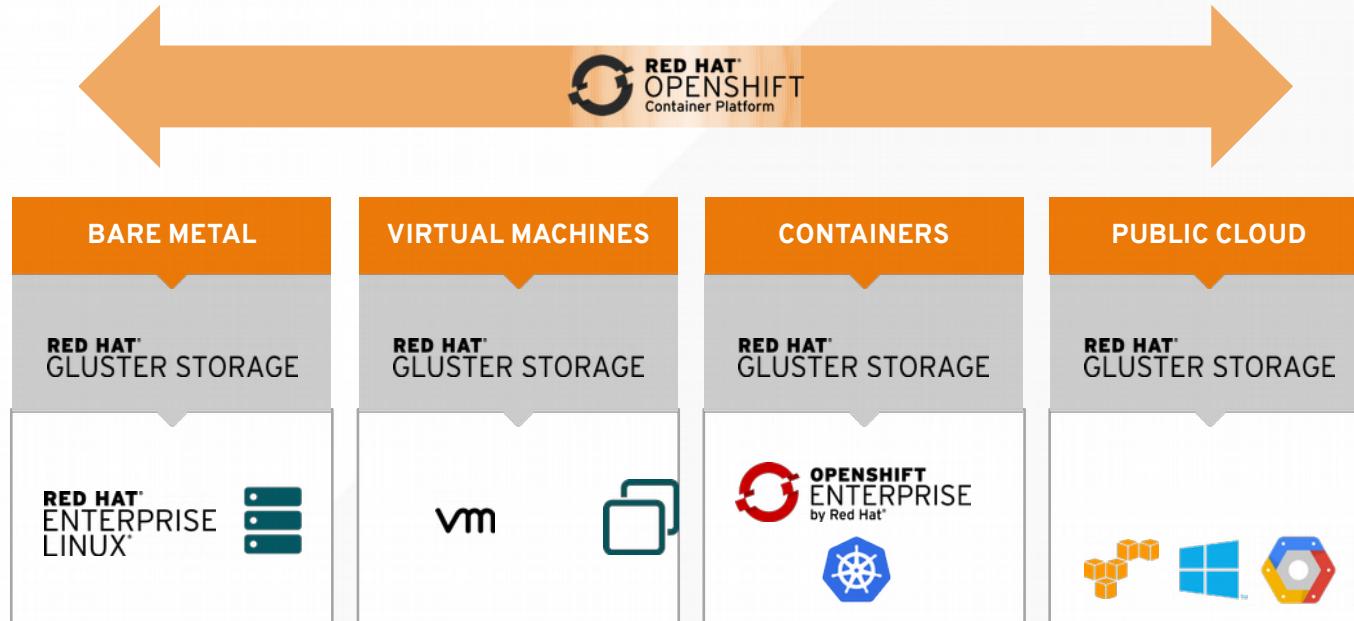
CONTAINER-NATIVE STORAGE



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

CONSISTENT EXPERIENCE ACROSS THE HYBRID CLOUD

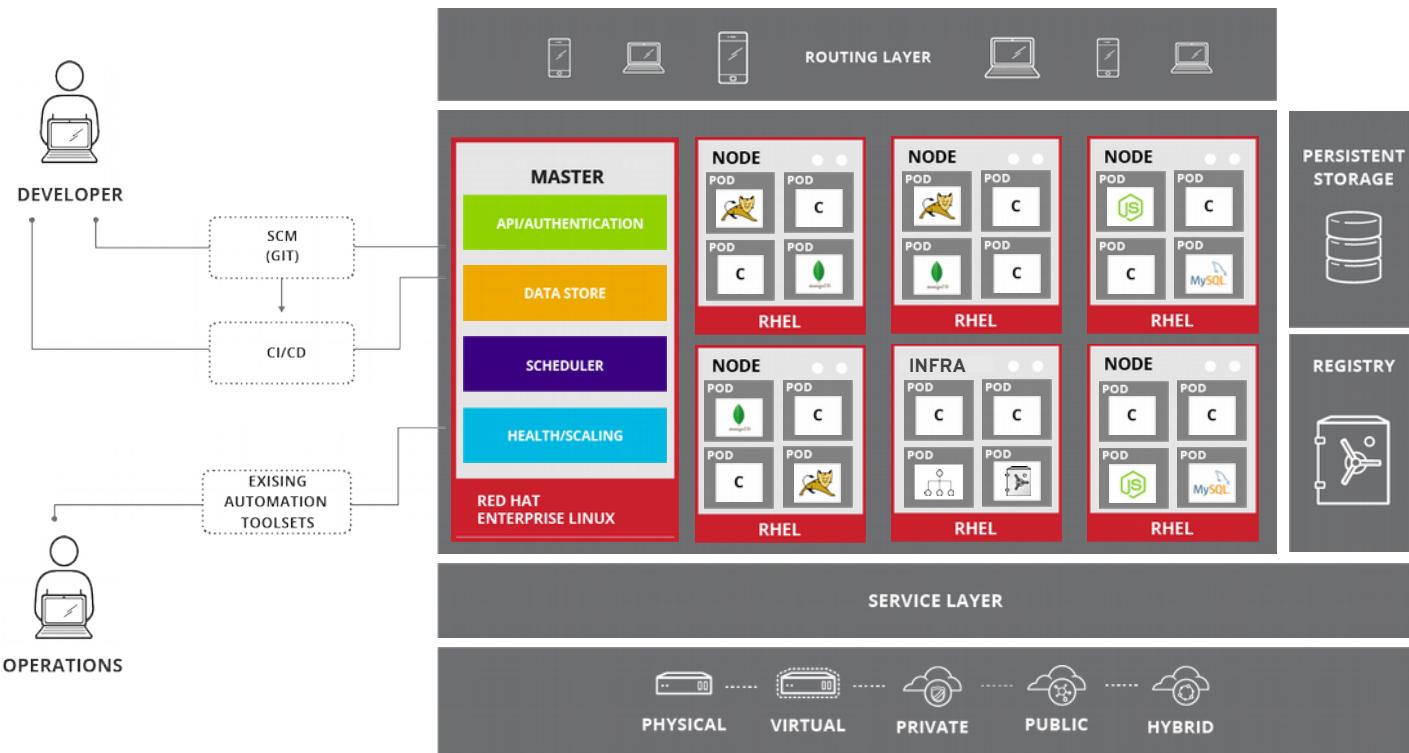
APPLICATION PORTABILITY AND LOWER COSTS



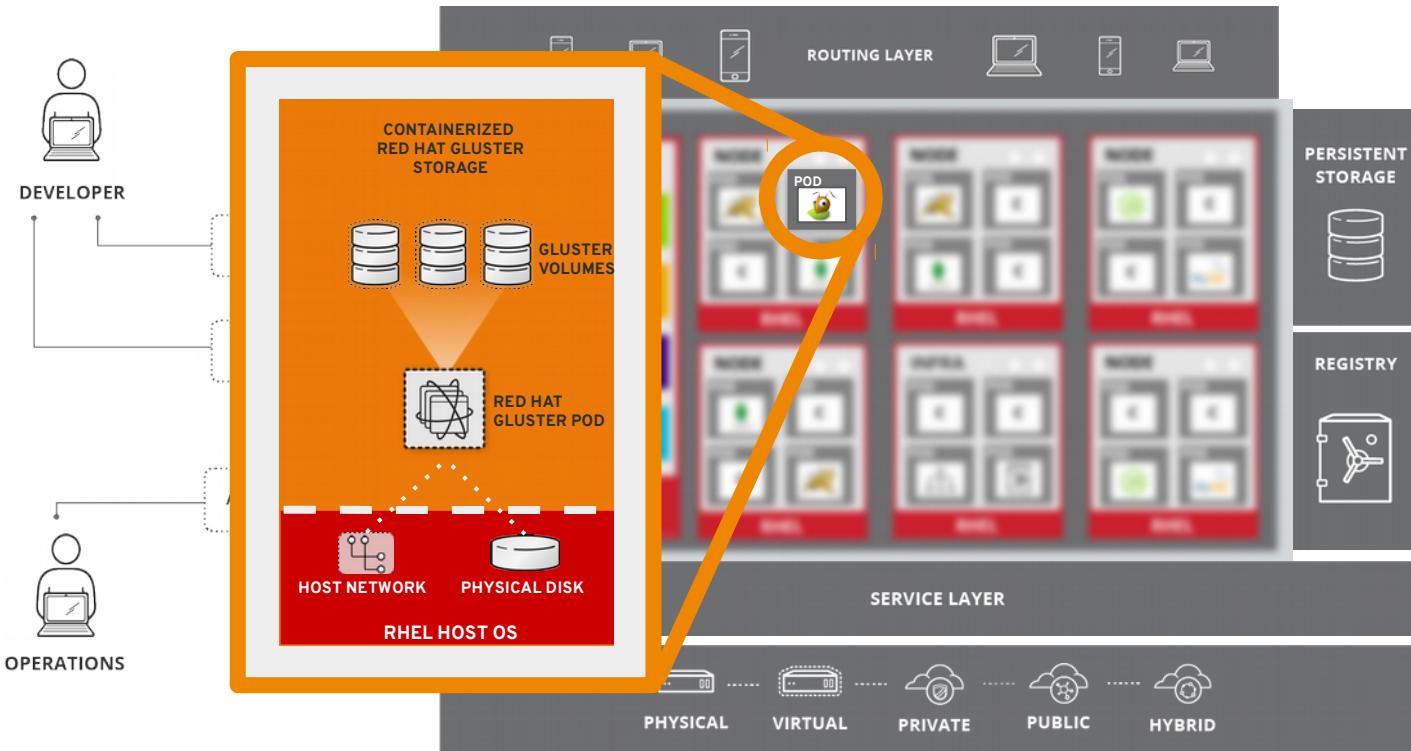


END USER EXPERIENCE

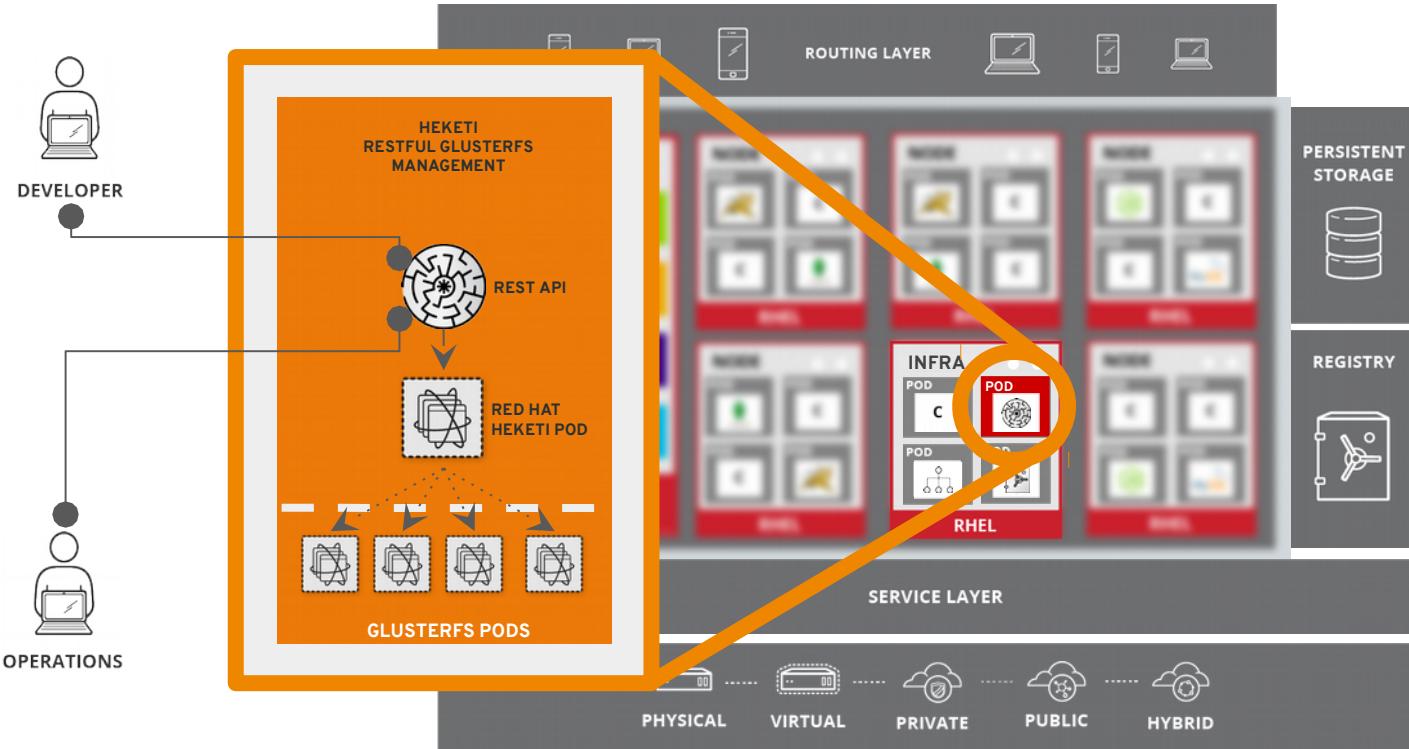
CONTAINER-NATIVE STORAGE ON OPENSHIFT



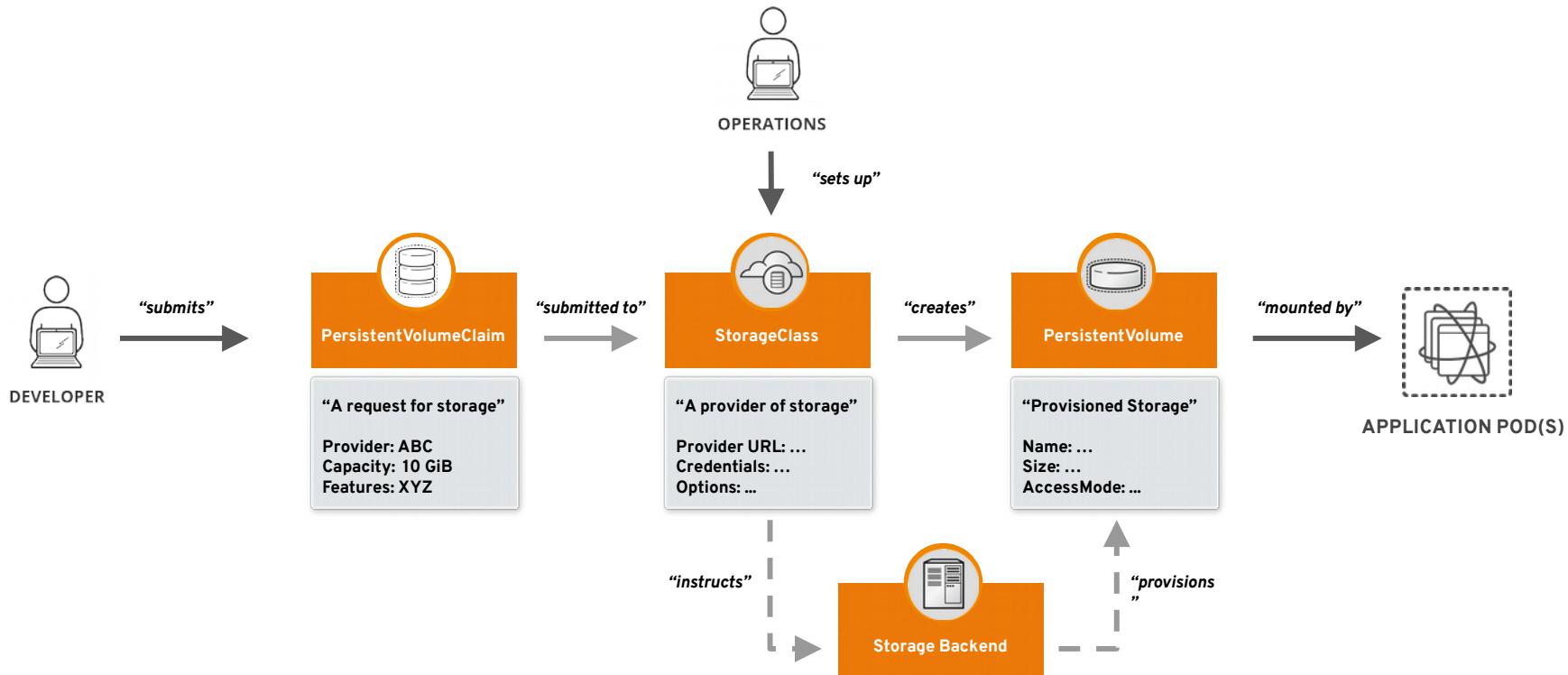
CONTAINER-NATIVE STORAGE ON OPENSHIFT



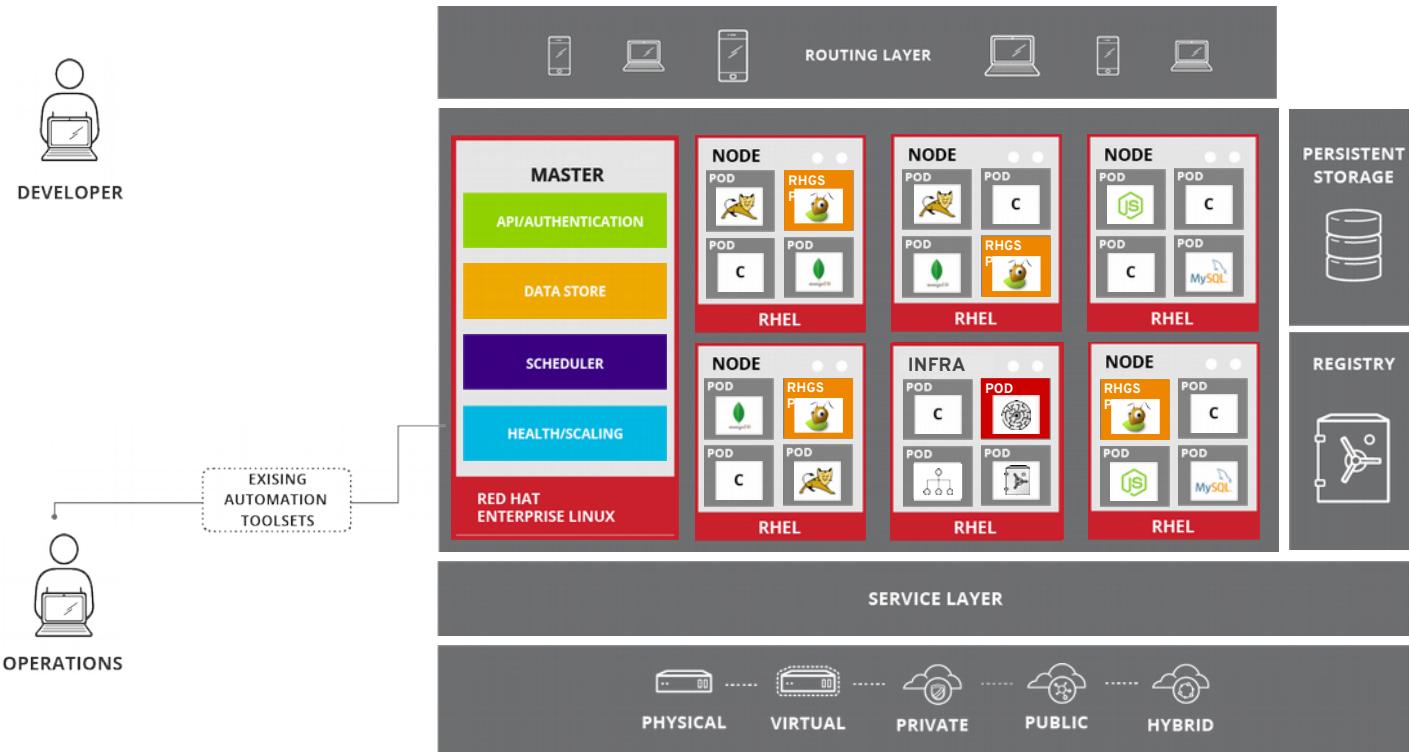
CONTAINER-NATIVE STORAGE ON OPENSHIFT



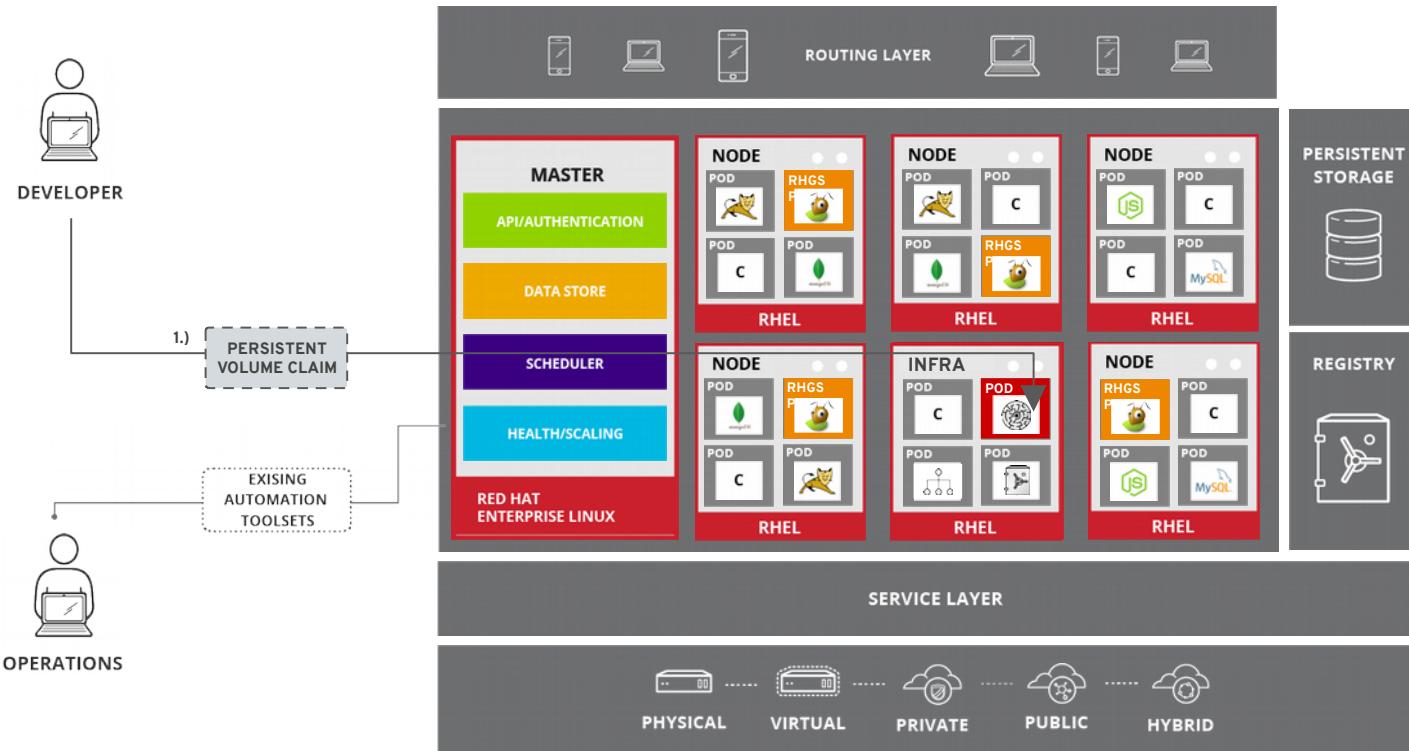
