Red Hat Storage Day
Nordics winter 2018

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WHAT IS RED HAT STORAGE DAY

Storage update every 6 months

Goals is to adjust agenda to

What's hot
What's interesting for our customers
What's happening on the use case side
What's happening on the collaboration side

This is the first event in this series: We hope to meet you again.

If todays agenda sucked - please provide feedback so we can fix this and get you and your friends here again! (You will be contacted afterwards)

Agenda

09:00 - 09:05 Welcome and logistics (AB)
09:05 - 09:30 Red Hat Storage - past, present and future (AB)
09:30 - 10:00 Use case 1: SDS as a Backup target (JR)
10:00 - 10:30 Use case 2: Openstack and Openshift (AB)
10:30 - 10:45 **Break**
10:45 - 11:15 Ceph for Virtualized environments - VMware and RHV (JR+HM)
11:15 - 11:45 How to choose the best HW for your SDS (SuperMicro)
11:45 - 12:15 Ask us anything + Demo of hyperconverged RHV + Gluster (All)
12:15 - 13:00 **Networking and burgers**

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AGENDA

12:30 - 12:55 **Registration**
13:00 - 13:05 Welcome and logistics
13:05 - 13:30 Red Hat Storage - past, present and future
13.30 - 14:00 Use case 1: SDS as a Backup target
14:00 - 14:30 Use case 2: Openstack and Openshift
14:30 - 14:45 **Break**
14:45 - 15:15 Ceph for Virtualized environments - VMware
15:15 - 15:45 How to choose the best HW for your SDS
15:45 - 16:15 Ask us anything + Demo of hyperconverged RHV + Gluster
16:15 - 17:00 **Networking and burgers**

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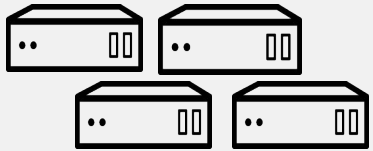
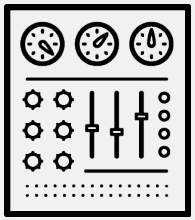
WHAT IS RED HAT STORAGE



Enterprise class iteration of the open source Ceph and Gluster projects

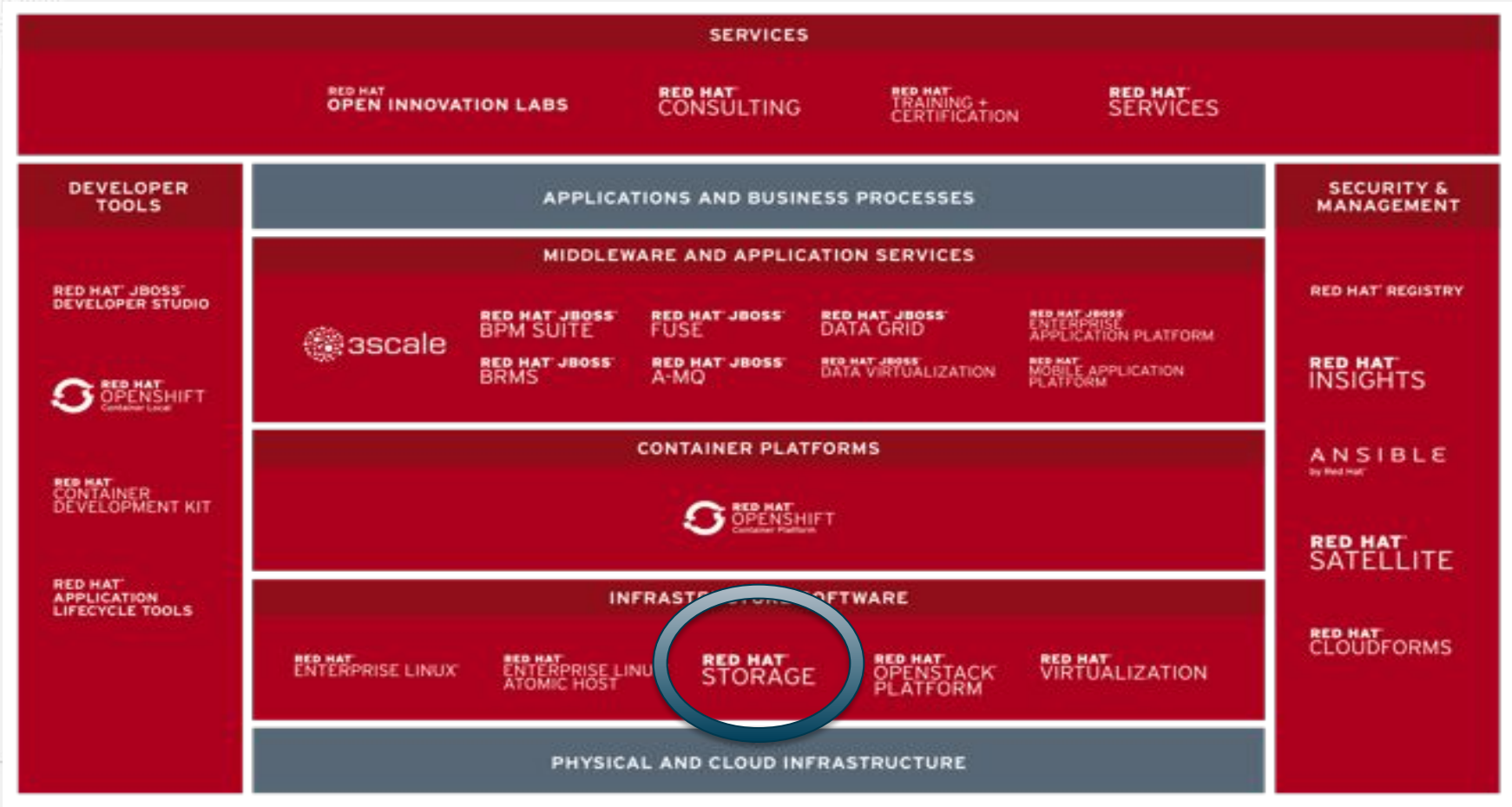
Reduced Infrastructure Cost



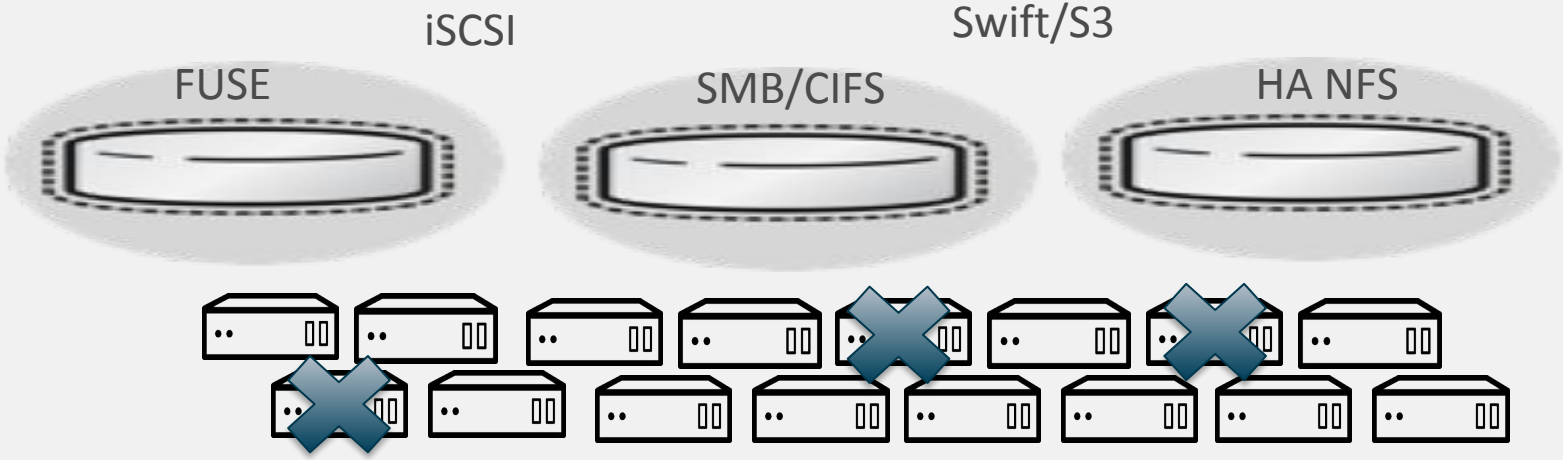
All-inclusive feature set

Extremely resilient, performant and secure

PART OF RED HATS STACK



What is Red Hat Gluster Storage



Scale Out NAS

Multiprotocol access

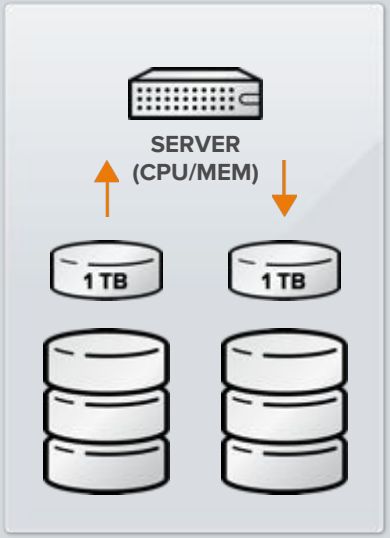
Highly Resilient

Installable everywhere

WHAT IS A GLUSTER SYSTEM?

Can be physical, virtual or cloud

PHYSICAL



VIRTUAL/CONTAINER

CLOUD

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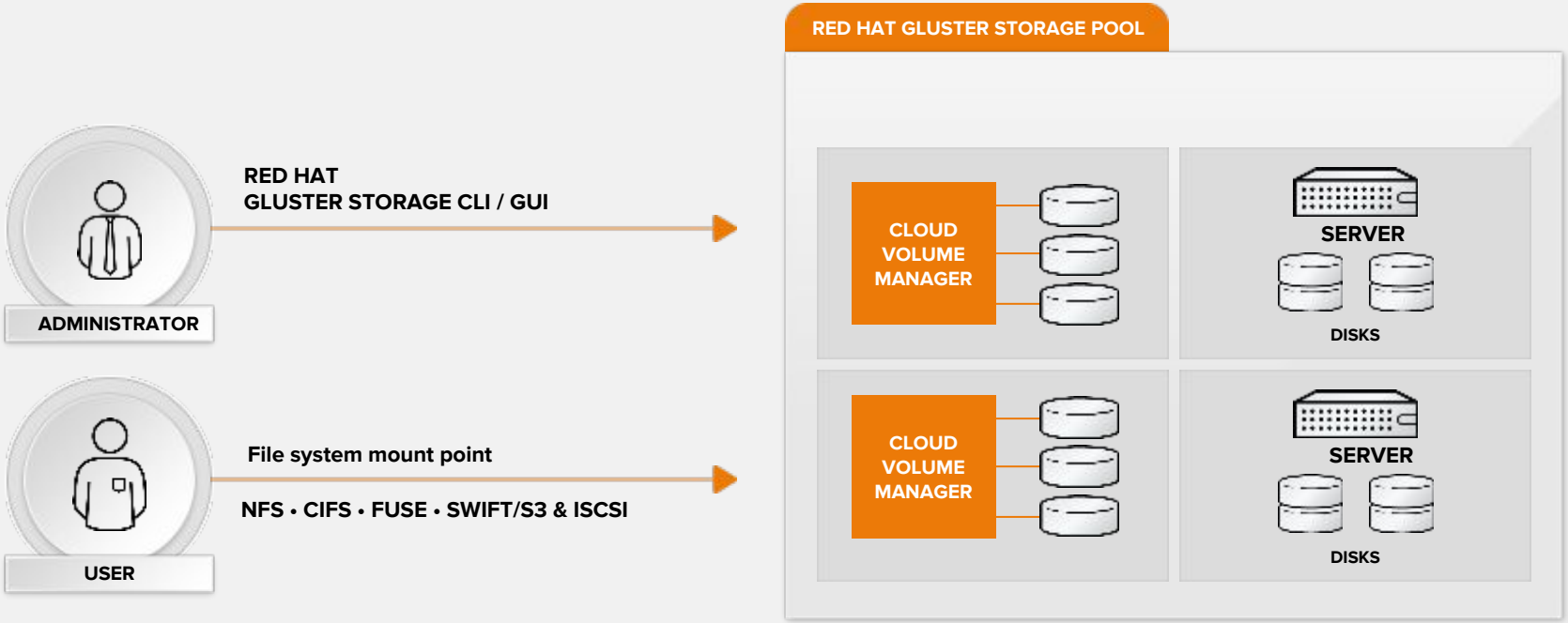
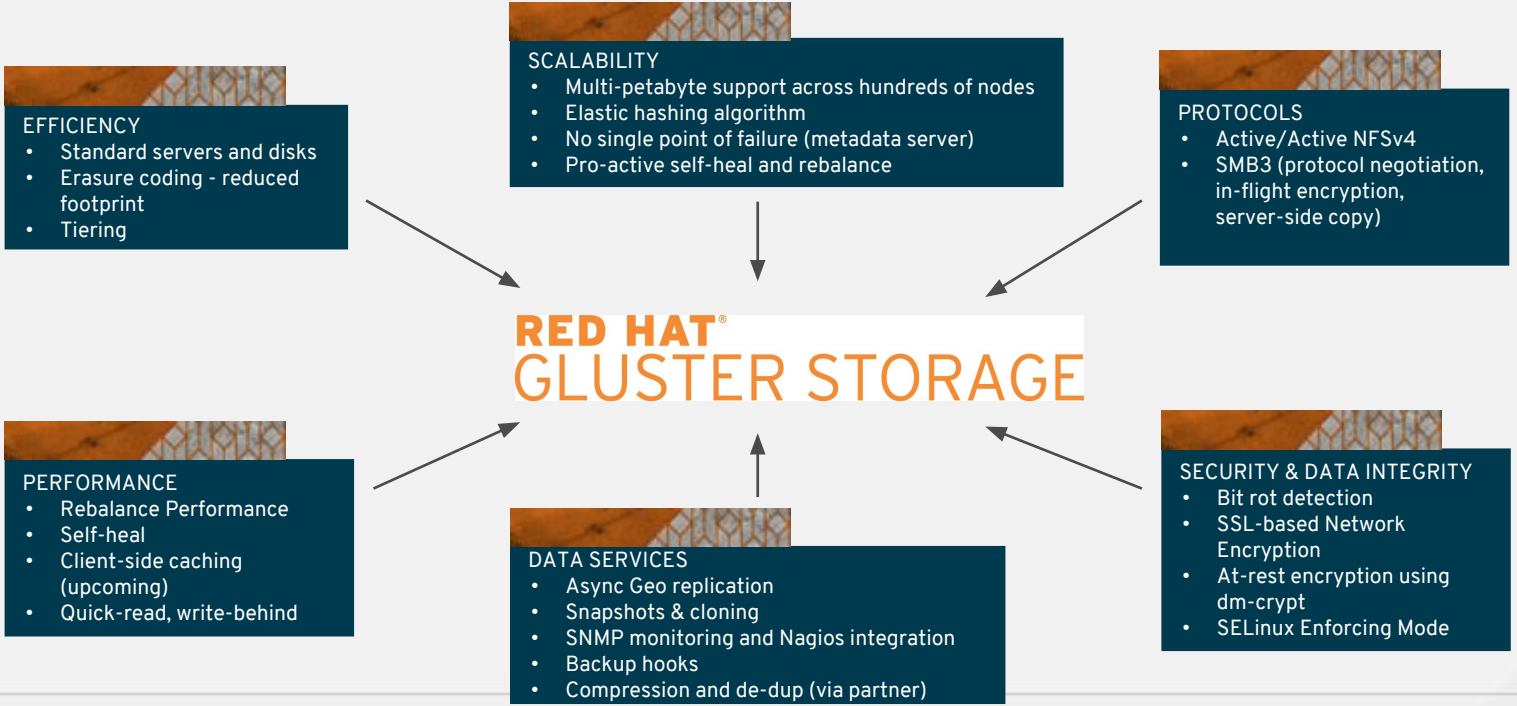
RED HAT GLUSTER STORAGE



KEY FEATURES



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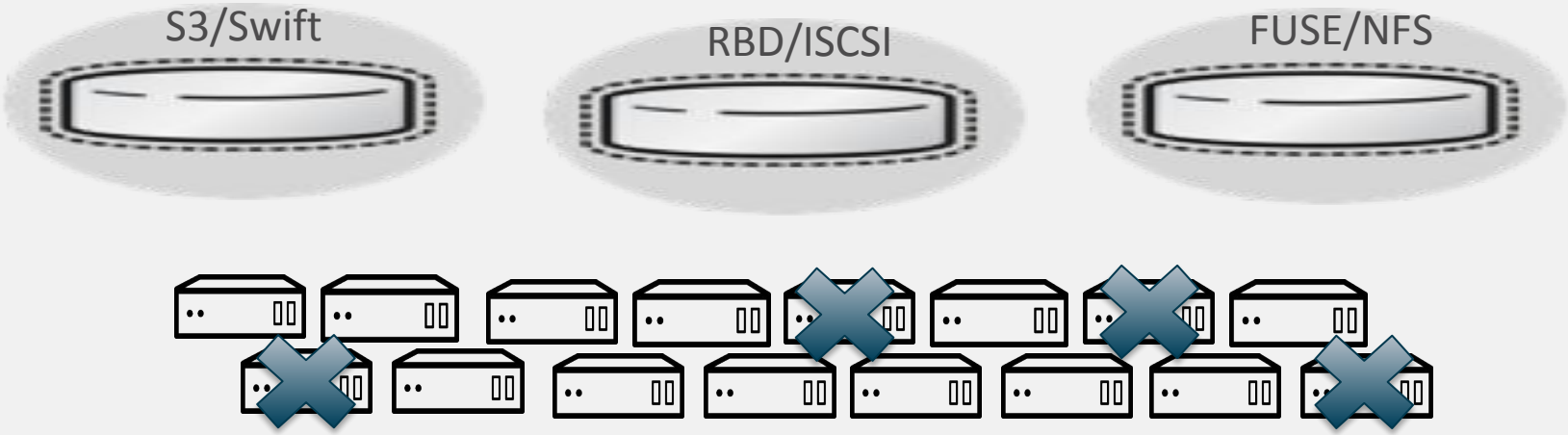
Red Hat Gluster Storage