OPENSHIFT PERSISTENT STORAGE SYSTEM



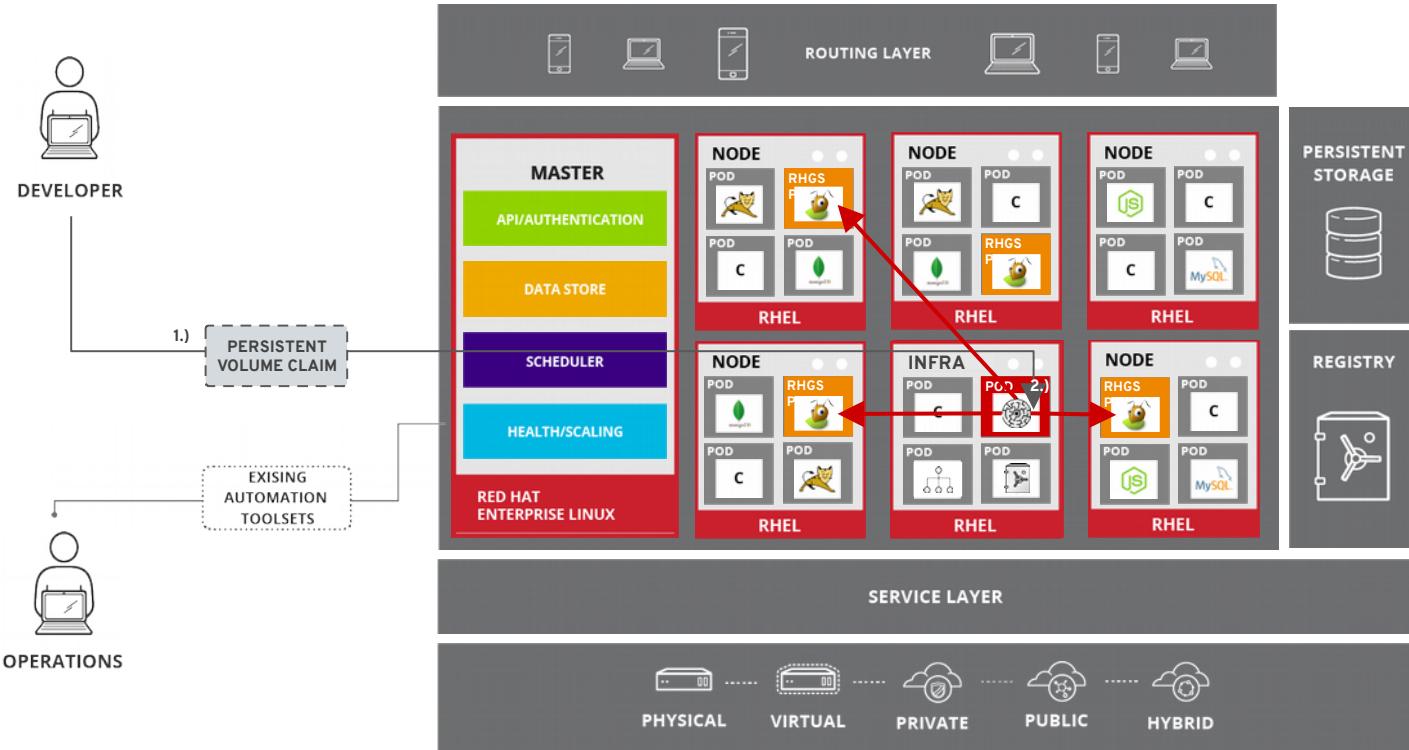
CONTAINER-NATIVE STORAGE ON OPENSHIFT



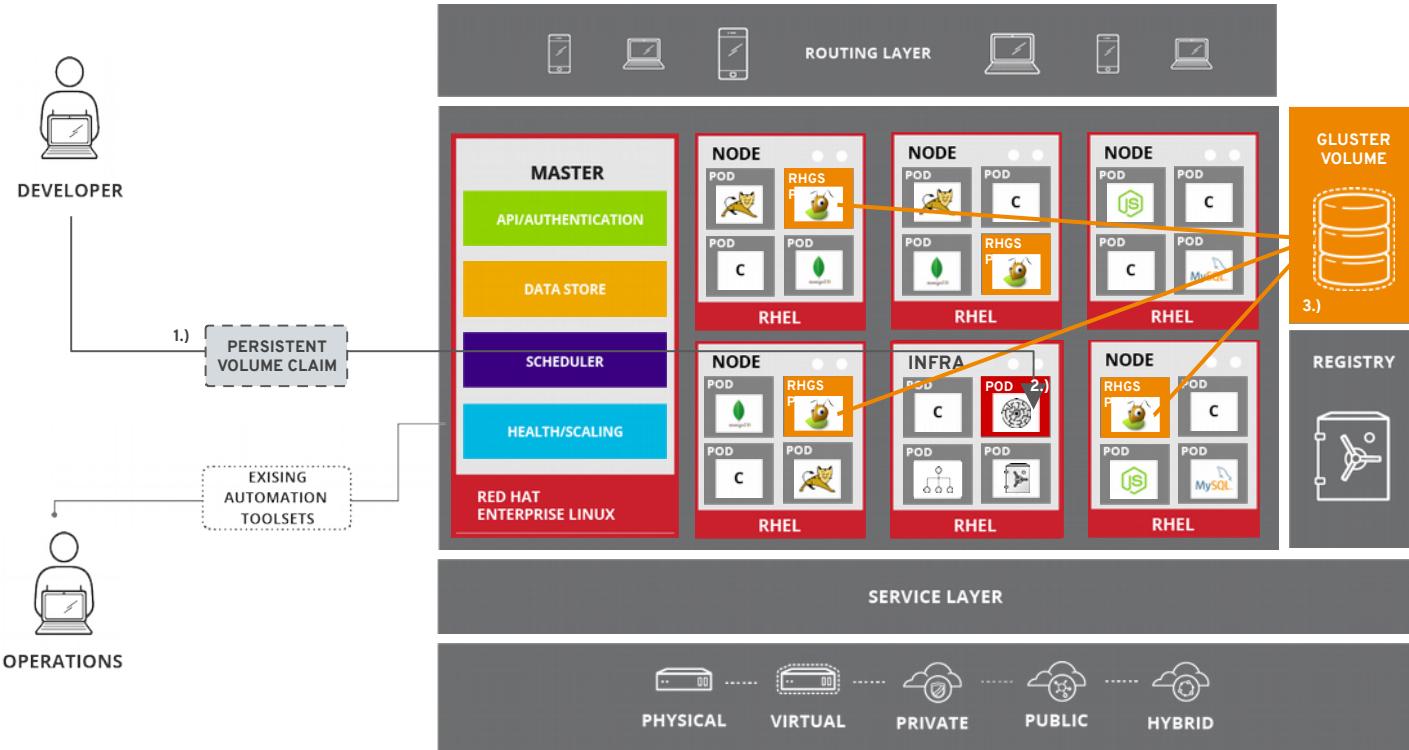
CONTAINER-NATIVE STORAGE ON OPENSHIFT



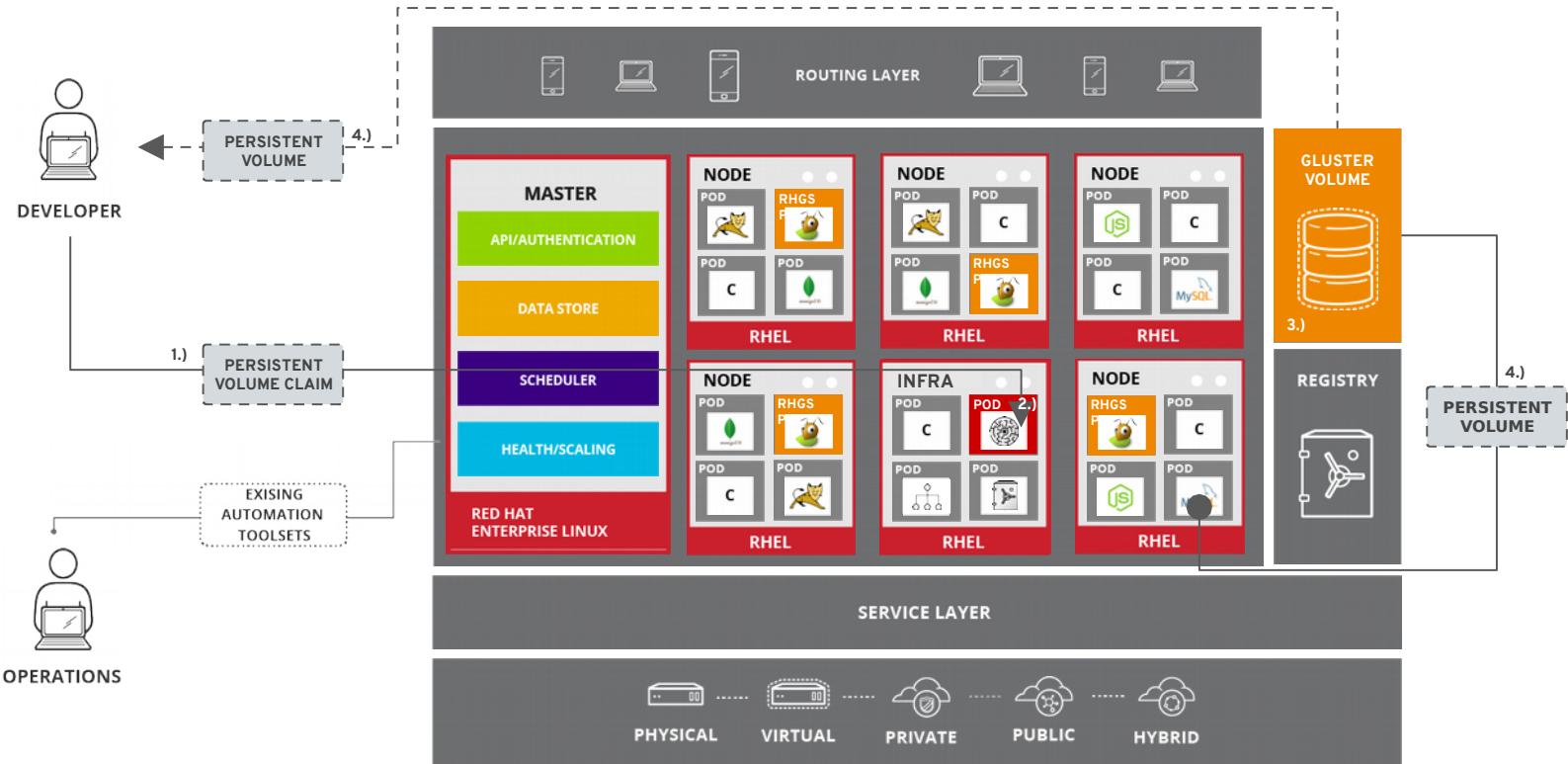
CONTAINER-NATIVE STORAGE ON OPENSHIFT



CONTAINER-NATIVE STORAGE ON OPENSHIFT



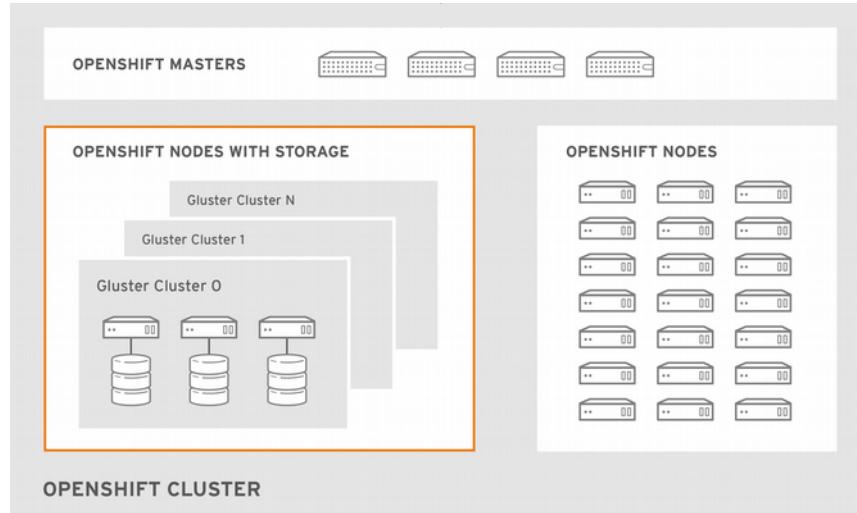
CONTAINER-NATIVE STORAGE ON OPENSHIFT





CONTAINER NATIVE STORAGE IN THE CLOUD

AGNOSTIC TO THE INFRASTRUCTURE



**RED HAT[®]
ENTERPRISE LINUX[®]**

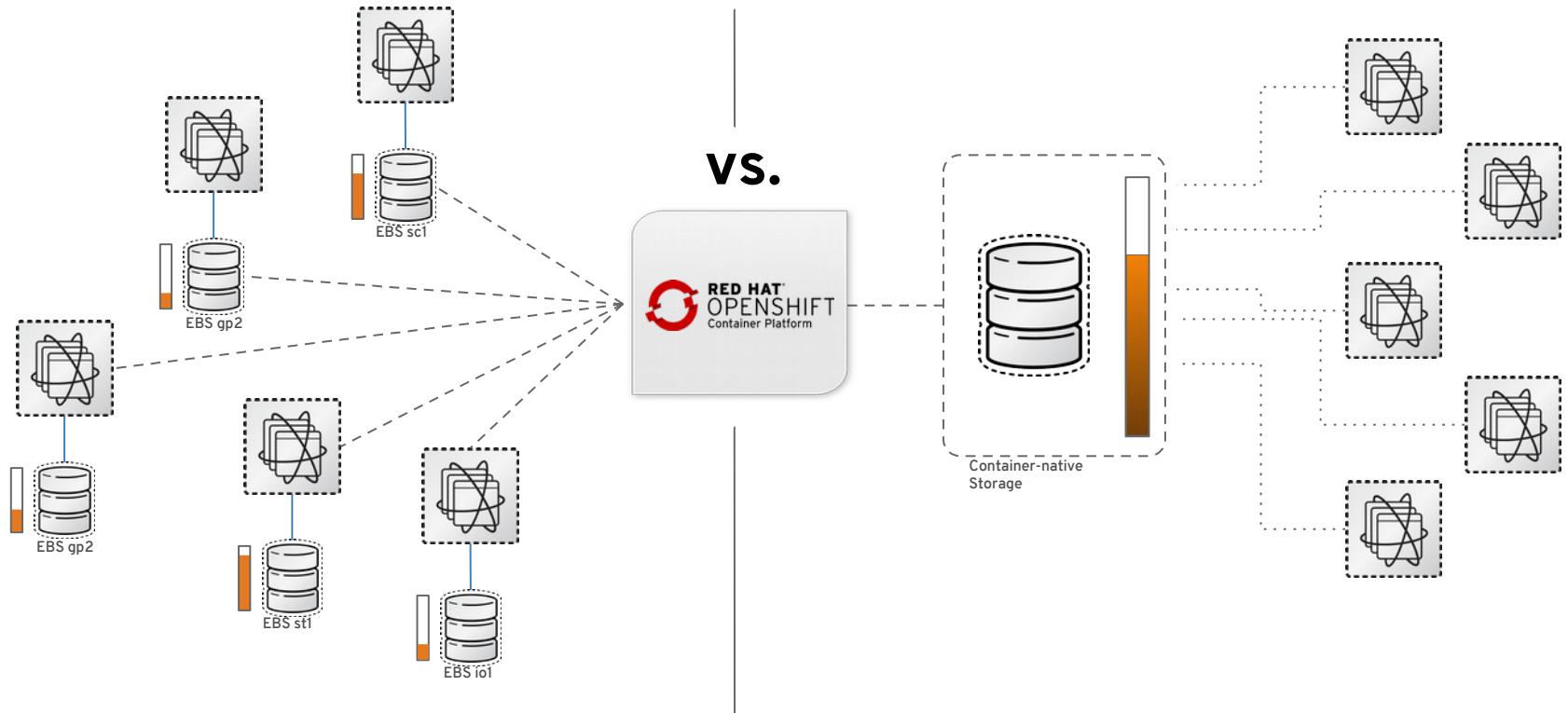
**RED HAT[®]
VIRTUALIZATION**



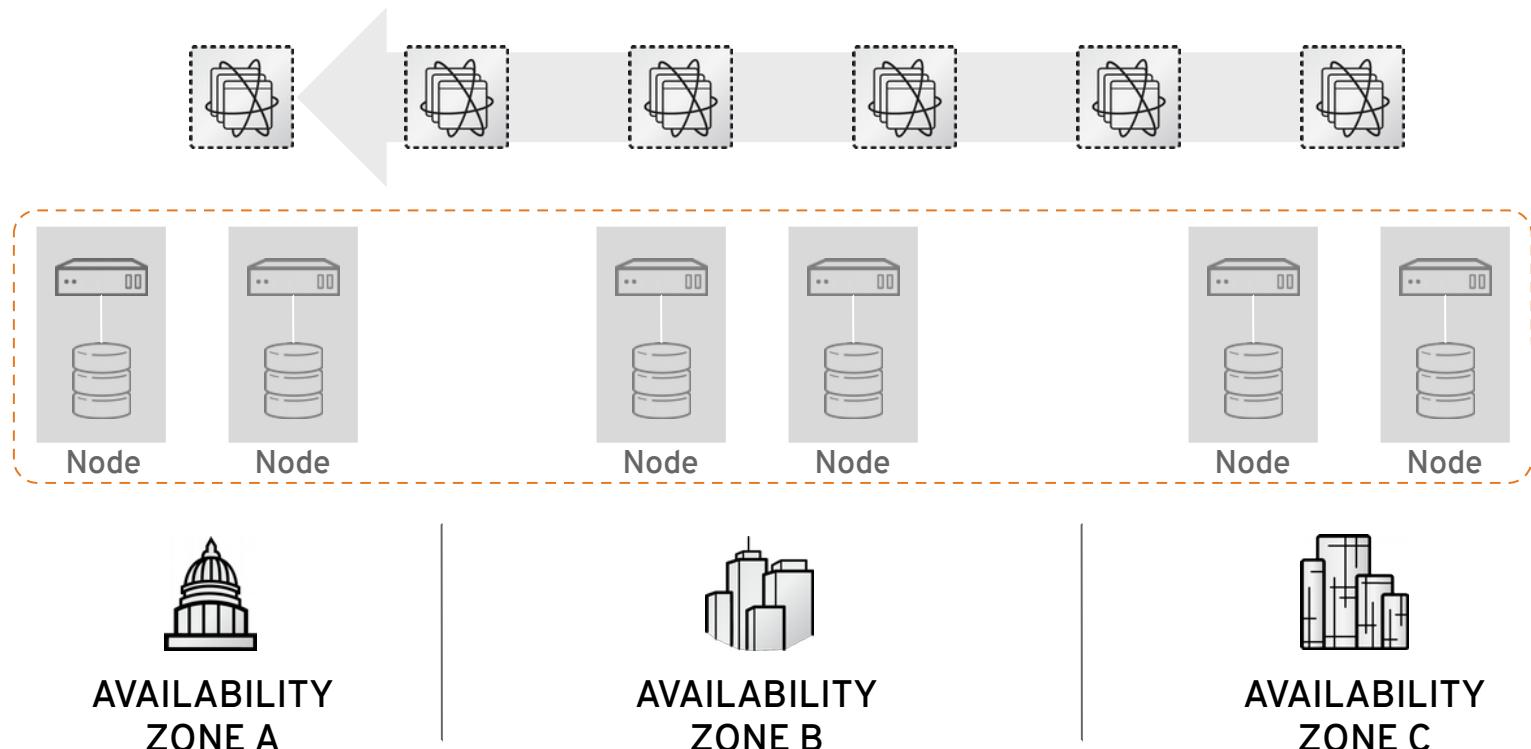