Goes under many names:

RHGS
CNS
CRS
RHHI

All is based on RHGS but is used in different flavors for different use cases

What is Red Hat Ceph Storage



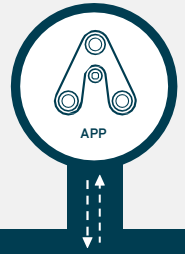
Scale Out Object storage

Multiprotocol access

Highly Resilient

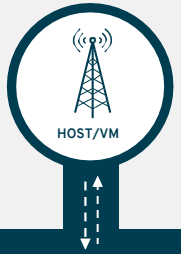
Extremely scalable

RED HAT CEPH STORAGE



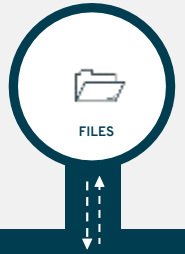
RGW

A web services gateway for object storage, compatible with S3 and Swift



RBD

A reliable, fully distributed block device with cloud platform integration



CEPHFS

A file system with native writes to the block store , I/O optimized by device

LIBRADOS

A library allowing apps to directly access RADOS (C, C++, Java, Python, Ruby

RADOS

A software-based reliable, autonomous, distributed object store comprised of self-healing, self-managing, intelligent storage nodes and lightweight monitors

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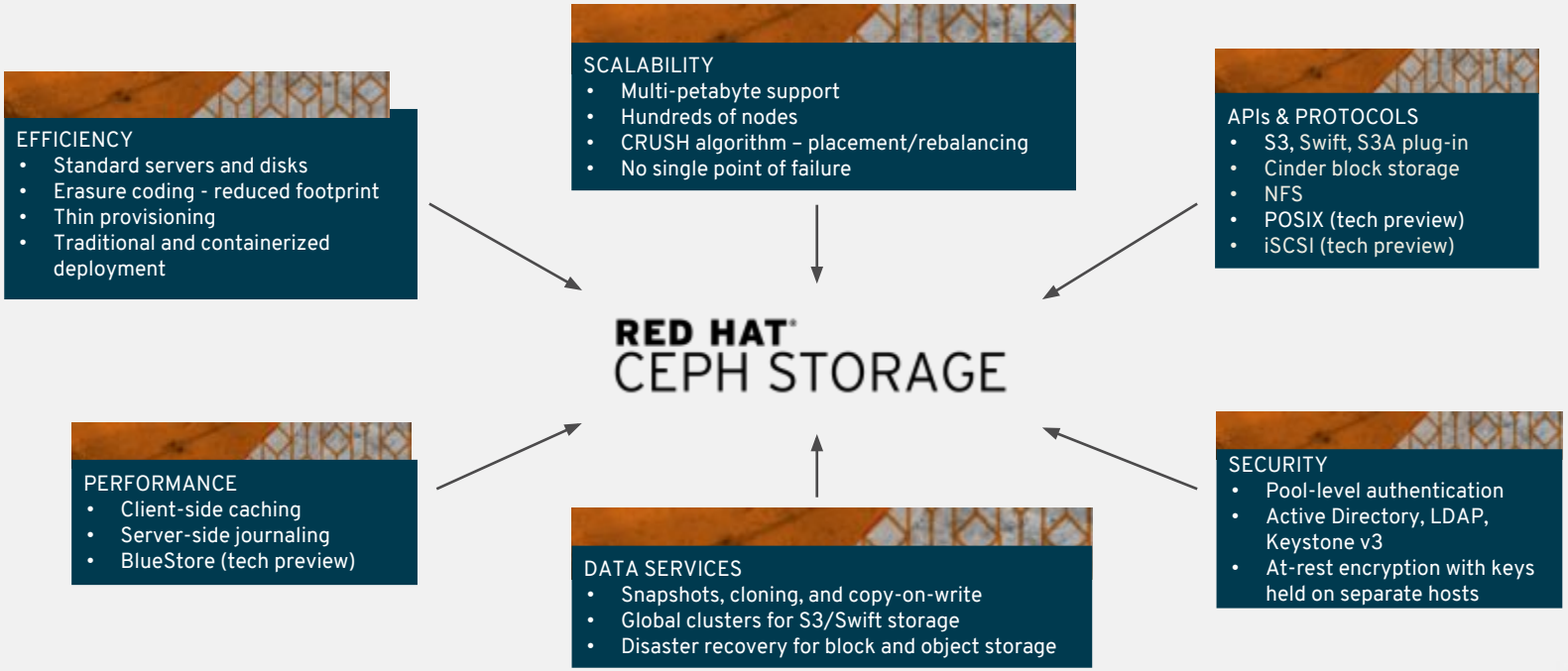
KEY FEATURES



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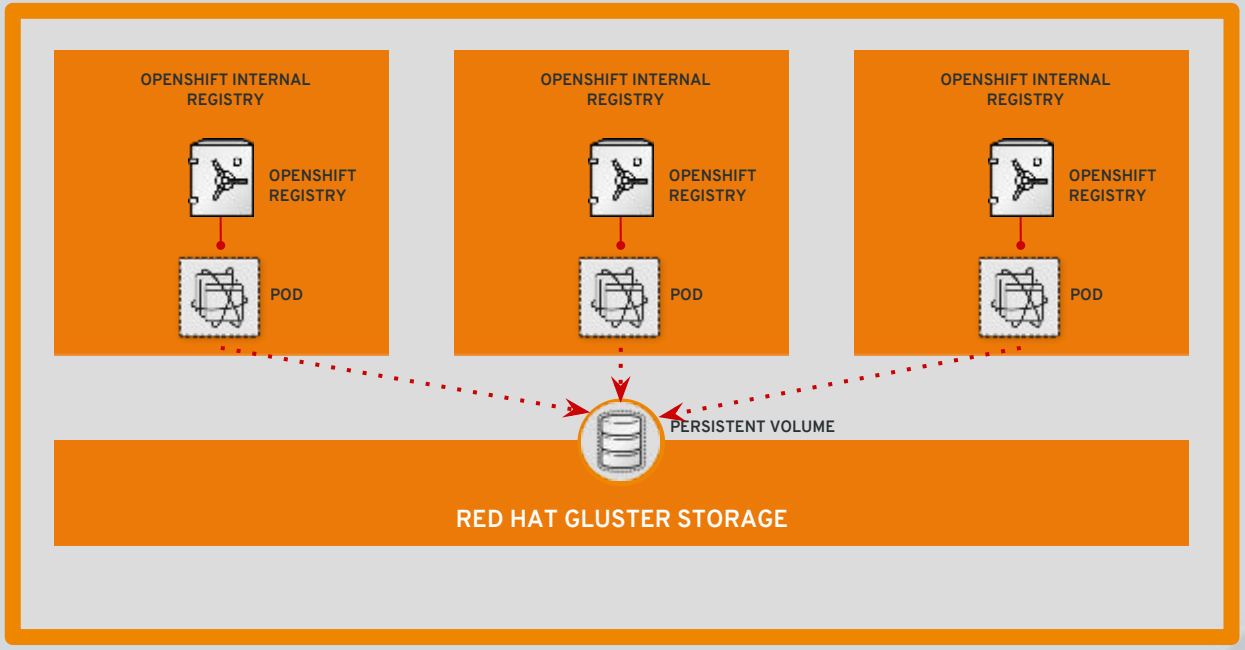
TARGET WORKLOADS – USE CASES

CONTAINER-NATIVE STORAGE	Scalable, flexible persistent storage for, and in, containers
PRIVATE CLOUD INFRASTRUCTURE	Elastic storage for OpenStack virtual machines and tenant applications
ELASTIC DATA LAKES	Massively scalable storage enabled for big data analytics frameworks
HYPERCONVERGENCE	Compute and storage tightly integrated for ROBO, edge, and IoT
MEDIA REPOSITORY	Cost effective, scale out storage for rich media and content delivery

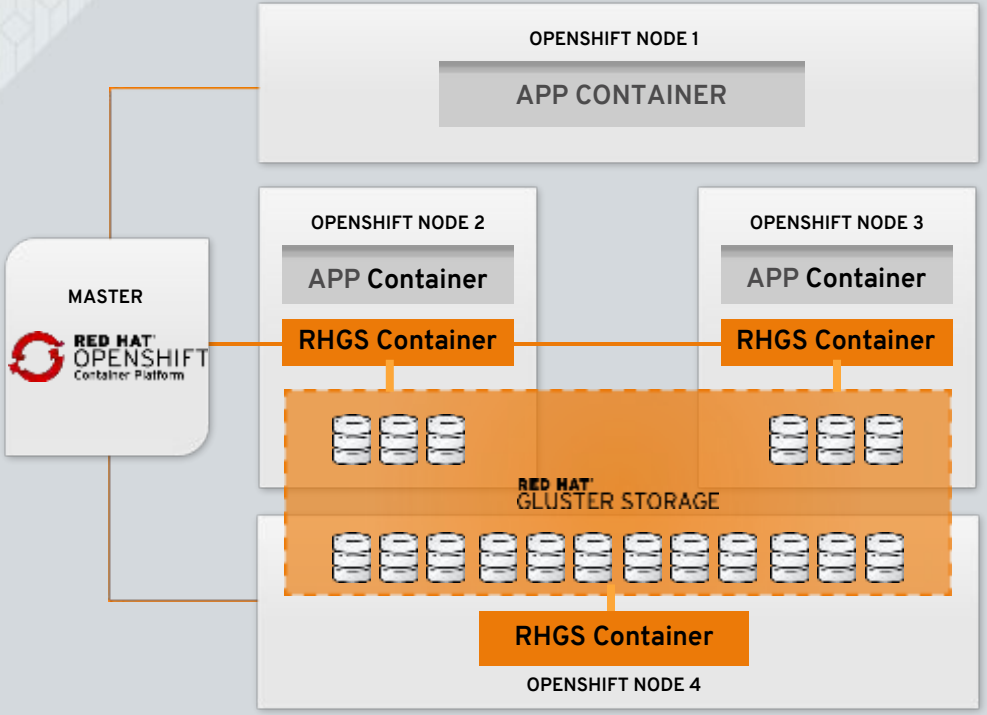
Container Native Storage

CONTAINER-NATIVE STORAGE



NOT JUST PERSISTENT STORAGE

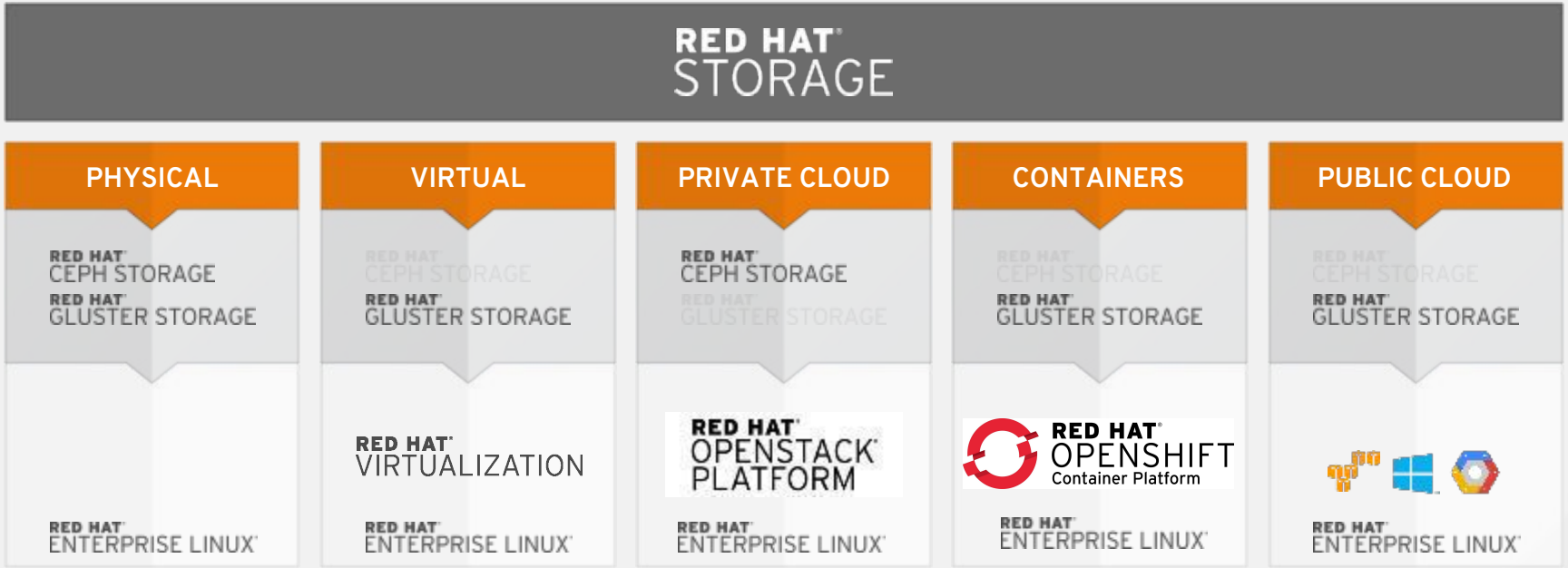
INTEGRATED PART OF THE RED HAT OPENSHIFT CONTAINER PLATFORM



- Co-Locate Storage and Apps
- Dynamic Provisioning
- Managed by OpenShift
- Infrastructure-Agnostic

Private Cloud Infrastructure

STORAGE &THE OPEN HYBRID CLOUD



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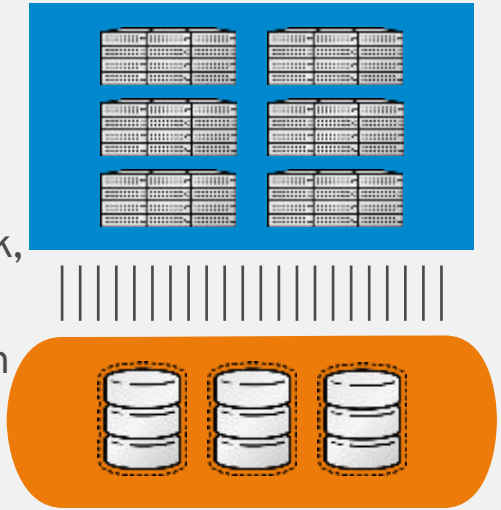
STORAGE FOR CLOUD INFRASTRUCTURE

Supporting file, object and block storage

- Proven for large-scale, modern workloads
- Open, massively-scalable, software-defined
- Flexible, scale-out architecture on clustered industry standard hardware
- Efficient, unified storage platform (object, block, file)
- User-driven storage lifecycle management with 100% API coverage
- Integrates easily and tightly with OpenStack Cinder, Glance, Nova, Keystone, and Manila



RED HAT® OPENSTACK® PLATFORM

RED HAT® CEPH STORAGE

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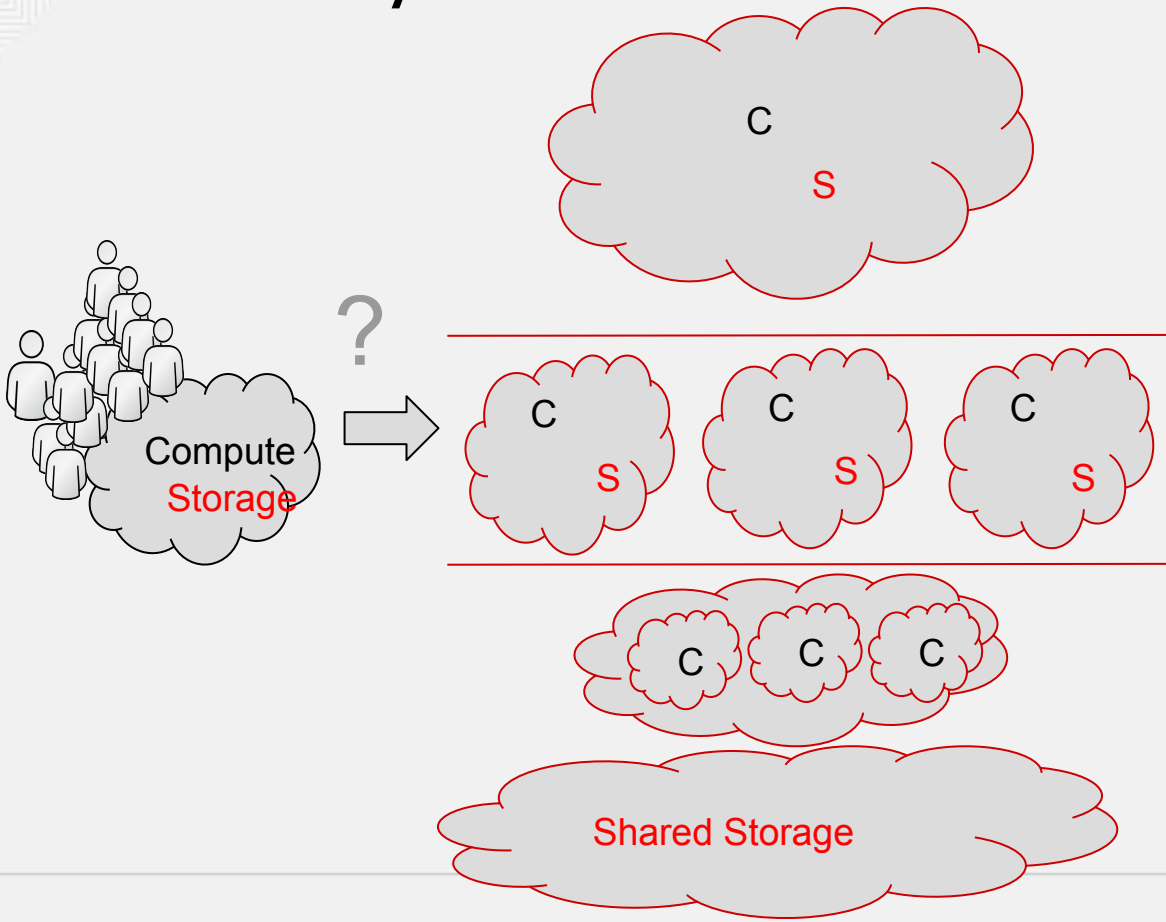
Elastic Shared Data Lakes

Discontinuity Presents Choice



Get a bigger cluster

- Lacks isolation - still have noisy neighbors
- Lacks elasticity - rigid cluster size
- Can't scale compute/storage costs separately

Get more clusters

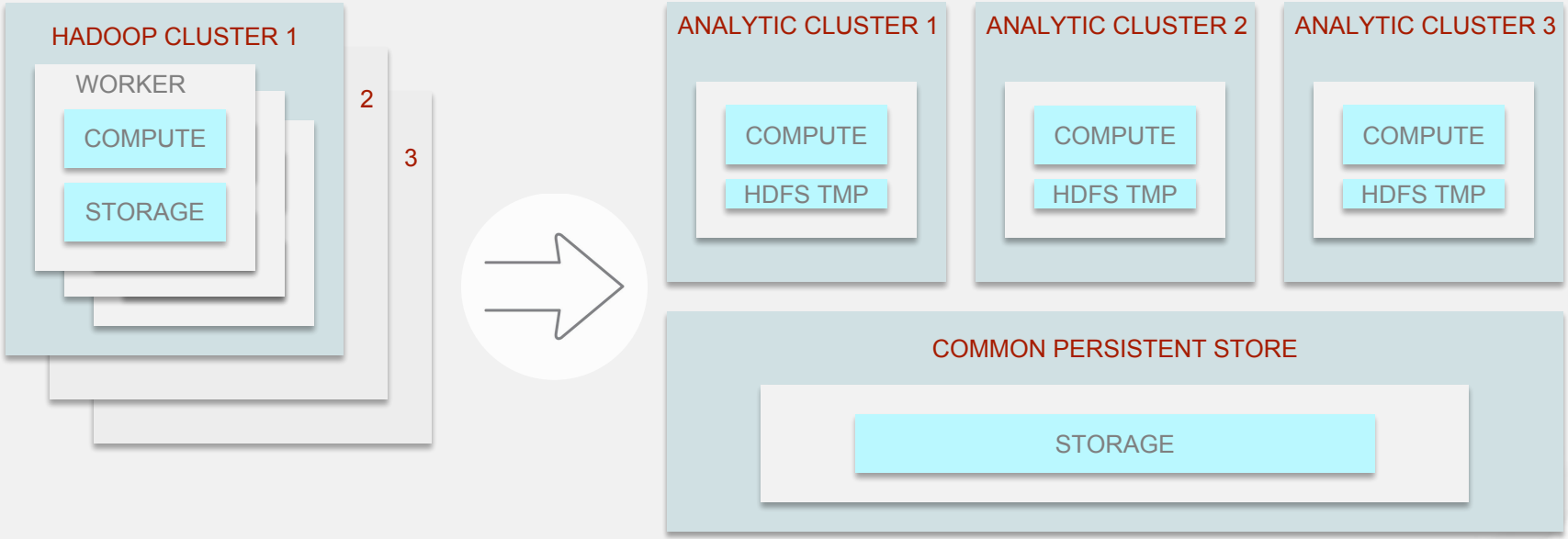
- Cost of duplicating big datasets
- Lacks on-demand provisioning
- Can't scale compute/storage costs separately

On-demand Compute and Storage pools

- Isolation of high-priority workloads
- Shared big datasets
- On-demand provisioning
- Compute/storage costs scale separately

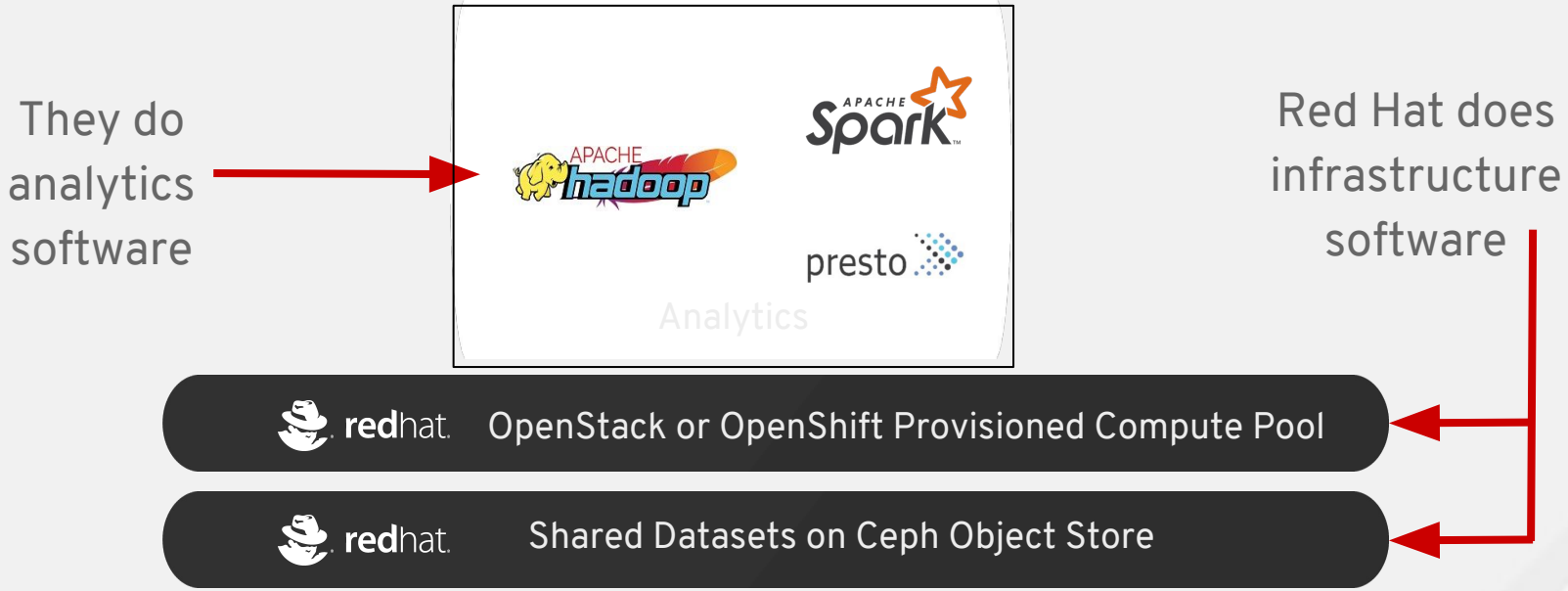
Emerging Patterns

Multiple analytic clusters, provisioned on-demand, sourcing from a common object store



The Evolution of Big Data Analytics - the new way

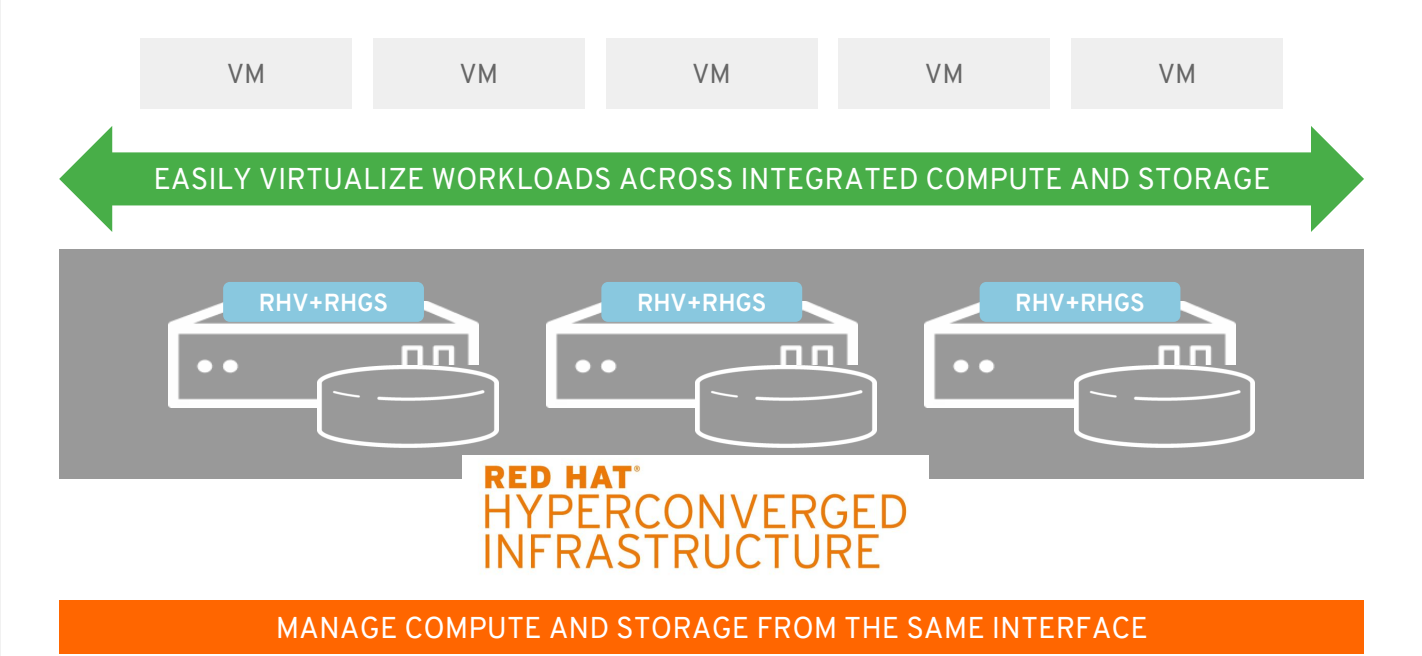
Analytics vendors focus on analytics, Red Hat on infrastructure.



Hyperconvergence

RED HAT HYPERCONVERGED INFRASTRUCTURE

OPTIMIZE, INTEGRATE, MANAGE

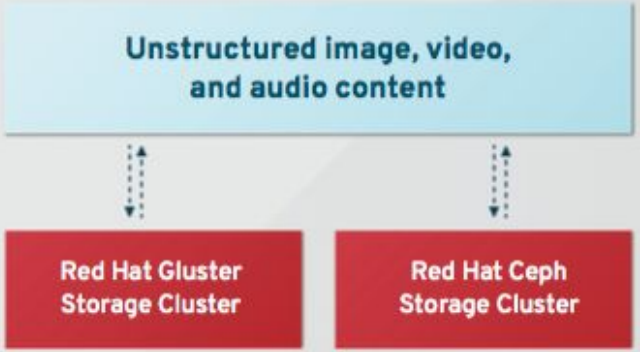


Like VMware + VSAN at a fraction of the cost

Media Repository

RICH MEDIA

Massively-scalable, flexible, and cost-effective storage for image, video, and audio content



FEATURES	BENEFITS
• Support for multi-petabyte storage clusters on commodity hardware • Erasure coding and replication for capacity-optimized or performance-optimized pools • Support for standard file & object protocols • Snapshots and replication capabilities for high availability and disaster recovery	• Provides massive and linear scalability in on-premise or cloud environments • Offers robust data protection with an optimal blend of price & performance • Standard protocols allow access to broadcast content anywhere, on any device • Cost-effective, high performance storage for on-demand rich media content

Conclusion

Red Hat Storage is a part of Red Hats stack

Integrated into and brings huge value to:
RH Openshift, RH Openstack, RH Virtualization

Today 6 use cases we go after, in reality we see a LOT more coming up. Todays focus will be on the ones that we see most of here in EMEA.

Purpose of this presentation is to start talking where Red Hat Storage fit in your environment.

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Use case nr 1:

SDS as a Backup target

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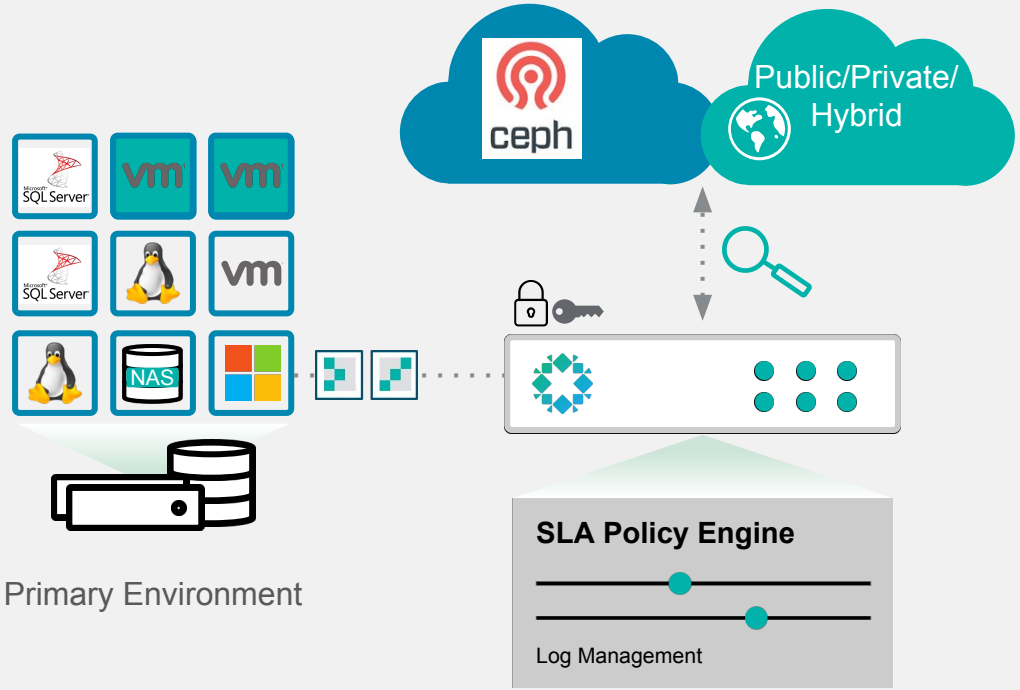
Software Defined Storage in backup environments

Johan Robinson
Feb, 2018

Traditional Backup Architecture - Drawbacks

- High Infrastructure Costs
- Complex Management and Operations
- Limited Resiliency and Availability
- Poor Cloud Integration
- Tough procurement and lifecycle

Rubrik – Ceph at a glance



Quick Start: Rack and go. Auto-discovery.

Rapid Ingest: Flash-optimized, parallel ingest accelerates snapshots. Scale-out dedupe and compress.

Automate: SLA policy engine for hands-free management. Archive to Ceph automatically based on SLA's retention

Recover: Instant and point-in-time recovery. Search and restore files from Rubrik or Ceph instantaneously. Recover from Ransomware.

Secure: End-to-end encryption.

Cloud: Secure "CloudOut" instantly accessible with global search.

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Big Telco – NetBackup + Ceph

Why CEPH?