**RED HAT[®]
OPENSTACK[®]
PLATFORM**



STORAGE CONSOLIDATION



SIMPLIFY CONTAINER AVAILABILITY



DRIVING THE FUTURE OF STORAGE

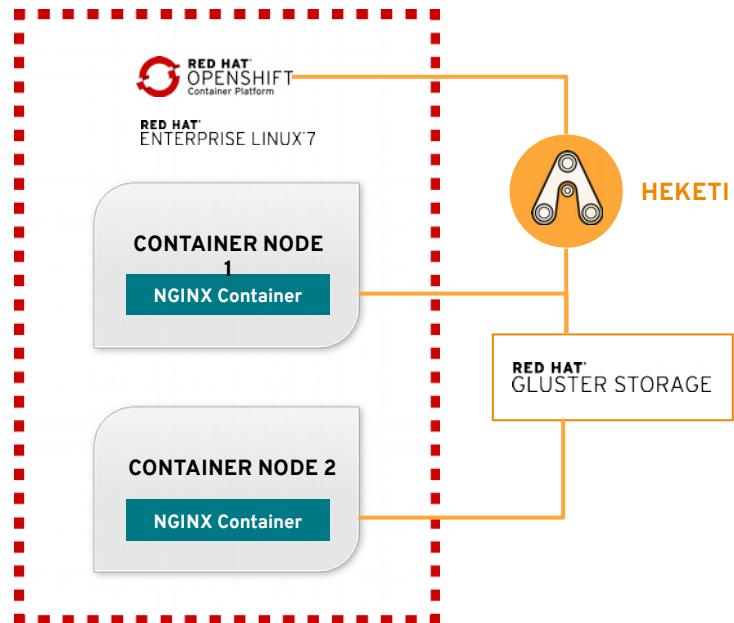
CONTAINER READY STORAGE

RED HAT[®]
GLUSTER STORAGE

Nov 2015

- Dedicated storage cluster for containerized and PaaS environments
- Supported for OpenShift Enterprise

CONTAINER READY STORAGE



DRIVING THE FUTURE OF STORAGE

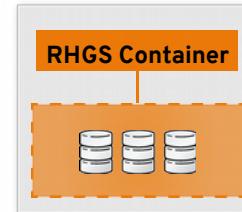
CONTAINER READY STORAGE

RED HAT[®] GLUSTER STORAGE

Nov 2015

- Dedicated storage cluster for containerized and PaaS environments
- Supported for OpenShift Enterprise

CONTAINER-NATIVE STORAGE

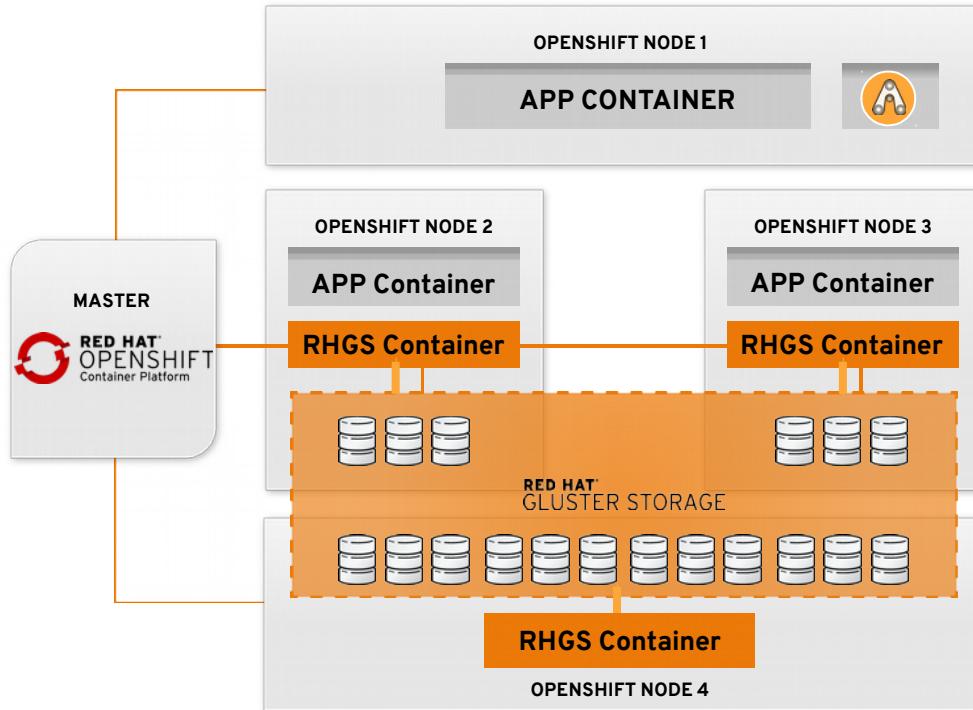


Summer 2016

- Containerized Red Hat Gluster Storage inside OpenShift Container Platform hyper converged with application containers
- Red Hat Gluster Storage cluster comprised of disks from multiple container cluster nodes

CONVERGENCE OF STORAGE AND COMPUTE

CONTAINER-NATIVE STORAGE



Co-Locate Storage and Apps

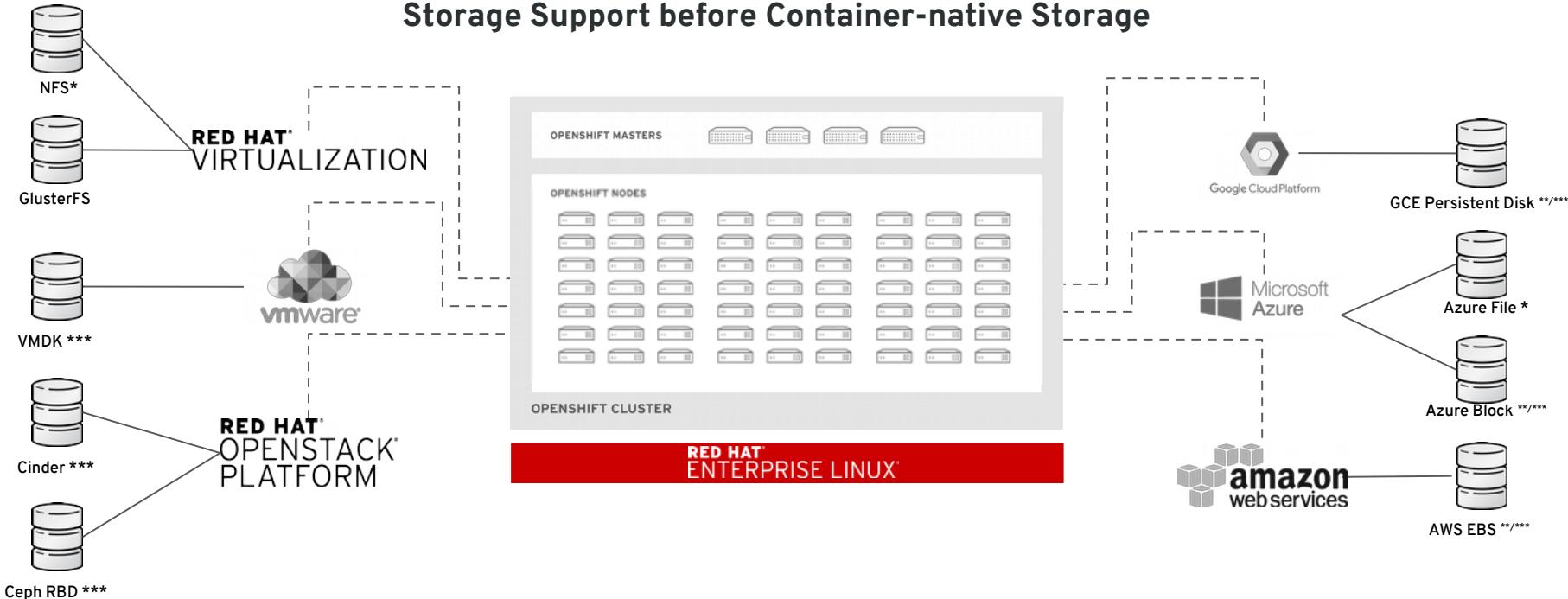
Dynamic Provisioning

Managed by OpenShift

Infrastructure-Agnostic

SUMMARY

Storage Support before Container-native Storage



* No dynamic provisioning

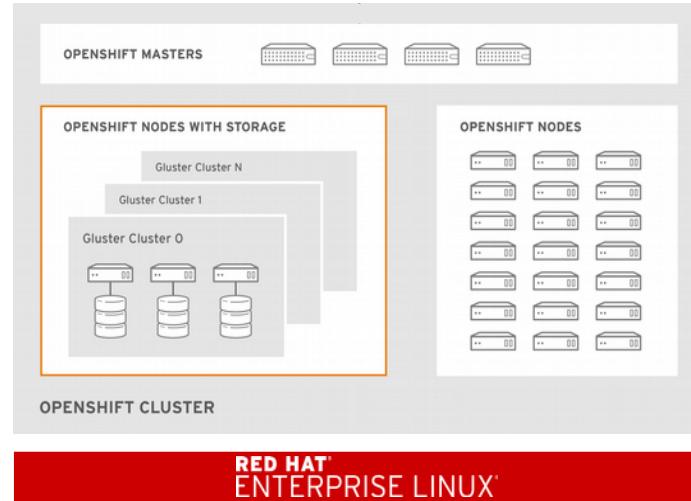
** No Cross-Availability Zone Support

*** No Shared-Storage

SUMMARY

With Container-native Storage

- **Scalable**
(1000+ volumes)
- **Highly-Available**
(across availability zones)



Persistent, resilient and elastic storage...

- **Automated**
(Dynamic Provisioning)
- **Integrated**
(installs with / runs on OpenShift)

... that travels with the platform.



CONTAINER NATIVE STORAGE IN THE DATACENTER

TWO FLAVORS OF CONTAINER STORAGE

Lead with Container-Native Storage

STORAGE FOR OPENSHIFT

CONTAINER-READY STORAGE



- Leverage existing investment in traditional storage, managed by storage admin
- Attach to stand alone storage

STORAGE IN OPENSHIFT

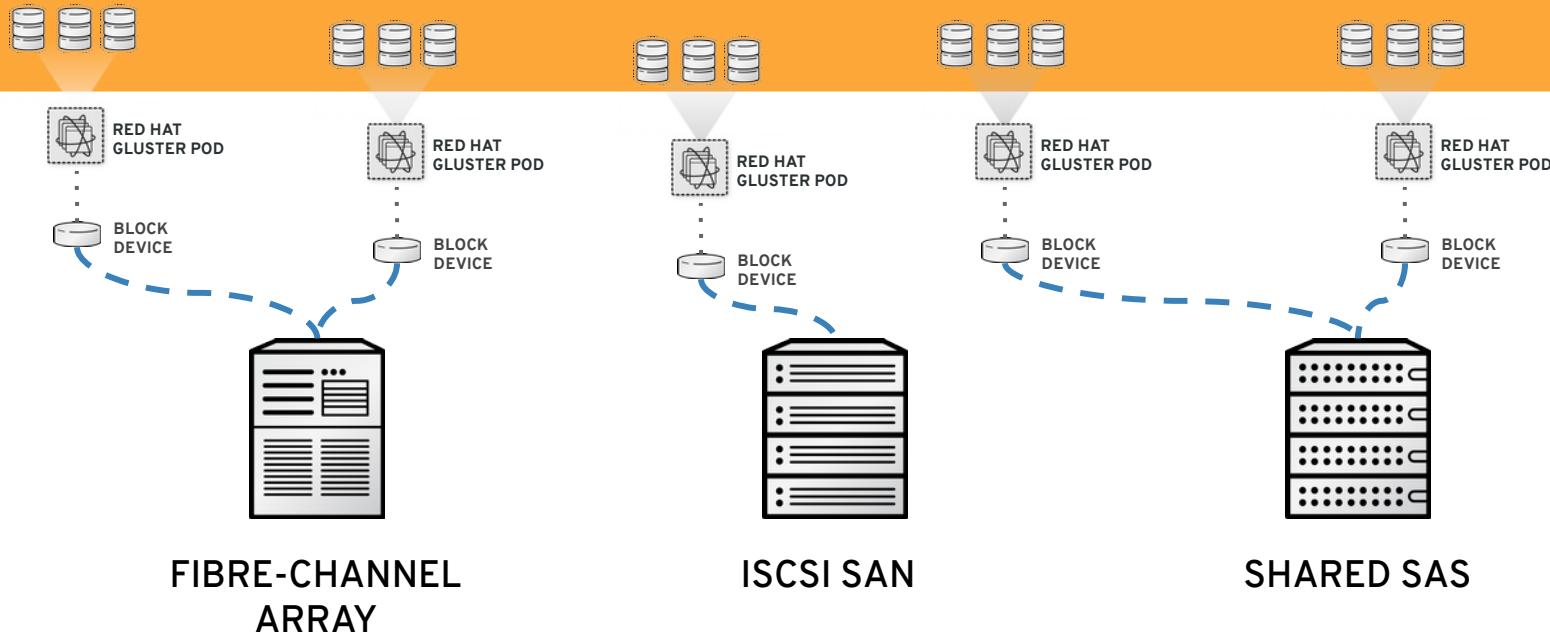
CONTAINER-NATIVE STORAGE



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

MAKE LEGACY STORAGE...CONTAINER-READY!