- **Exponential growth of data**
- **In 2014 the engineers discovered a new way to do Storage**
- **...and became very interested in scale-out Software Defined Storage**
  - **Linear growth**
  - **Maintained performance at scale**
  - **Always on**
  - **Commodity hardware**
  - **Easier to adapt hardware architecture over time**

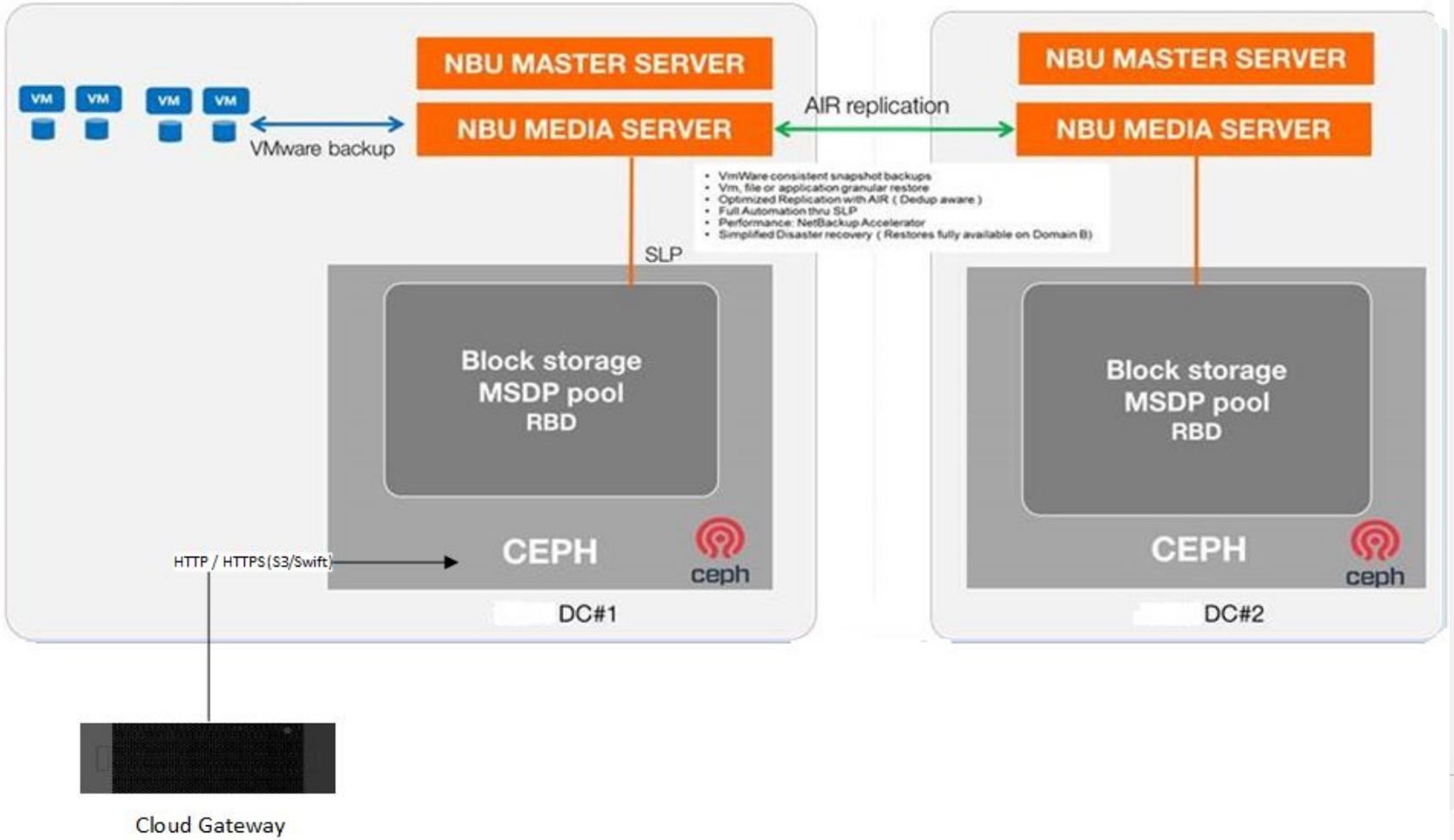
Big Telco – NetBackup + Ceph

CEPH was the solution:

- **Technology on the rise**
- **Mature and a large community**
- **Possible to get Enterprise support from Red Hat**
- **Very performant and resillient (no SPOF)**
- **OpenSource**
- **Multiprotocol support (Block | Object | File)**

- **The competition:**
  - **VSAN:** Vmware only. Inconclusive tests carried out by their colleagues
  - **ScaleIO:** Interesting solution if you want to do block only. This solution is nevertheless quite expensive. Moreover, EMC's strategy on this product was not very clear.

DC primary backup based on NBU+CEPH



COMMVAULT®

Rikard Lindkvist

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Use case 2:
Openstack and Openshift

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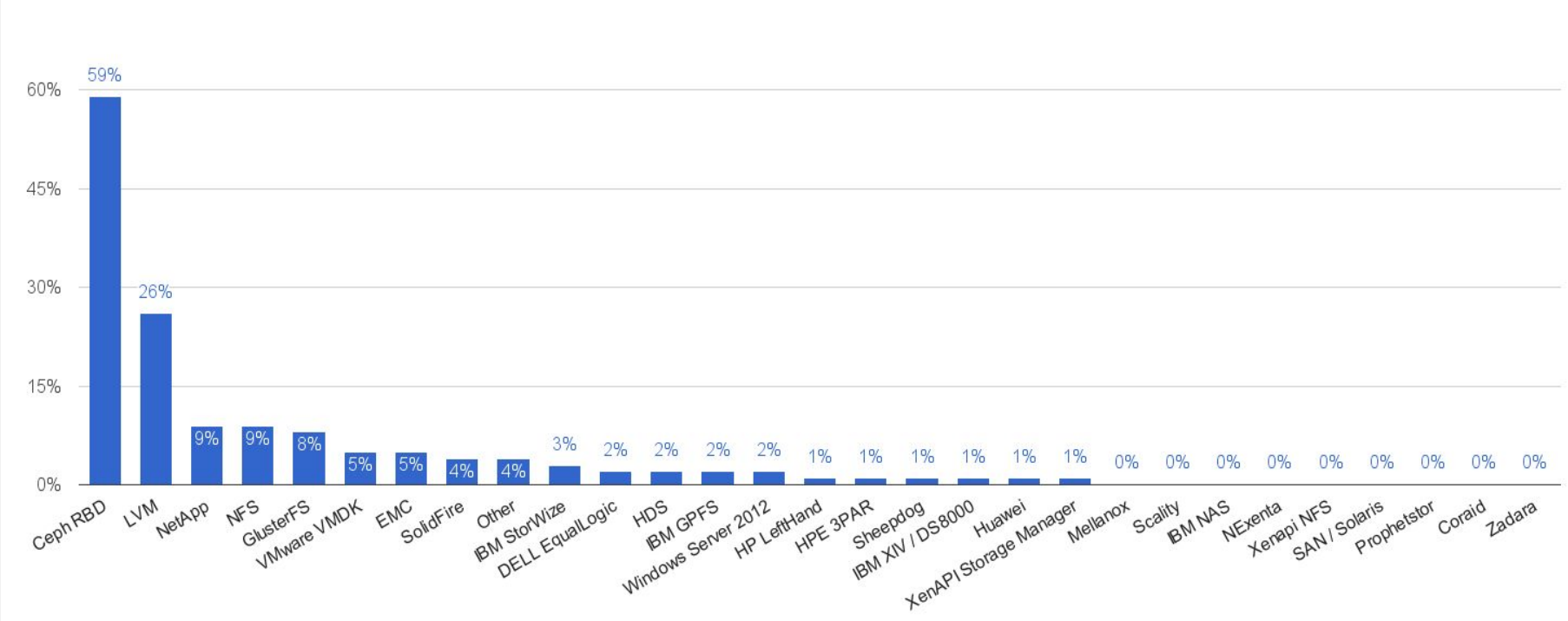
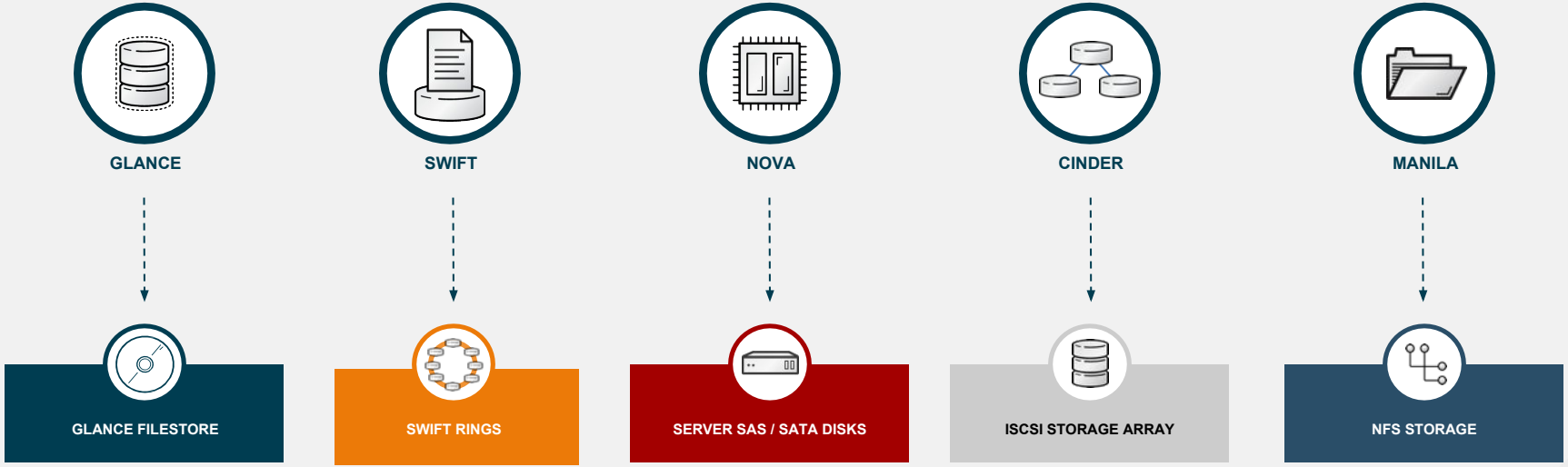
OpenStack and Ceph

Which OpenStack Cinder driver are you using?

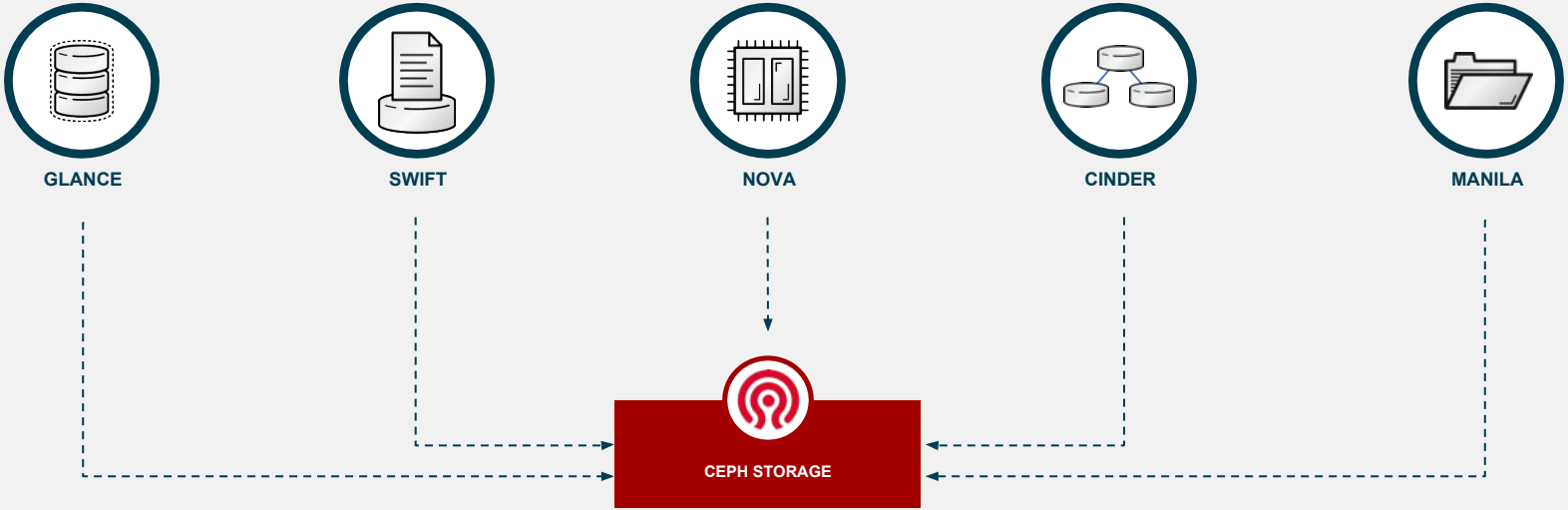


Source: http://www.openstack.org/analytics

OpenStack without Ceph

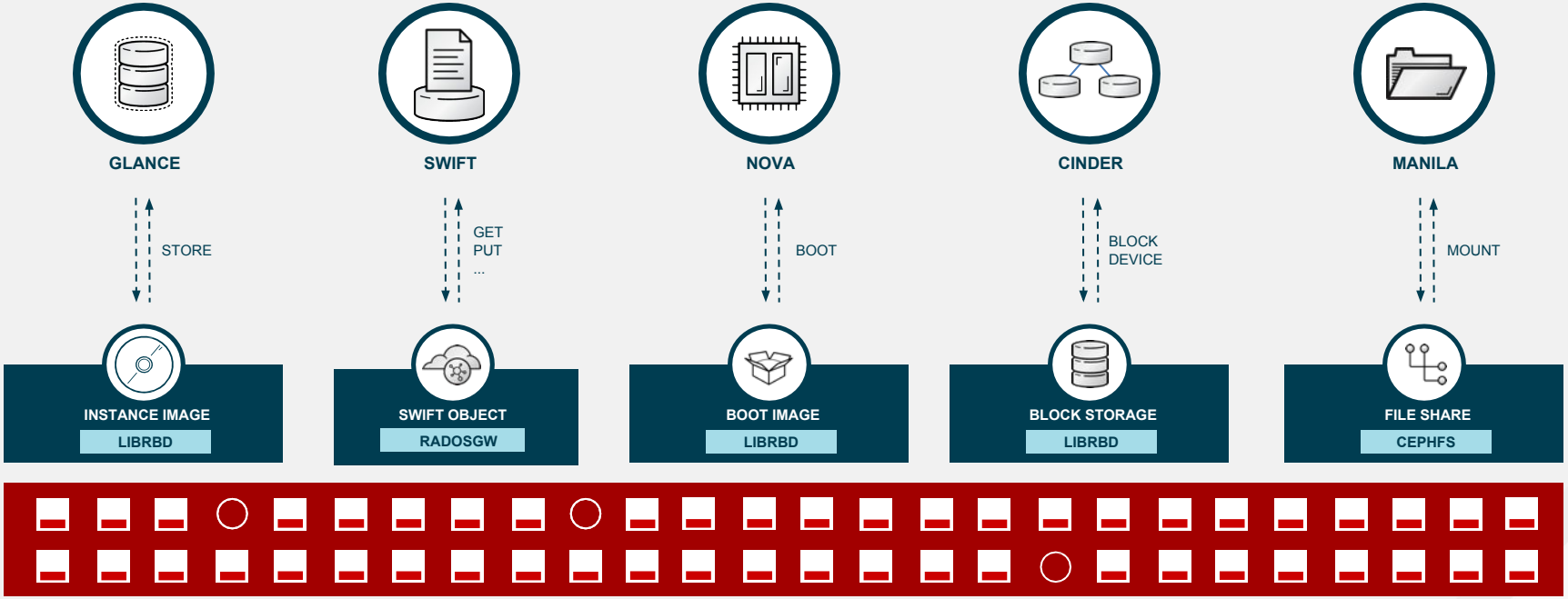


"Ceph" : The complete storage for OpenStack



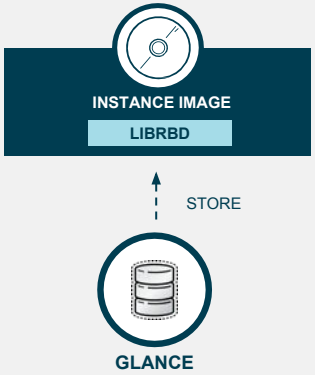
How does Ceph work with OpenStack?

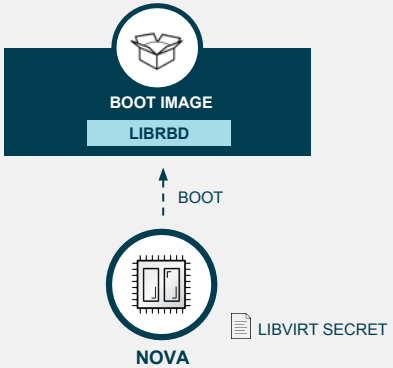
Integration status of Ceph in OpenStack

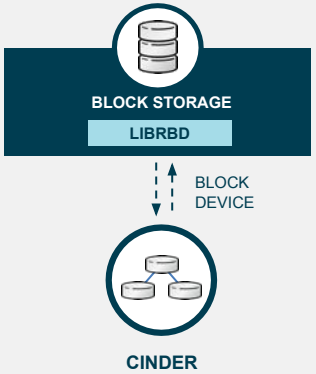


What can I do with Ceph in OpenStack?