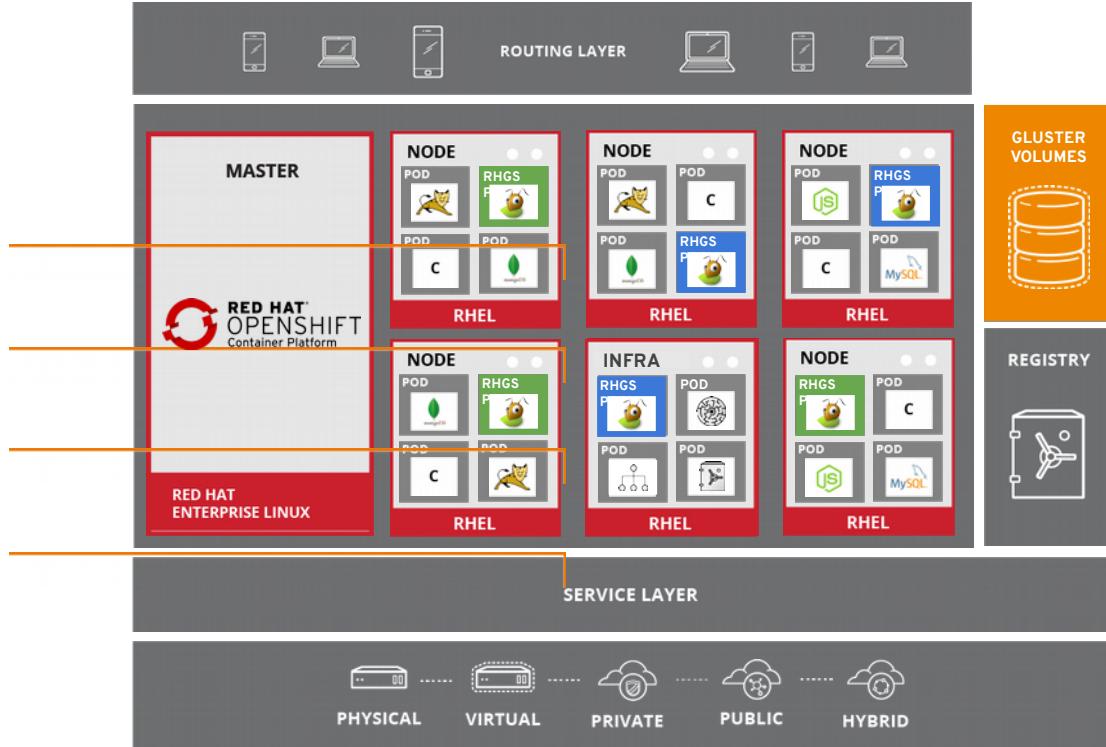
PERSISTENT VOLUMES PROVIDED BY CONTAINER-NATIVE STORAGE



Container-native vs. Container-ready

	Container-native Storage	Container-ready Storage
Deployment Flavor	GlusterFS running in Pods	GlusterFS running on RHEL
Dynamic Provisioning	yes	yes
RWO Support	yes	yes
RWX Support	yes	yes
Registry Support	yes	yes
Snapshots	yes *	yes
Geo-Replication	yes *	yes
Heketi High-Availability	Managed by OpenShift	Managed by OpenShift or Customer
Nagios Monitoring	no	yes
Updates	via Red Hat Registry	via Red Hat CDN or Satellite
Separate Replication Traffic	no	yes