Scalable Backend for OpenStack Storage Services







GLANCE-API.CONF

```
stores = rbd
default_store = rbd
rbd_store_chunk_size = 8
rbd_store_pool = images
rbd_store_user = glance
rbd_store_ceph_conf = <ceph.conf>
show_image_direct_url = True
```

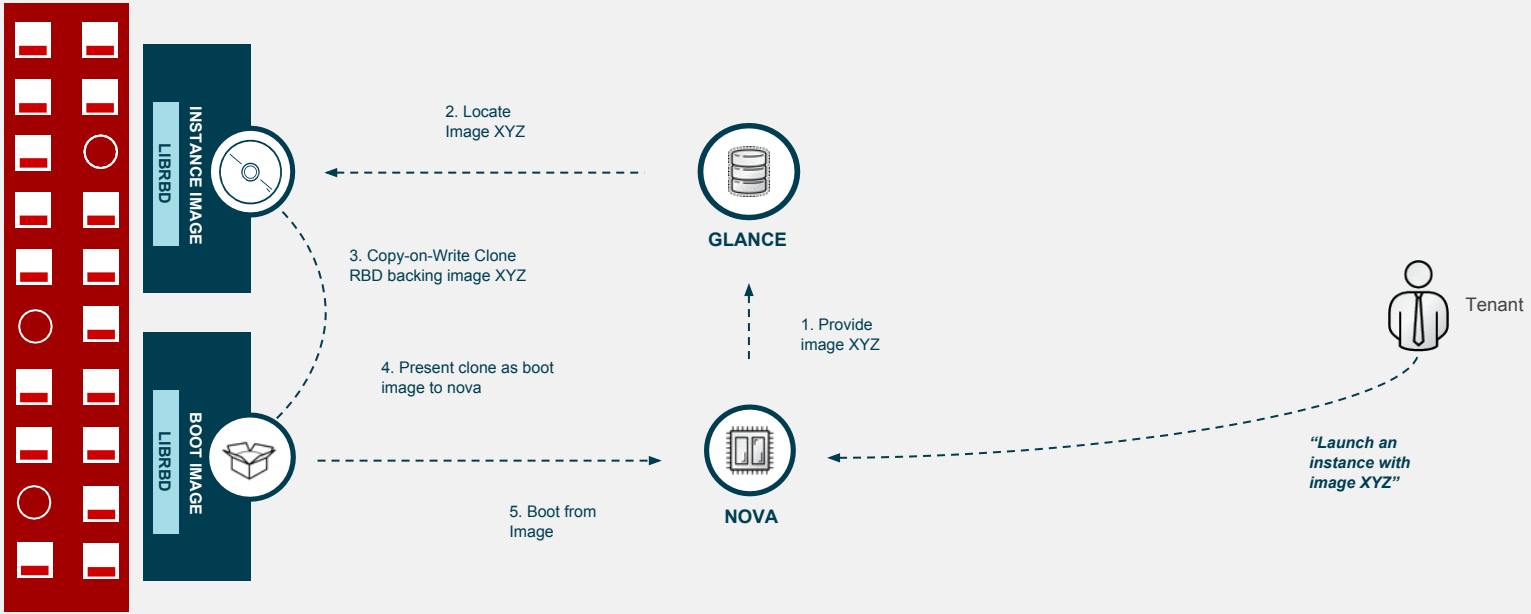
NOVA.CONF

```
images_type = rbd
images_rbd_pool = vms
images_rbd_ceph_conf = <ceph.conf>
rbd_user = cinder
rbd_secret_uuid = <uuid>
disk_cachemodes="network=writeback
"
inject_password = false
inject_key = false
inject_partition = -2
hw_disk_discard = unmap
```

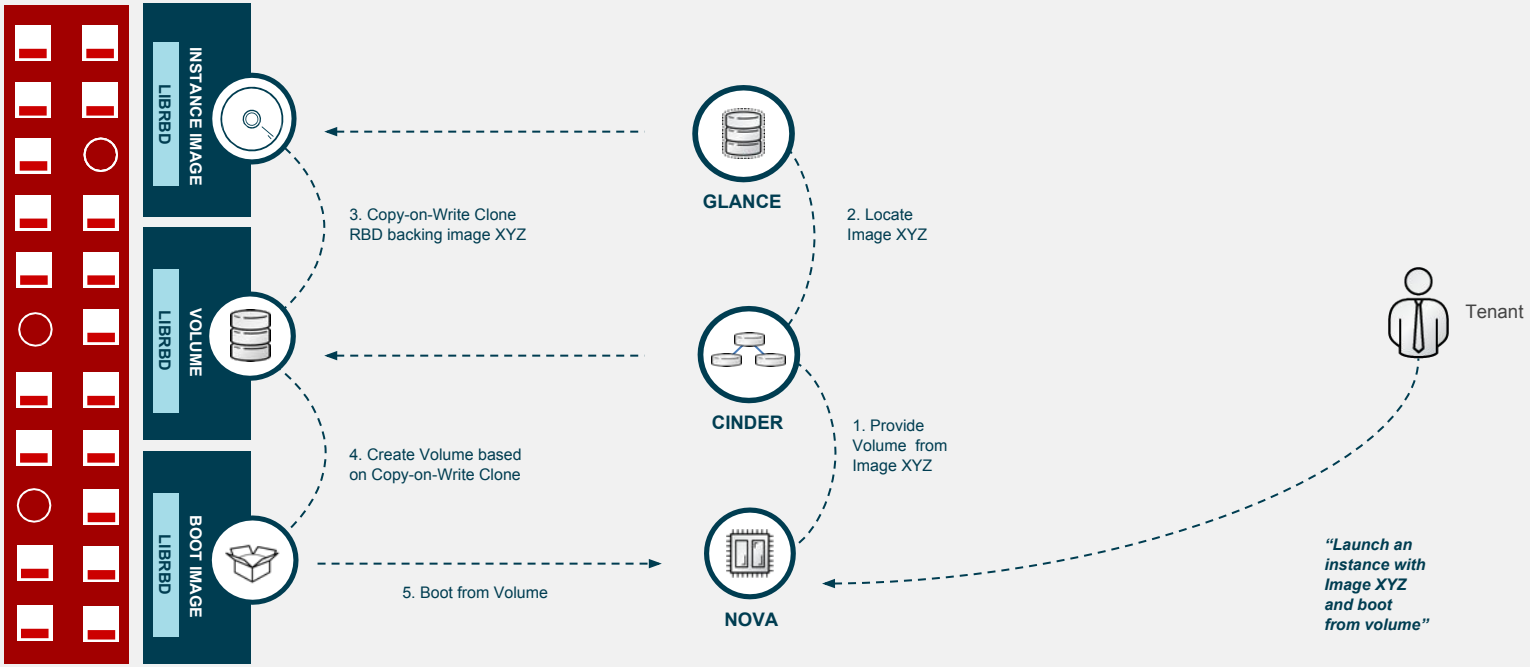
CINDER.CONF

```
volume_driver =
cinder.volume.drivers.rbd.RBDDriver
rbd_cluster_name = ceph
rbd_pool = volumes
rbd_user = cinder
rbd_ceph_conf = <ceph.conf>
rbd_flatten_volume_from_snapshot = false
rbd_secret_uuid = <uuid>
rbd_store_chunk_size = 4
rados_connect_timeout = -1
```

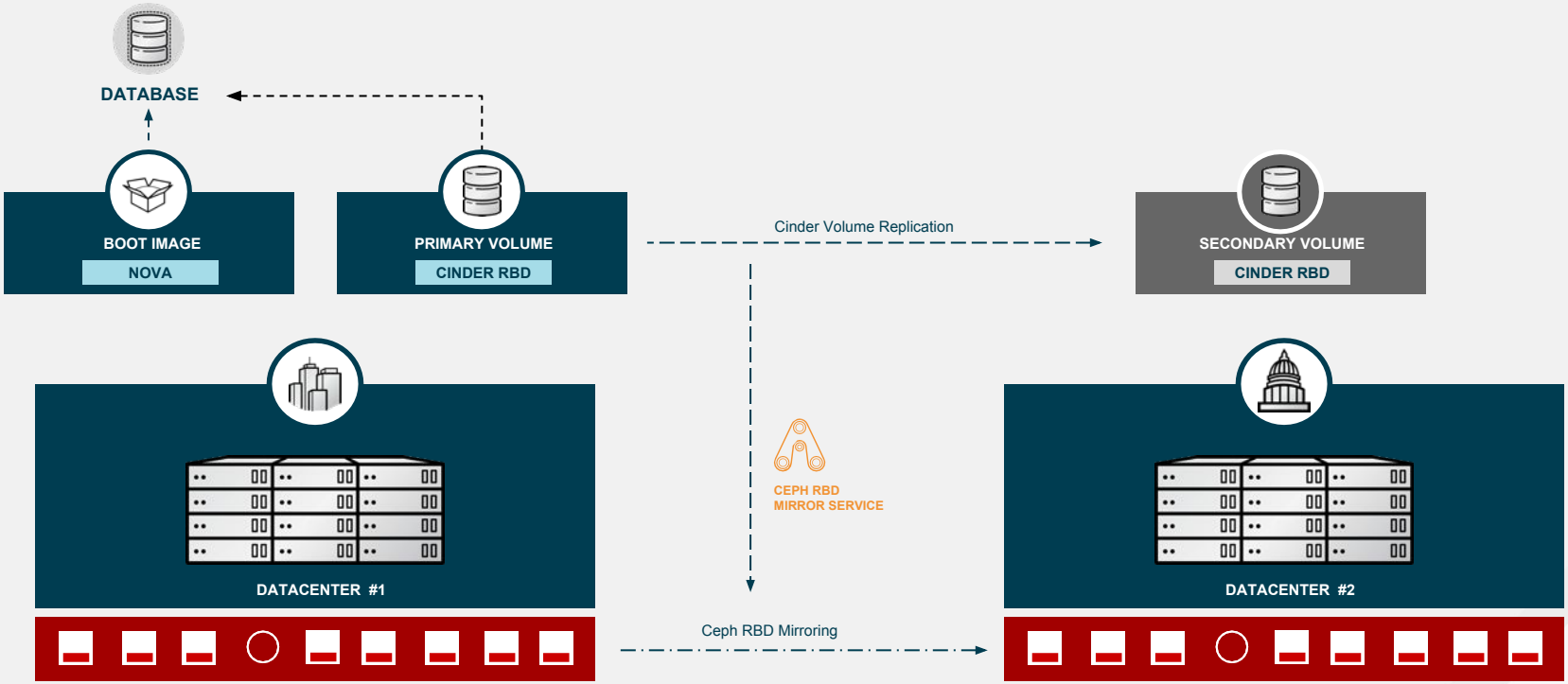
Fast instance boot with Ceph - 1/2



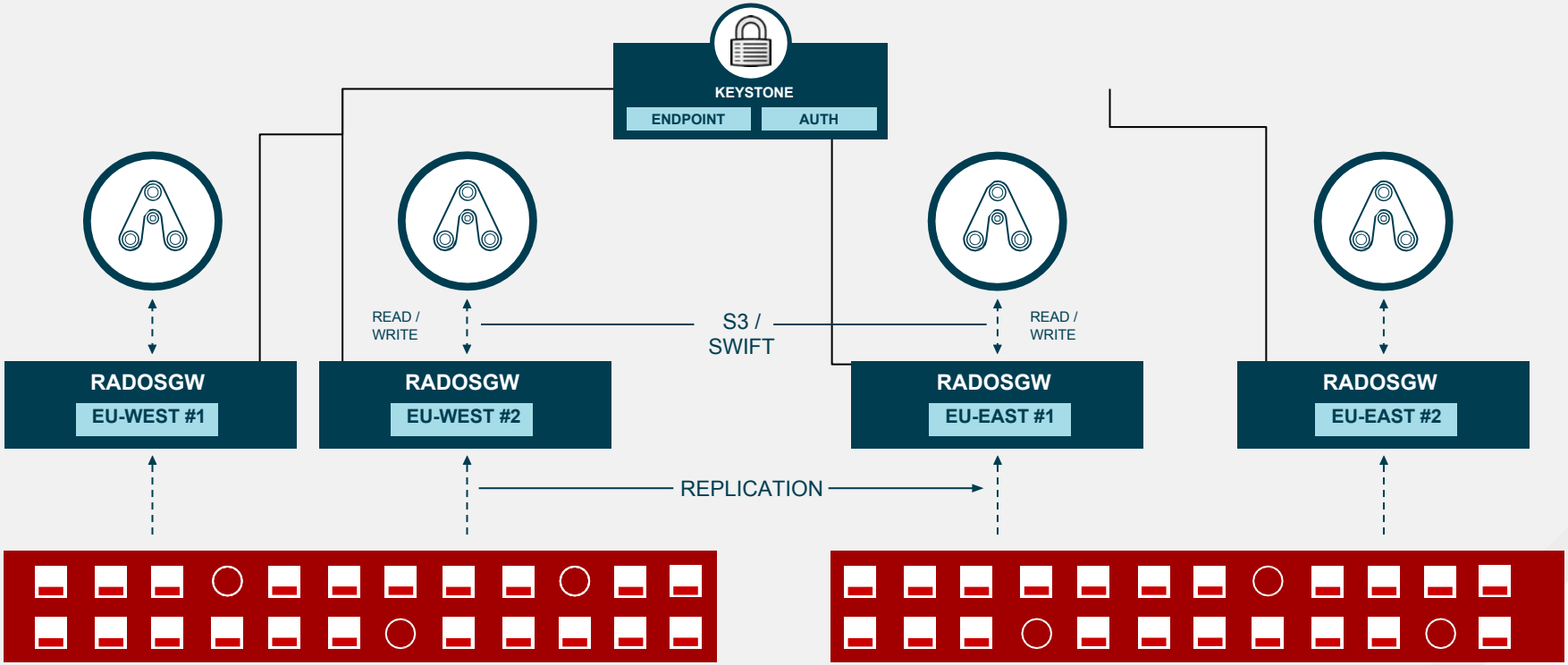
Fast instance boot with Ceph - 2/2



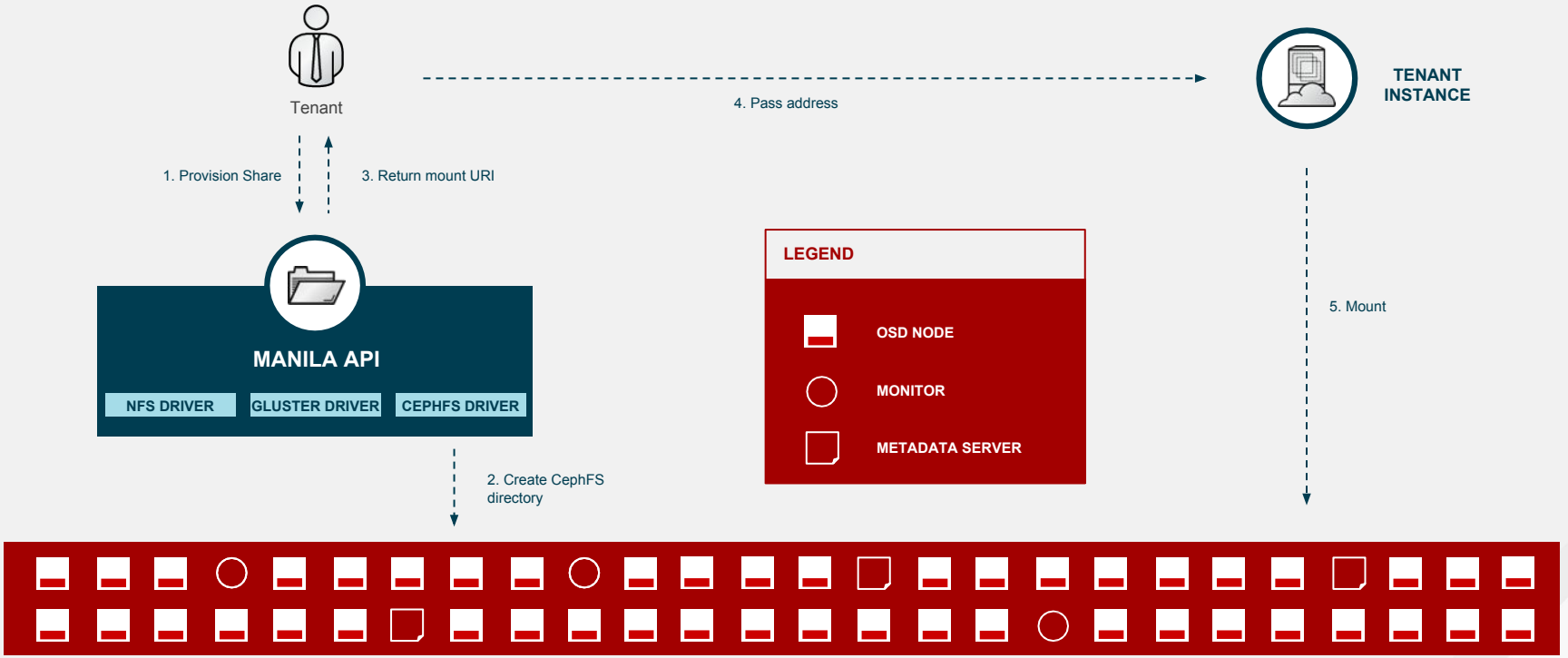
Geo-Replicated Cinder Volumes with Ceph



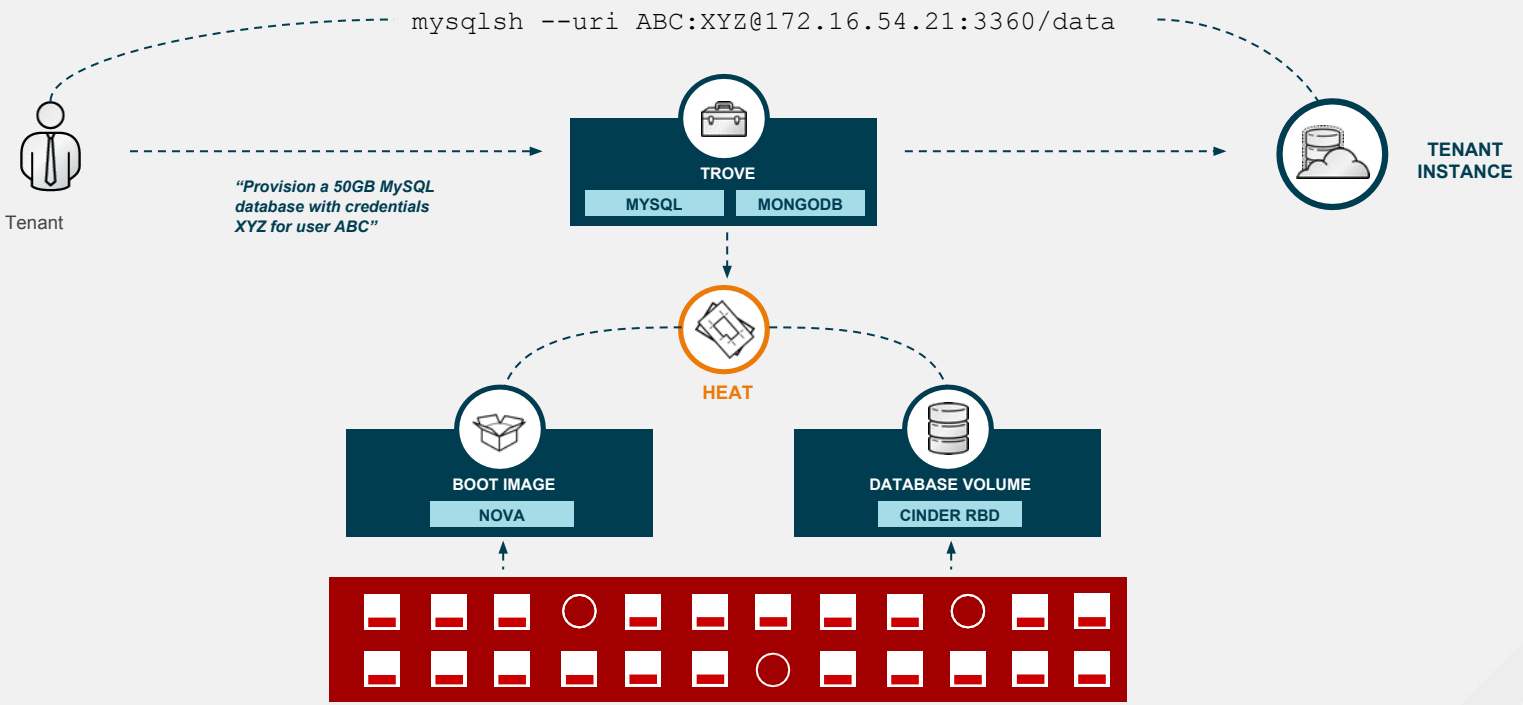
Multi-Site Object Storage for SWIFT/S3 tenants



Fileshare-as-a-service with CephFS



Database-as-a-service with Ceph



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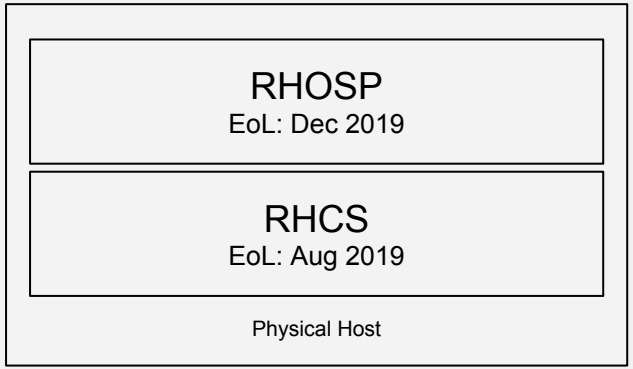
Red Hat Hyperconverged Infrastructure for Cloud

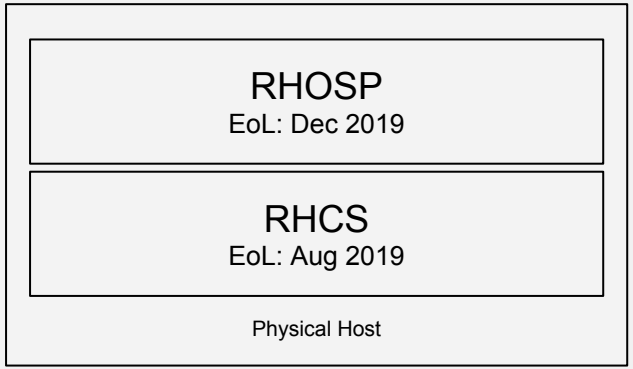
Red Hat Storage
November 2017

What is RHHI for Cloud?

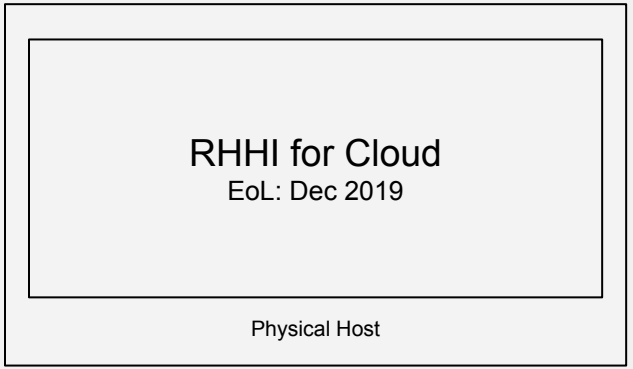


BEFORE

What is RHHI for Cloud?



BEFORE

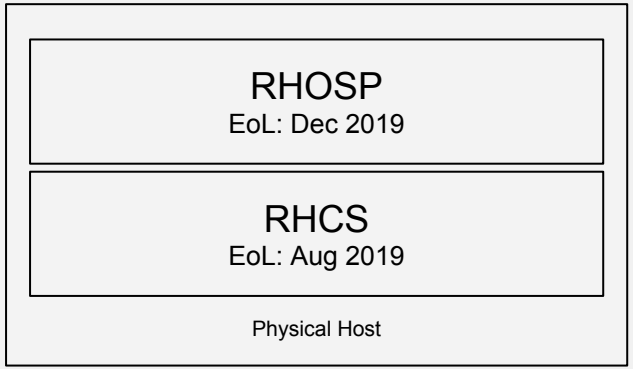


AFTER

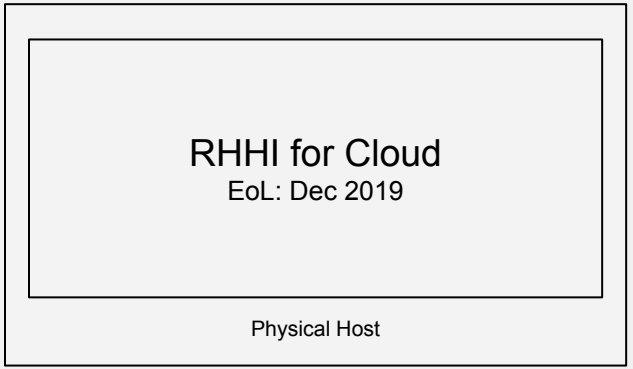
What is RHHI for Cloud?

A new offering for running Ceph Storage and OpenStack Compute functions on the same host.

It combines Red Hat OpenStack Platform and Red Hat Ceph Storage together in a single SKU with a per-node price, supported under a **single, common lifecycle. (EOL dates are examples:))**



BEFORE

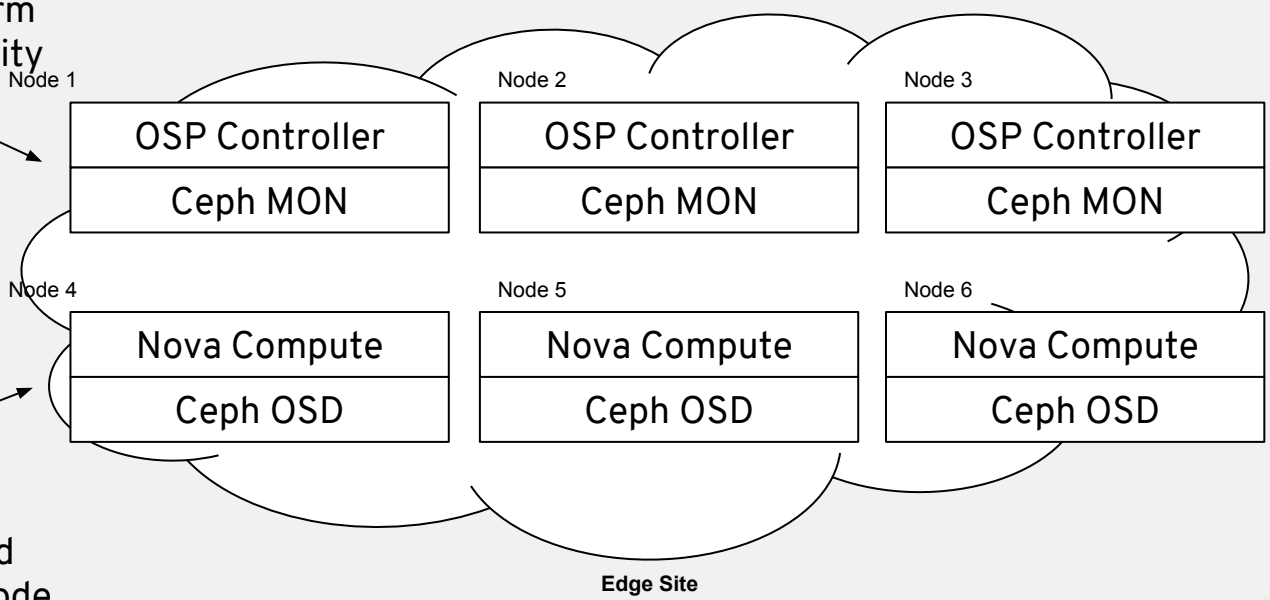


AFTER

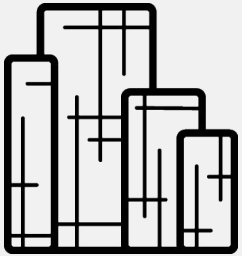
How is it deployed?

Existing SKU:
Red Hat OpenStack Platform + Red Ceph Storage (capacity based)

New SKU:
Red Hat Hyperconverged Infrastructure for Cloud, node based

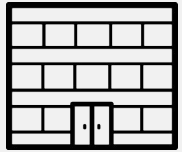


What is the target market?



NFVi Core

✓

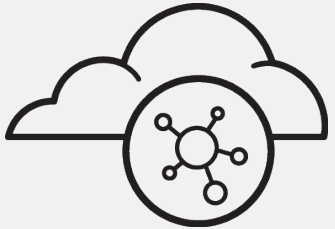


NFVi Edge

✓

Private Cloud

At small scale



Not recommended for Public Clouds

×

Predictable storage growth with compute growth	Storage Growth > Compute growth

What are the features?

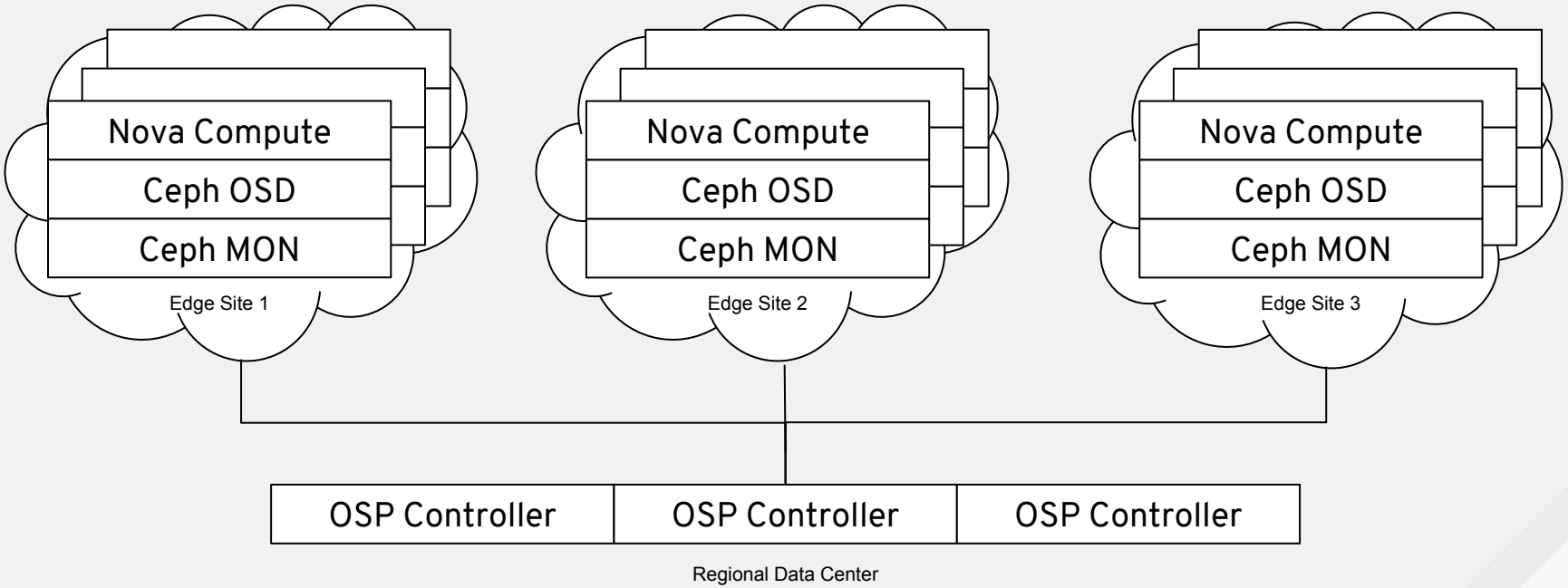
- OSP director as a single orchestration manager
- CPU resource management via NUMA pinning and memory management via KVM
- Reduces minimum OSP+Ceph cluster size to 6 nodes.
- Scales to 30 nodes (support available on request for larger sizes)
- Full support for Nova and OpenStack Storage services including Nova/Cinder/Glance/RGW
- Container-based deployment model

When is it available?

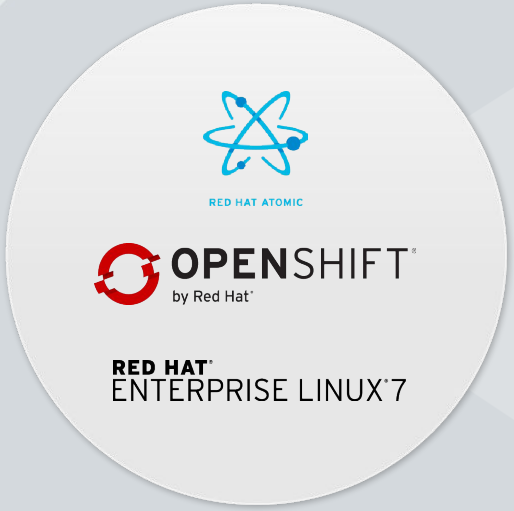
Product Timeline	Status
OSP-10 with RHCS 2	HCI via OSP Director *feature* flagged as Tech Preview (no test coverage) Pending backports to 10.z5 to enable scale up to 30 nodes Unaligned support lifecycles Support Exceptions for production support
OSP-11 & 12 with RHCS 2	HCI via OSP Director *feature* GA Unaligned support lifecycles Support Exceptions for production support
RHHI-4-C v10 (Nov 2017)	General purpose testing for RHOSP 10 with RHCS 2 Bare-metal-based 3 years lifecycle co-terminous with RHOSP 10 Limited Availability
RHHI-4-C v13 (May 2018)	NFV specific testing for RHOSP 13 with RHCS 3 Container-based 3 years lifecycle co-terminous with RHOSP 13 General Availability

What is the roadmap?