MULTI-CLUSTER SUPPORT



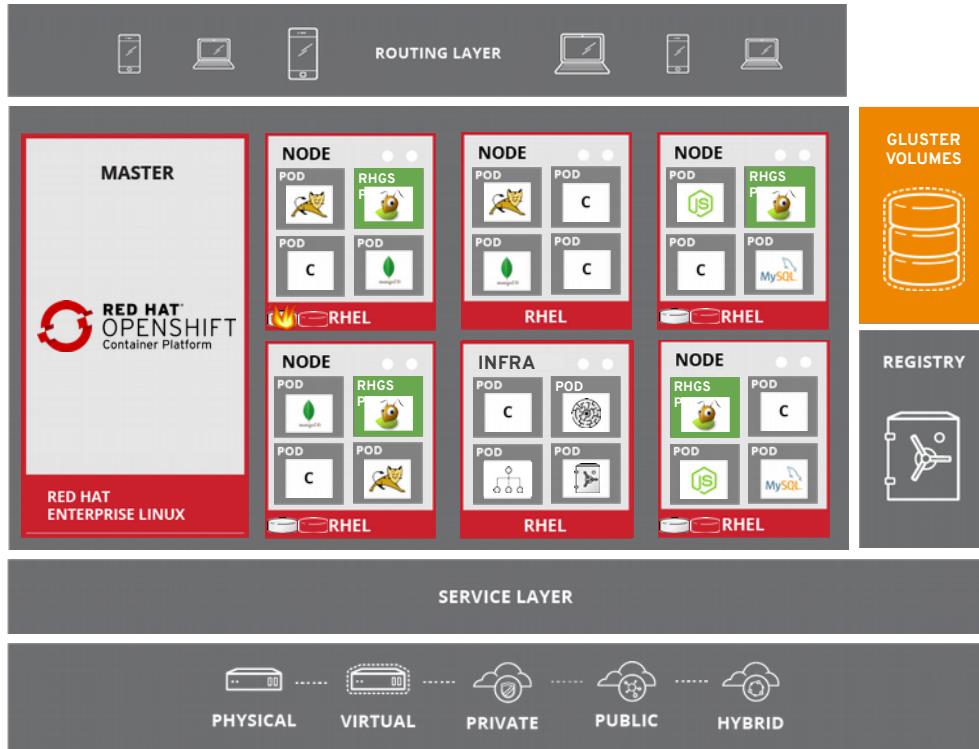
Multi-Tenancy

Multiple Storage Tiers

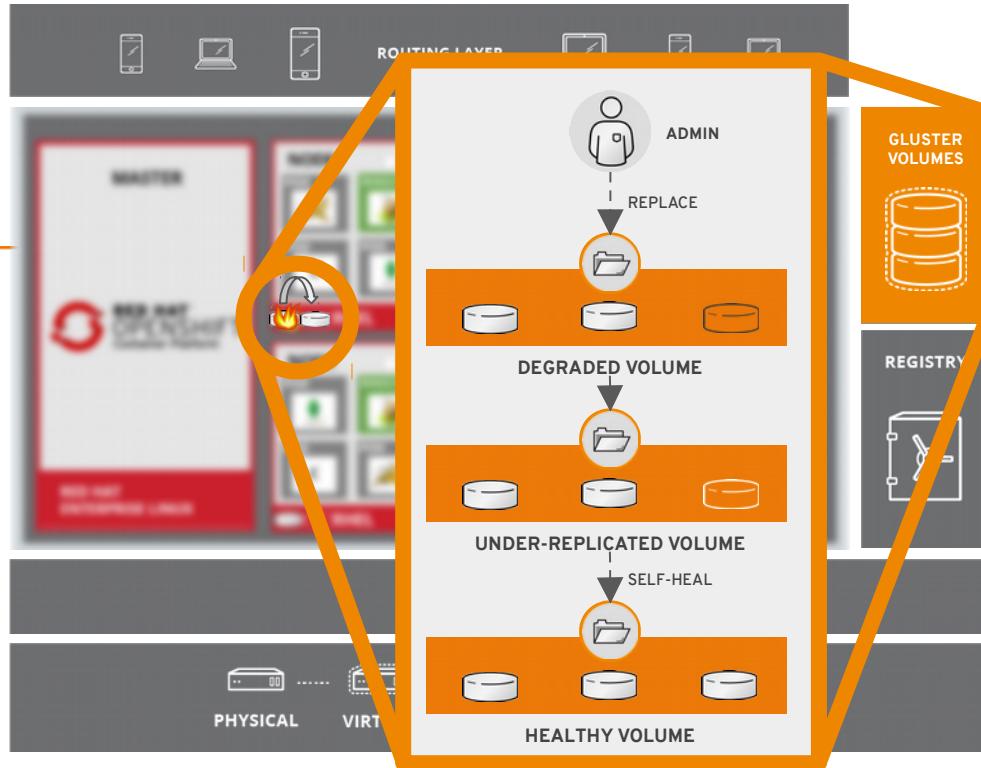
Separate Failure Domains

Single Point of Management

DEVICE FAILURE RECOVERY



DEVICE FAILURE RECOVERY

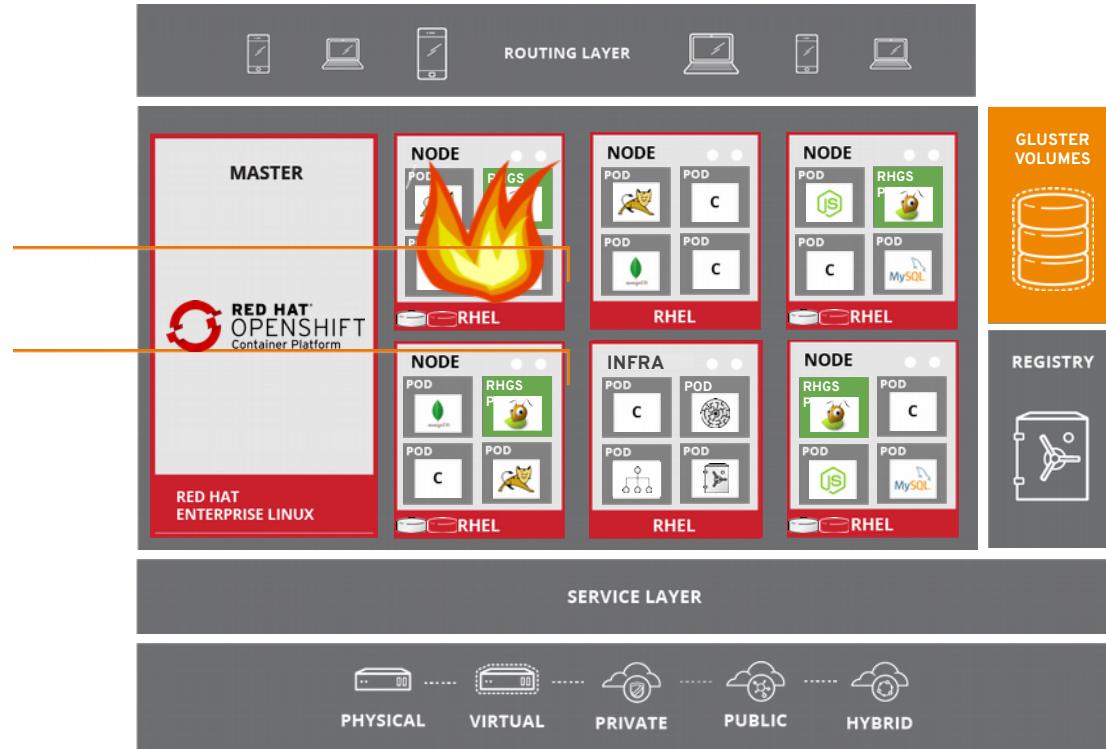


Recover lost backing storage

NODE FAILURE RECOVERY

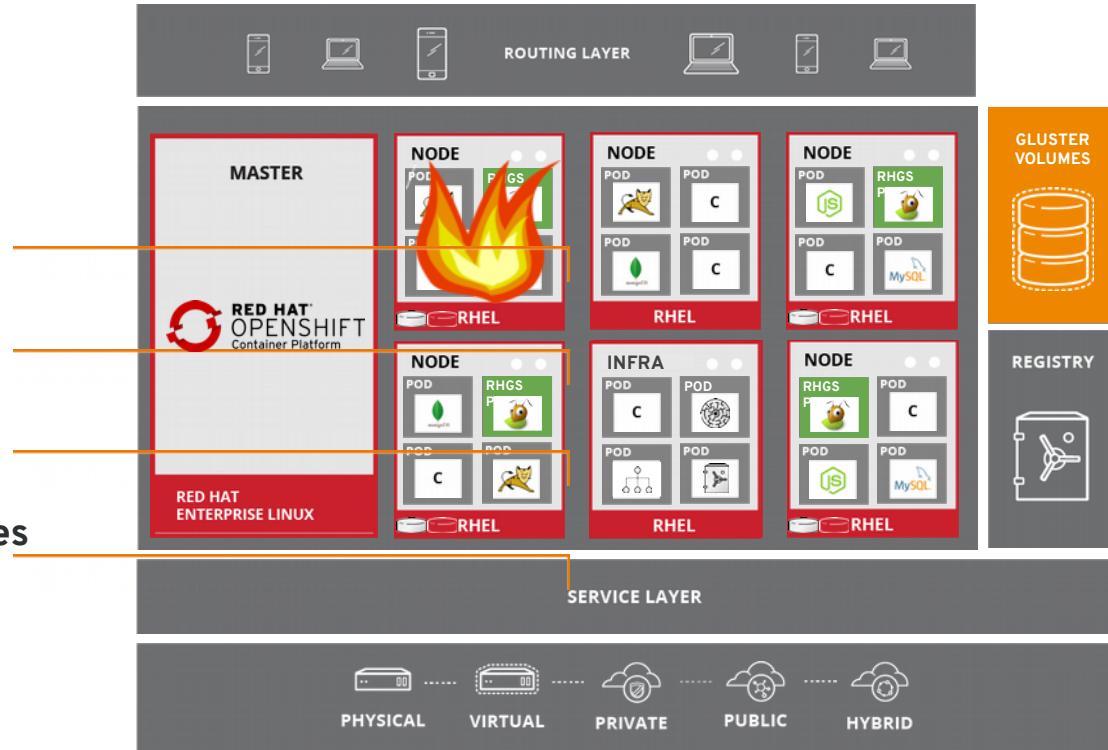
Recover lost backing storage

Recover lost nodes



DEVICE FAILURE RECOVERY

Recover lost backing storage

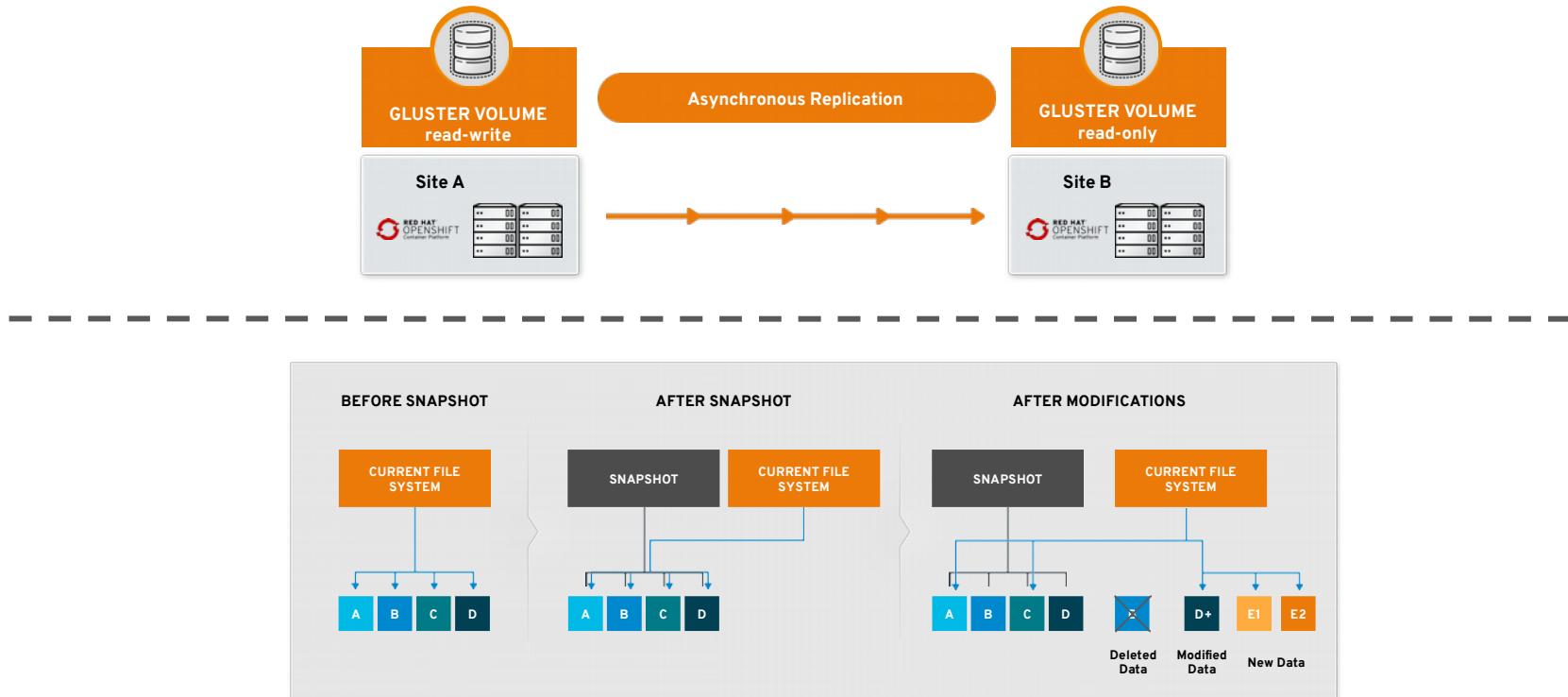


Recover lost nodes

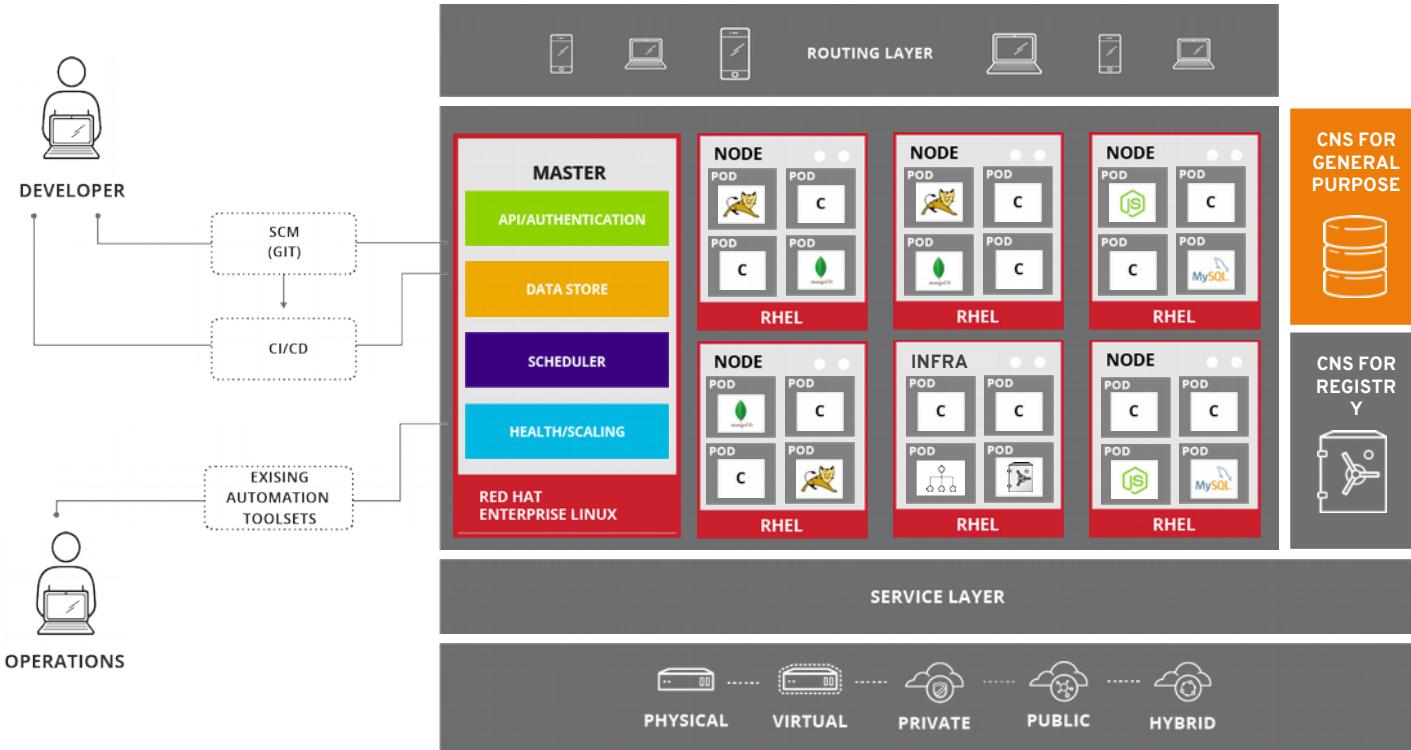
Topology-aware Recovery

Tolerance to temporary failures

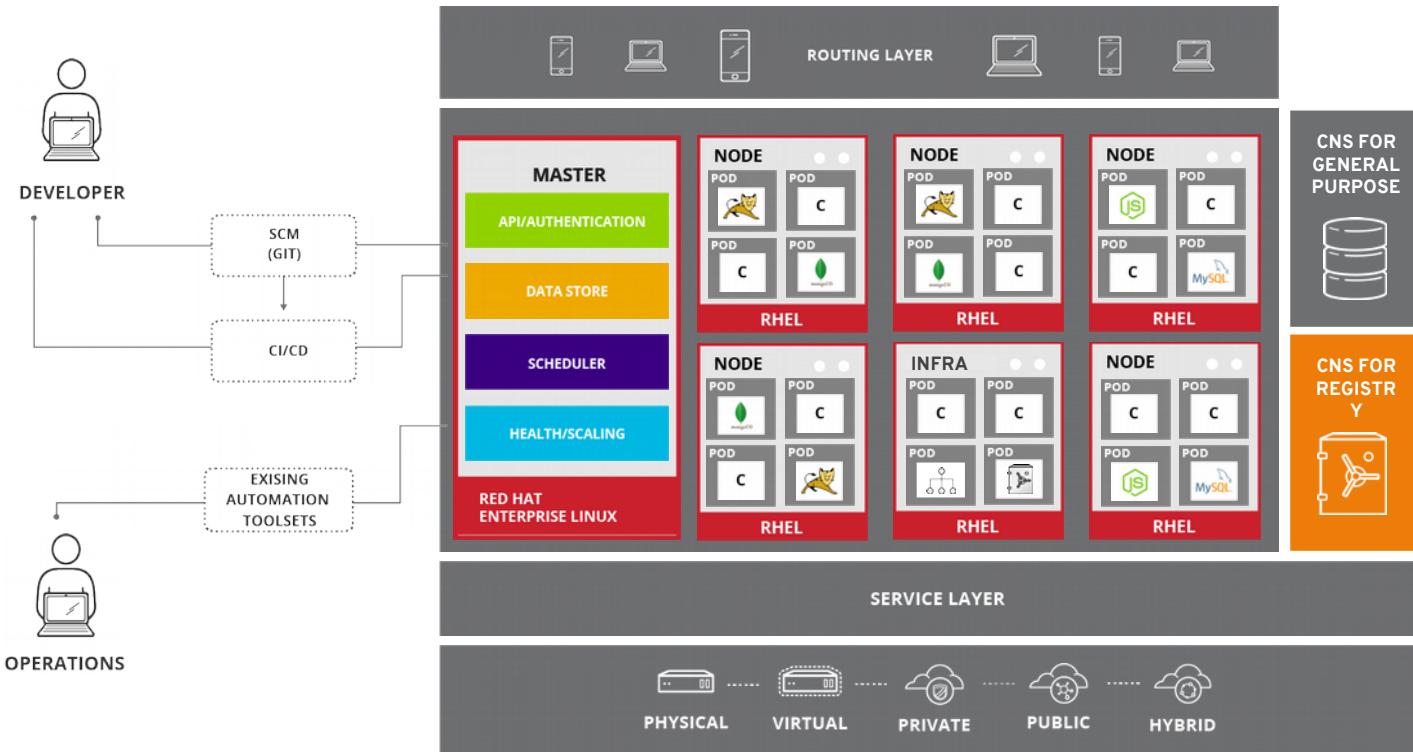
SNAPSHOTS AND GEO-REPLICATION



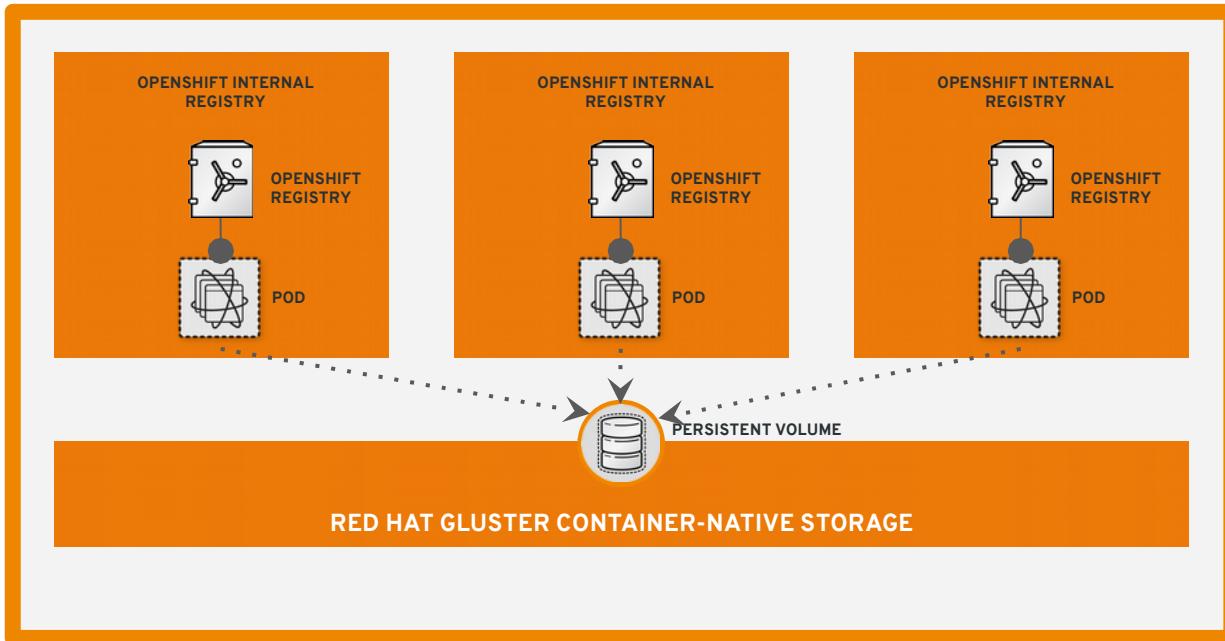
RESULT: CONTAINER-NATIVE STORAGE ON OPENSHIFT