OSP14+



STORAGE INNOVATION FOR CONTAINERIZED APPLICATIONS



- Ceph RBD
- Amazon EBS
- Fiber Channel
- GCE
- iSCSI
- NFS
- GlusterFS

AUTOMATED CONFIGURATION

SINGLE CONTROL PANEL

CHOICE OF PERSISTENT STORAGE

THE RED HAT STACK – FROM PAAS TO STORAGE

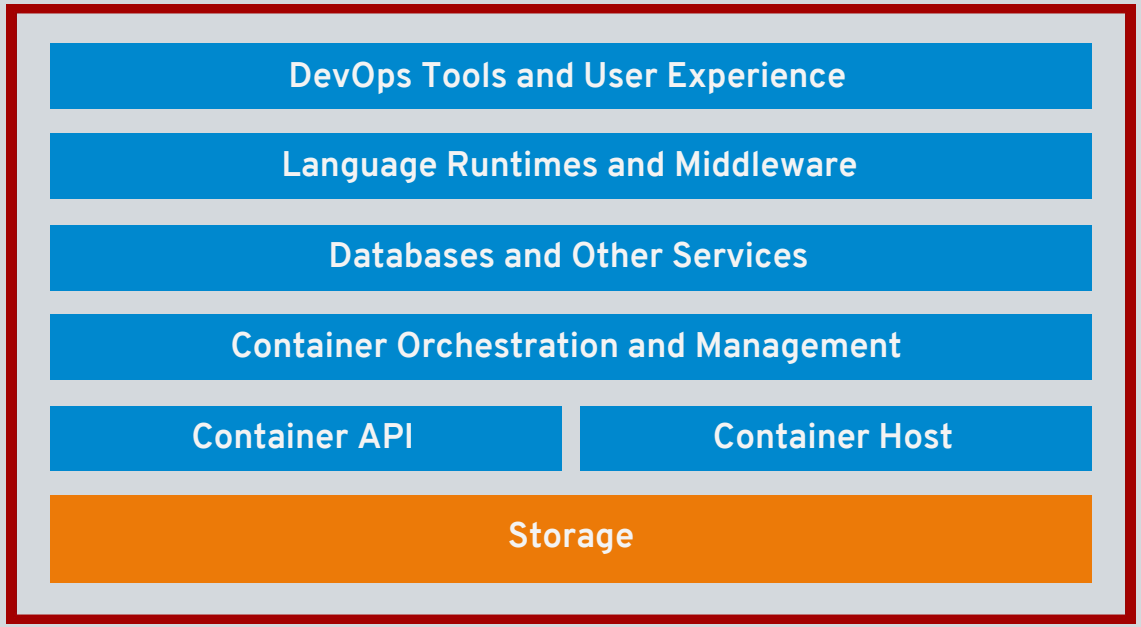
OPENSHIFT marketplace

RED HAT JBOSS MIDDLEWARE

RED HAT SATELLITE

xPaaS

RED HAT STORAGE



RED HAT OPENSHIFT Container Platform

kubernetes by Google

docker

redhat LINUX

DRIVING THE FUTURE OF STORAGE

CONTAINER READY STORAGE

RED HAT® GLUSTER STORAGE

Nov 2015

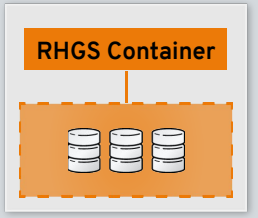
- Dedicated storage cluster for containerized and PaaS environments
- Supported for OpenShift Enterprise

CONTAINERIZED RHGS

Mar 2016

- Containerized Red Hat Gluster Storage serving storage from a dedicated storage cluster
- Optimized for applications running on RHEL 7, OpenShift Enterprise, and RHEL Container Host

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

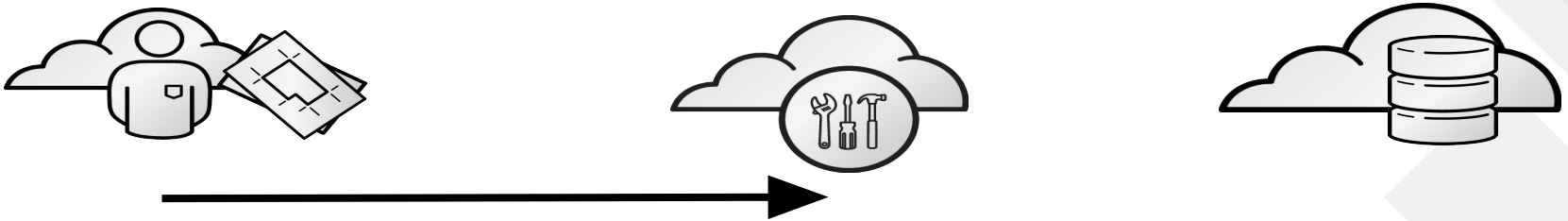
CONVERGENCE OF STORAGE AND COMPUTE

What this Solution delievers!

Provide a Storage solution that will run as containers in OpenShift pods.

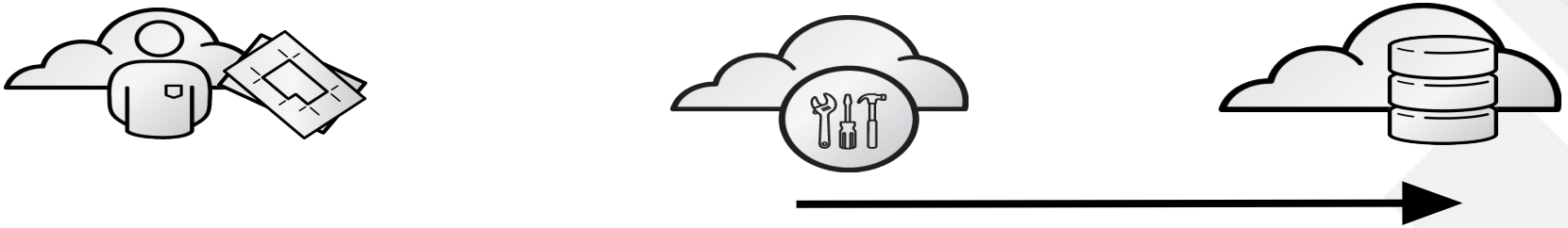
Integrate Storage deployment and management with OpenShift services.

Workflow with Dynamic Provisioning



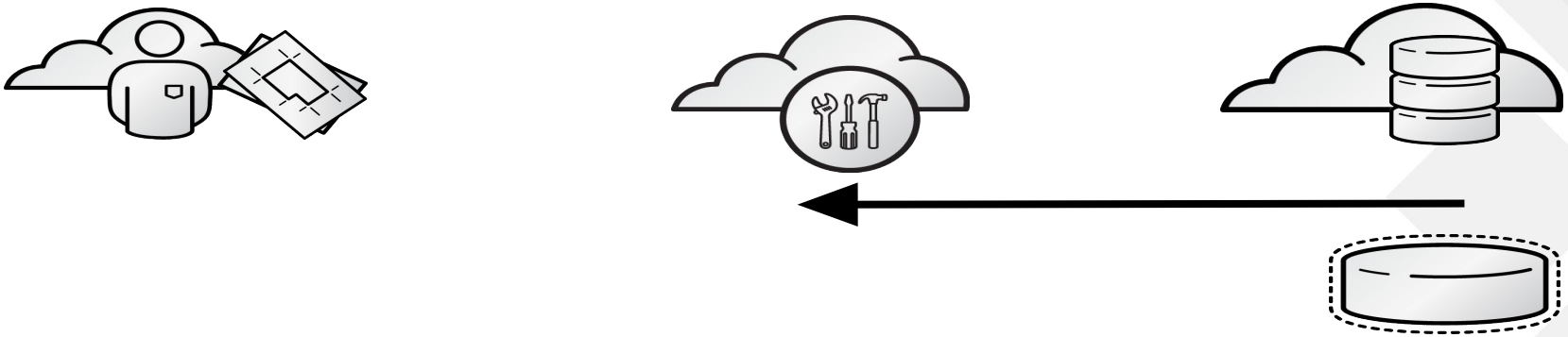
Persistent Volume Claim is submitted

Workflow with Dynamic Provisioning



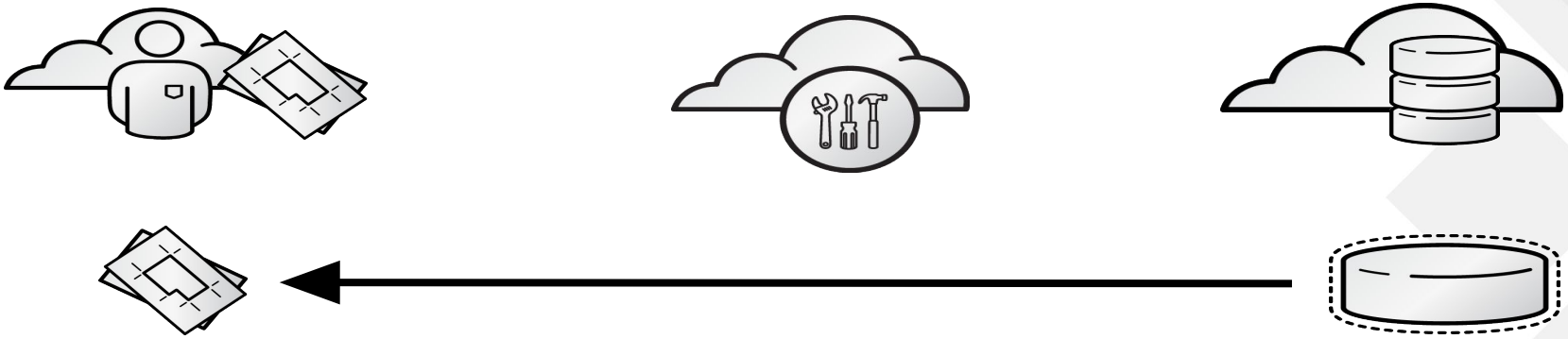
OpenShift request volume to be created in the Gluster container

Workflow with Dynamic Provisioning



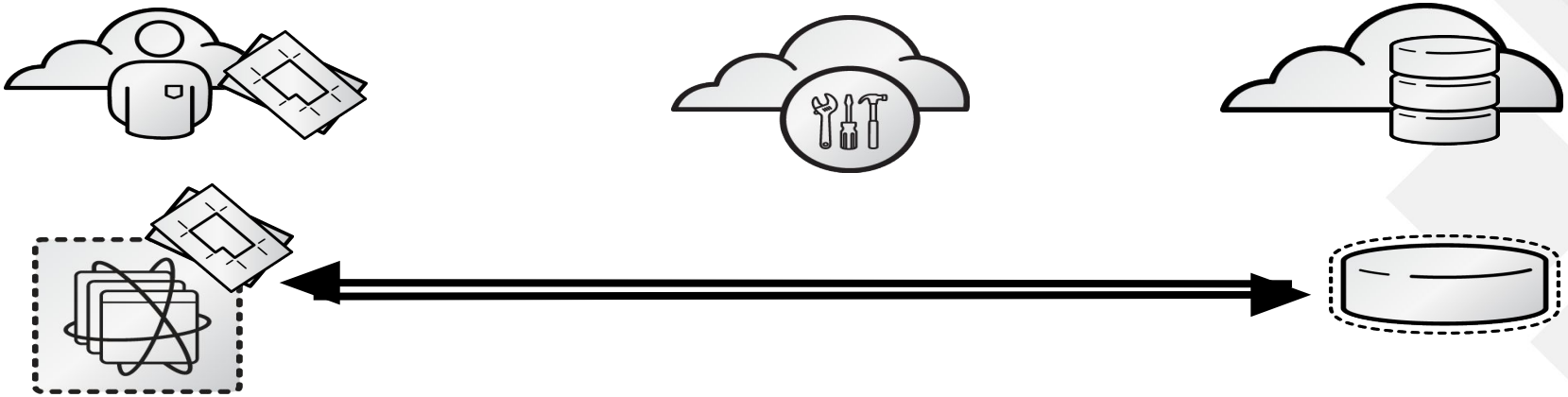
Persistent volume is created by storage system and registered with OpenShift. The exact size is provisioned dynamically.

Workflow with Dynamic Provisioning



OpenShift binds persistent volume to persistent volume claim request.

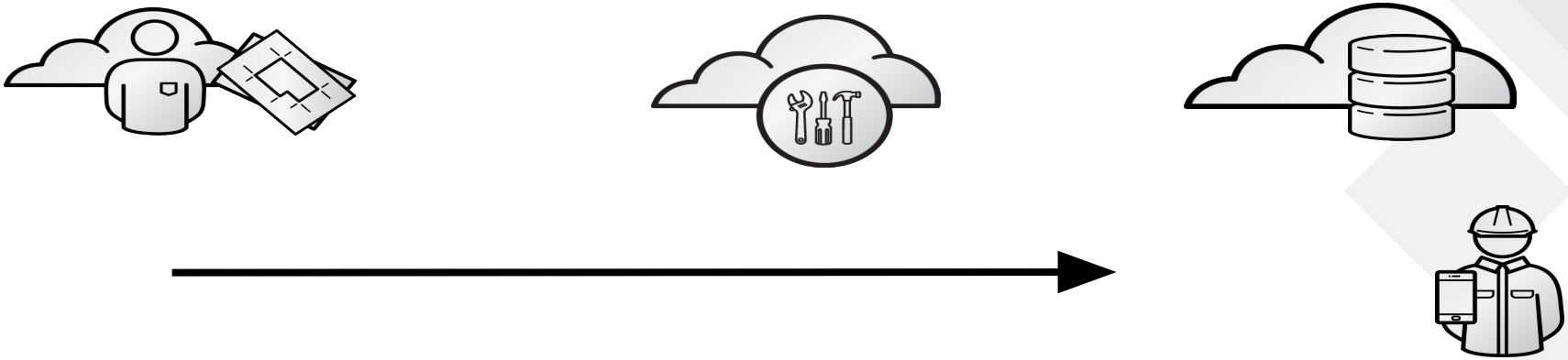
Workflow with Dynamic Provisioning



Volume can now be used by Pod to provide persistent storage.

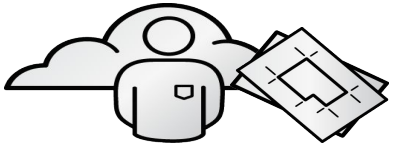
When volume no longer is needed, developer kills his/her PVC. Process is rolled backwards and space is free for other to use. Automatically,

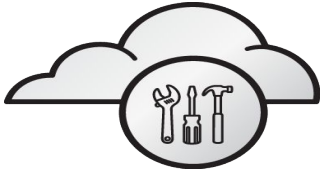
Workflow without Gluster



Developer request a **Persistent volume** via internal ticket.

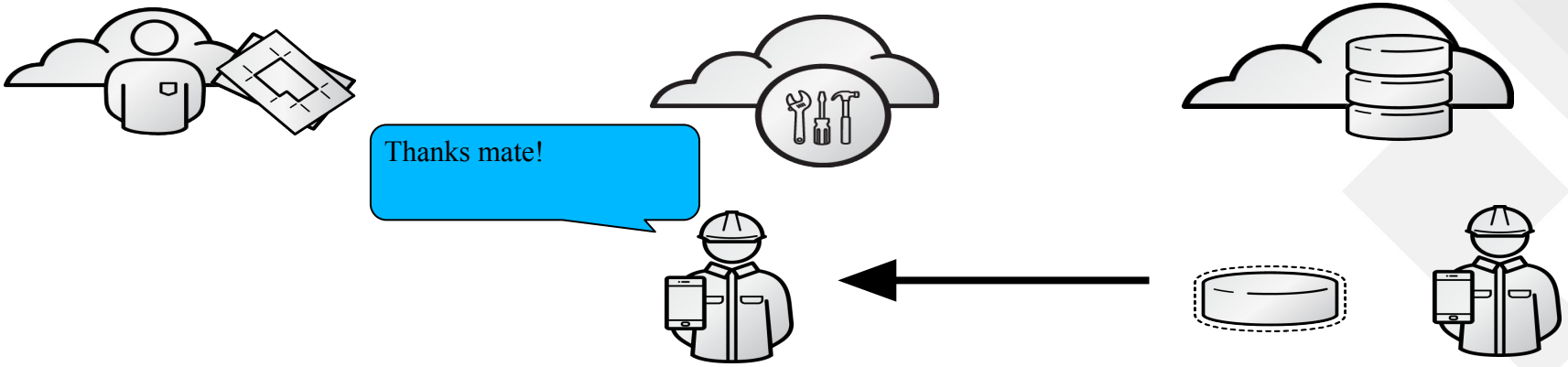
Workflow without Gluster





Administrator reads **request and start working.**

Workflow without Gluster

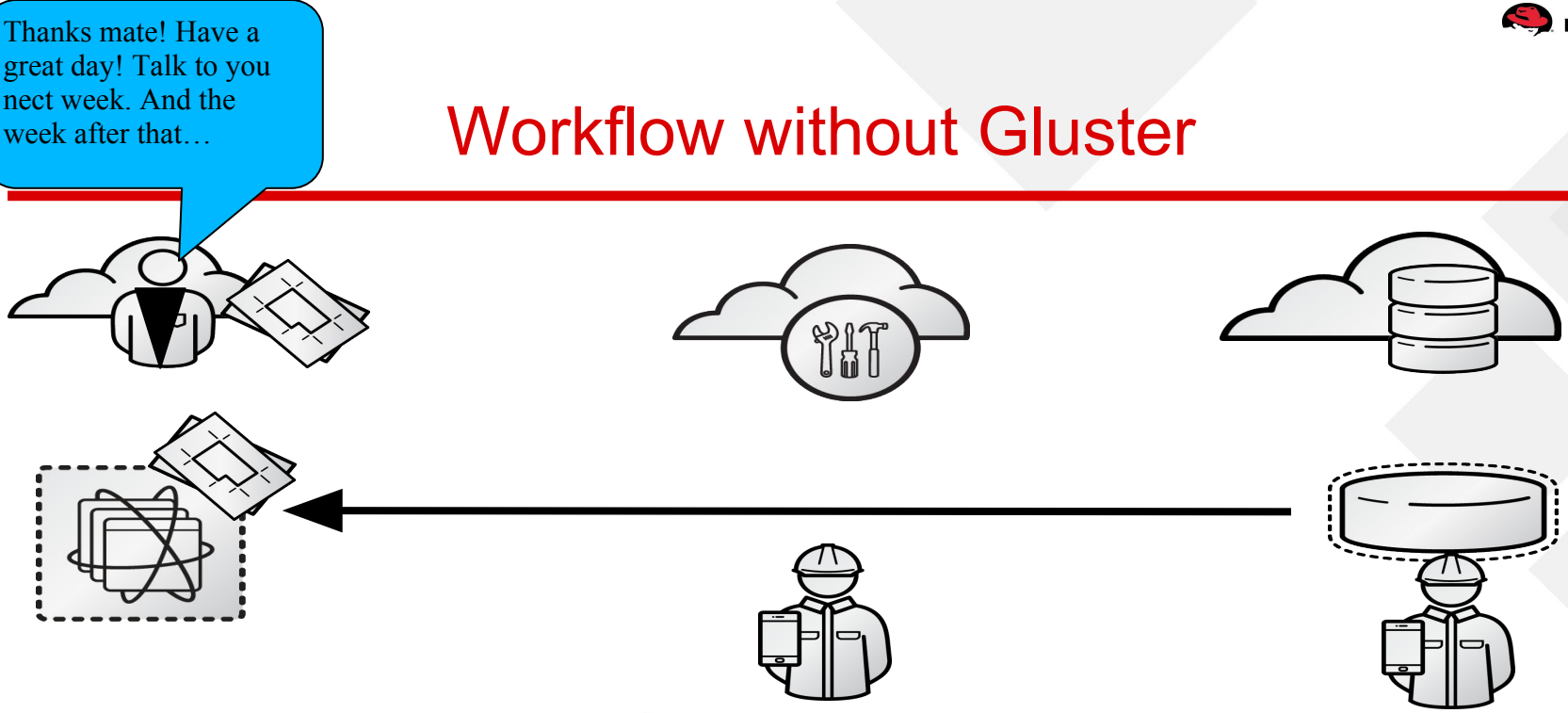


Administrator creates **volume** and notify the Open Shift administrator

Workflow without Gluster

Open Shift administrator binds the volume to the PVC.
Adminstrator is now in bearded