RESULT: CONTAINER-NATIVE STORAGE ON OPENSHIFT



OPENShift REGISTRY WITH CNS



Scalable



Highly-Available



Automated



Integrated



WHAT'S NEW IN CNS3.6?

INTRODUCING CONTAINER-NATIVE STORAGE 3.6

**Multi-purpose storage
for containers**

- Support for file, block & object storage
- Heketi deployment in HA on OCP for CRS
- Heketi support for expansion & choice of volume option

**Full support for All Red
Hat OpenShift
infrastructure elements**

- Ideal for OpenShift Registry, Logging & Metrics
- Provision of OCP Registry ‘Out of the Box’
- 3-Way replicated, highly available infrastructure

**Greater storage
resource utilization**

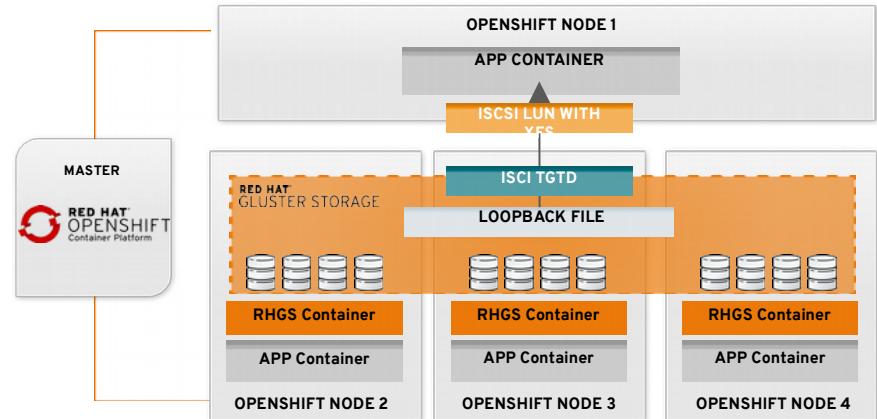
- Increased Persistent Volume (PV) density (Brick Mux)
- 3x improvement enabling greater number of microservices
- 1000+ PVs on 3 node (300 Block backed PV)

CNS 3.6 FEATURES

Description: CNS 3.6 with OCP 3.6 will support block, higher volume density & S3 object store

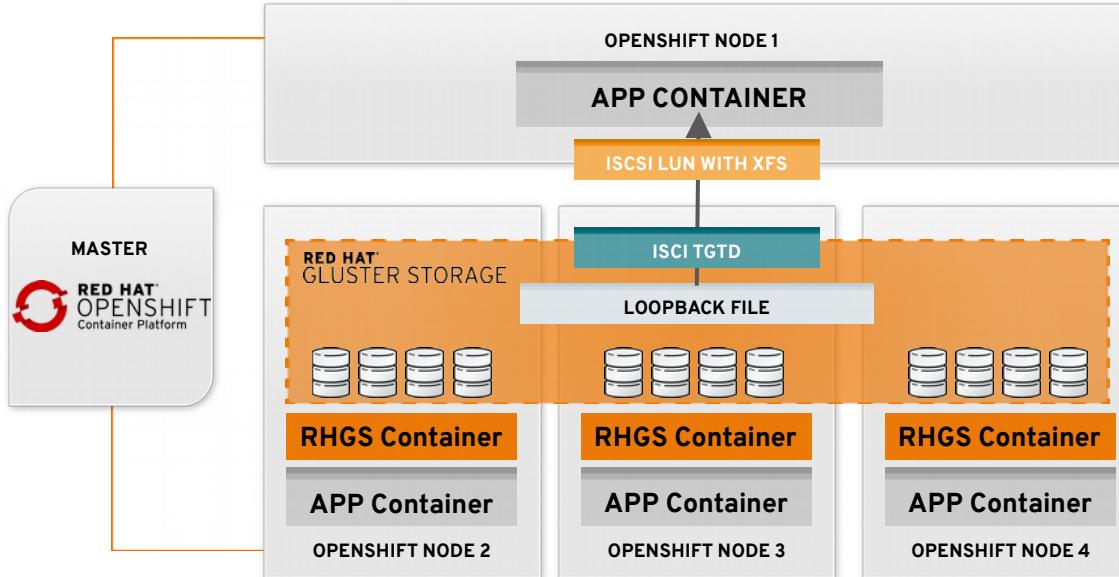
How it Works:

- RWO volumes backed by Gluster-iSCSI block storage provide better performance for MySQL, PostgreSQL, etc. and targeting support for Elastic Search (OCP Logging)
- 3x volume density per cluster (1000+) with lower memory footprint of RHGS (Brick-mux)
- S3 object service for OCP (based on swift-on-file, *Tech Preview*)
- Full Support for CNS providing RWO storage to OCP Logging and Metrics

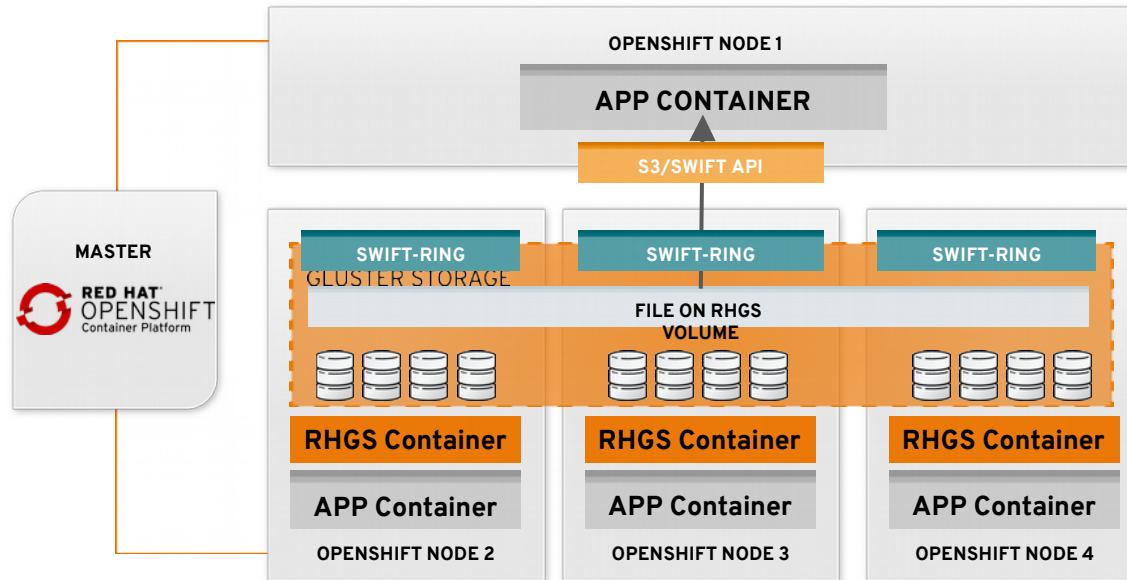


CONTAINER-NATIVE STORAGE BLOCK STORAGE

ENABLES LOGGING/METRICS ON CNS

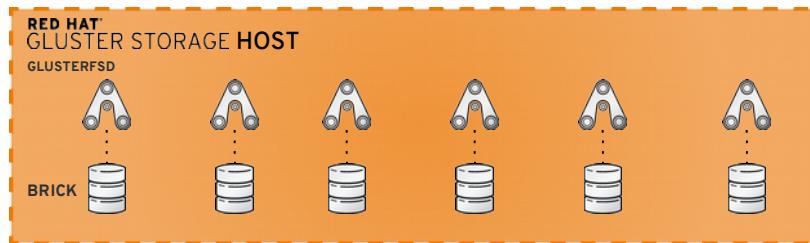


CONTAINER-NATIVE STORAGE S3



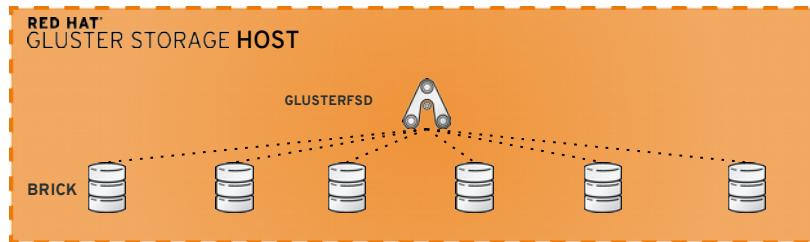
BRICK-MULTIPLEXING

BEFORE



300 MB RAM
/Brick

AFTER



20-30 MB
RAM /Brick

STORAGE FOR OPENSHIFT RESOURCES



The screenshot shows the Red Hat Storage Central MOJO site. At the top, there's a navigation bar with links for RED HAT MOJO, My Stuff, Spaces, Browse, Apps, Help, and Rover. Below the navigation is a header with the Red Hat Storage logo and the text "All Places > Red Hat Storage Central". The main content area has a dark banner with "STORAGECENTRAL" in large white letters. Underneath, there are two columns: "BUSINESS RULES" on the left and "STORAGE CENTRAL PRODUCT RESOURCES" on the right. The "BUSINESS RULES" section contains a paragraph about regional availability, SKUs, and ordering, along with a link to "Business Rules (internal)". The "STORAGE CENTRAL PRODUCT RESOURCES" section includes sections for "Announcements" (with links to Red Hat Gluster Storage 3.2 Launch Event, Red Hat Partner Ecosystem (11/15), Red Hat Ceph Storage 1.3 / Red Hat Gluster Storage 3.1 (6/15), and Red Hat Partner Ecosystem (6/15)) and "Sales Tools" (with links to Red Hat Storage Internal Introduction, Red Hat Storage Customer Wins, Red Hat Storage Cheatsheet, Red Hat Storage for Containers Cheatsheet, and Red Hat Storage for Containers FAQs).

Container-Native Storage Sales Kit:

<https://mojo.redhat.com/docs/DOC-1069496>

Storage Central MOJO site (shown):
<https://mojo.redhat.com/groups/red-hat-storage-bu>



redhat.

THANK YOU



plus.google.com/+RedHat



facebook.com/redhatinc



linkedin.com/company/red-hat



twitter.com/RedHatNews



youtube.com/user/RedHatVideos