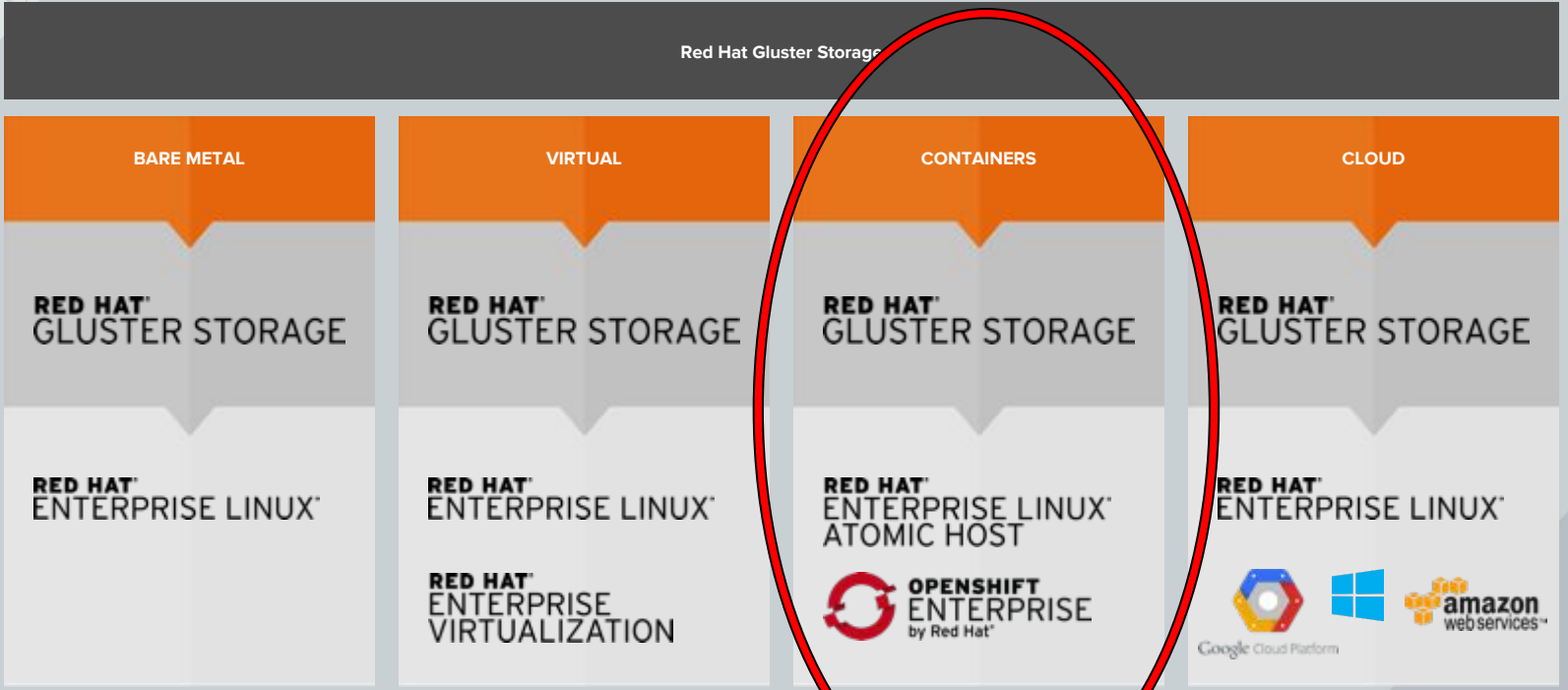
Workflow without Gluster



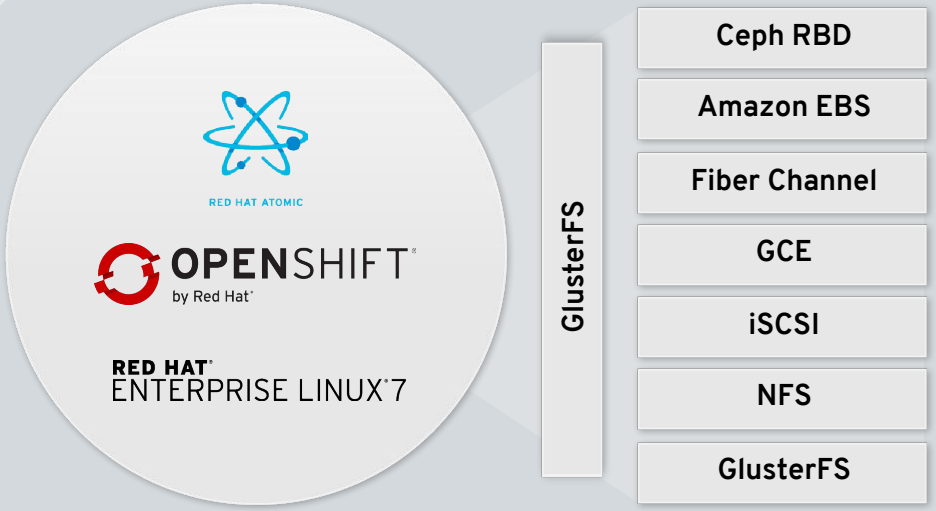
Volume can now be used by Pod to provide persistent storage.

When PVC is no longer needed the process for releasing the volume is as manual as the creation process.

WHERE IS GLUSTER DEPLOYED?



Gluster helps you create tiers from existing storage!

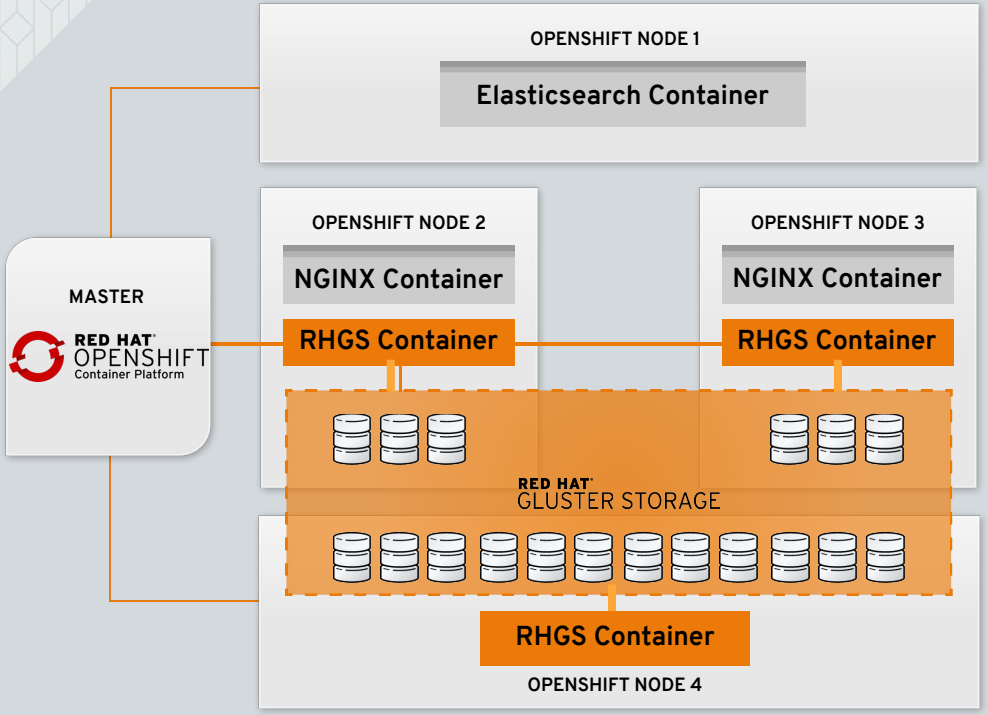


AUTOMATED CONFIGURATION

SINGLE CONTROL PANEL

CHOICE OF PERSISTENT STORAGE

CONTAINER-NATIVE STORAGE



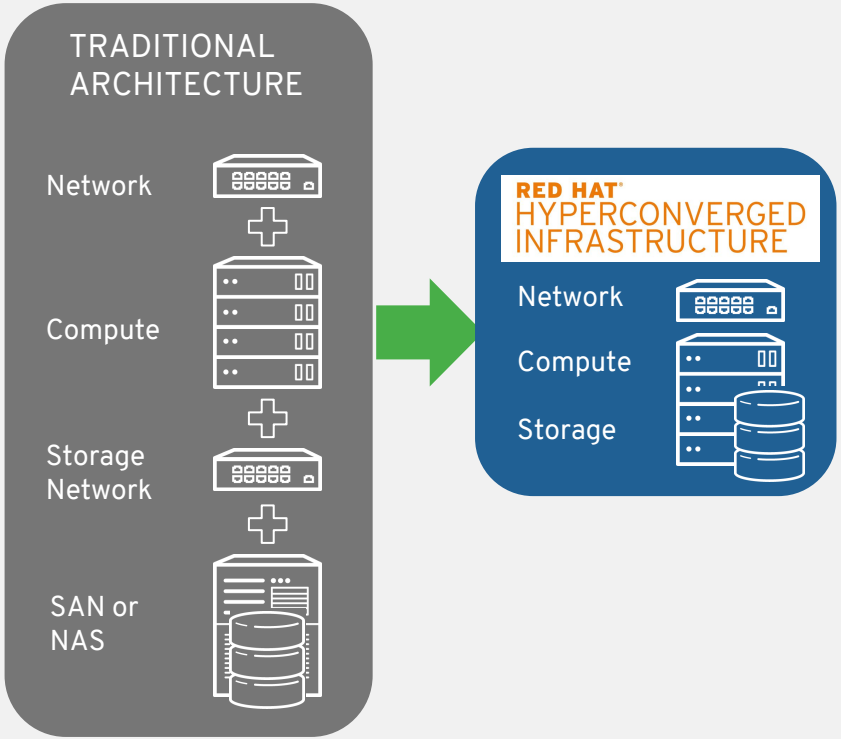
- Lower TCO
- Unified Orchestration
- Ease of Use
- Greater control

redhat.

Software Defined Storage in Virtualized environments

Johan Robinson
Feb, 2018

Red Hat Virtualization with Red Hat Gluster Storage

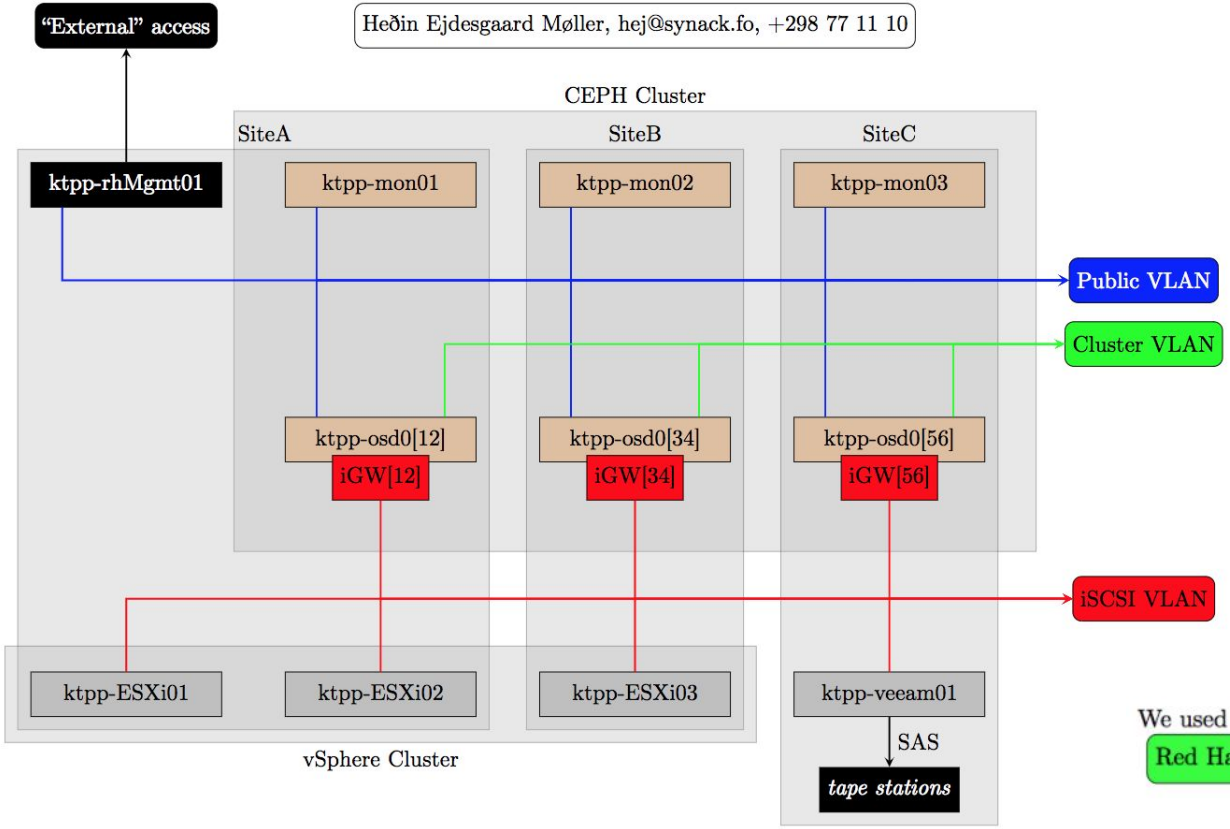


- **Eliminate** storage as a discrete tier
- **Easily virtualize** business applications, maximizing resource utilization
- **Single budget** for compute & storage
- **Single** team managing infrastructure
- **Simplified** planning & procurement
- **Streamlined** deployment & management
- **Single support** stack for compute & storage

redhat.

Vmware with Red Hat Ceph Storage

Heðin Ejdesgaard Møller, hej@synack.fo, +298 77 11 10



We used the following components.

Red Hat Ceph Storage 3

VMware ESXi-6.5 & VCSA-6.5

Based on Luminous-12.2.x

redhat.

Nextron

redhat.

Use case - Red Hat Gluster Storage

Johan Robinson
Feb, 2018

conoa

Conoa är Premier Partner till Red Hat som är en av världens största leverantörer av Enterprise Open Source-lösningar. Red Hat är en av de ledande aktörerna för utveckling av Open Source till företag och har idag mer än 90% av världens Fortune 500-företag som användare. Red Hats produkter ger företag de möjligheter som behövs för att distribuera en komplett, högpresterande IT-infrastruktur som är flexibel, skalbar och säker.

Gluster Customer Use Case

Background:

Old, big, expensive filer EOL
Choice of either Big renewal of support or buy new, big, expensive filer

Use case: Storage of media files, lots of small movies for advertisement

Challenge:
Very short time to implement new solution
Uptime requirements high
Budget restrictions

Solution:

4 node Gluster cluster initially and now expanded to 16 nodes.

Setup in one week
Qualification testing one week
Great help from partner Conoa, Red Hat and Conoa shared risk on the implementation project:
Happy=you pay
Not happy= no invoice

redhat.

Ask us anything + demo

Johan Robinson
Feb, 2018

redhat.

THANK YOU

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