

The logo for Red Hat Summit, featuring the words "RED HAT" in a smaller font above "SUMMIT" in a larger, bold font, all contained within a white speech bubble shape.

RED HAT  
**SUMMIT**

# Red Hat Gluster Storage Roadmap - Past, Present & Future

## Red Hat Gluster Storage Roadmap

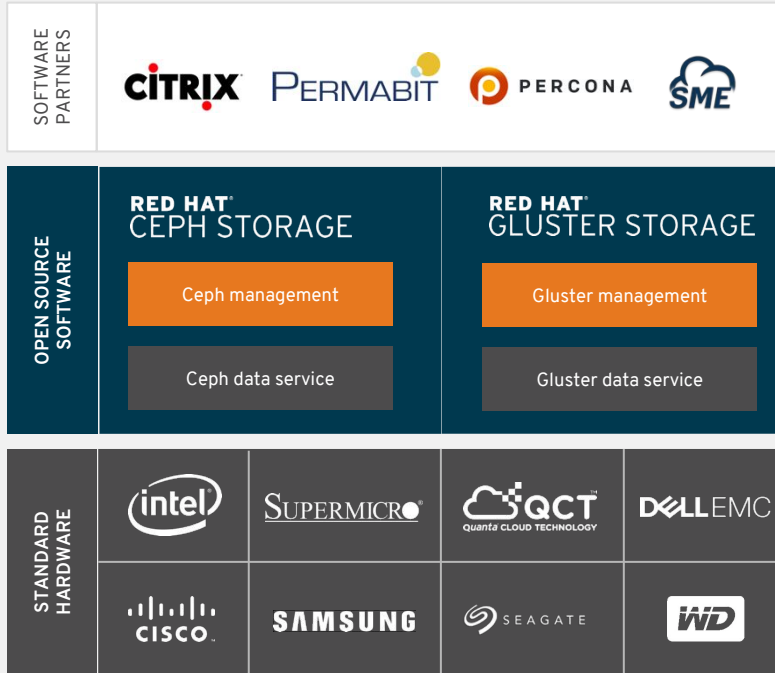
Sayan Saha  
Director, Product Management, Storage Business

Vijay Bellur  
Senior Principal Software Engineer

02-May-2017

# Why?

# THE RED HAT STORAGE ECOSYSTEM



Standard interfaces and full APIs ease integration with applications and systems

Self-managing and self-healing software provides durability and adapts to changes

Industry-standard hardware provides choice and can be tailored for specific workloads

# RED HAT STORAGE IS DEEPLY INTEGRATED

## RED HAT<sup>®</sup> STORAGE

### PHYSICAL

RED HAT<sup>®</sup>  
CEPH STORAGE

RED HAT<sup>®</sup>  
GLUSTER STORAGE

RED HAT<sup>®</sup>  
ENTERPRISE  
LINUX<sup>®</sup>

### VIRTUAL

RED HAT<sup>®</sup>  
CEPH STORAGE

RED HAT<sup>®</sup>  
GLUSTER STORAGE

RED HAT<sup>®</sup>  
ENTERPRISE  
LINUX<sup>®</sup>

RED HAT<sup>®</sup>  
VIRTUALIZATION

### PRIVATE CLOUD

RED HAT<sup>®</sup>  
CEPH STORAGE

RED HAT<sup>®</sup>  
GLUSTER STORAGE

RED HAT<sup>®</sup>  
OPENSTACK  
PLATFORM

### CONTAINERS

RED HAT<sup>®</sup>  
CEPH STORAGE

RED HAT<sup>®</sup>  
GLUSTER STORAGE



### PUBLIC CLOUD

RED HAT<sup>®</sup>  
CEPH STORAGE

RED HAT<sup>®</sup>  
GLUSTER STORAGE

RED HAT<sup>®</sup>  
ENTERPRISE  
LINUX<sup>®</sup>



# Red Hat Gluster Storage

## RED HAT GLUSTER STORAGE

### TARGET USE CASES

#### Container-Native Storage

- Persistent storage
- Containerized storage

#### Enterprise File Sharing

- Media streaming
- Active Archives

#### Enterprise Virtualization

#### Rich Media and Archival

## Shared-nothing, scale out file storage

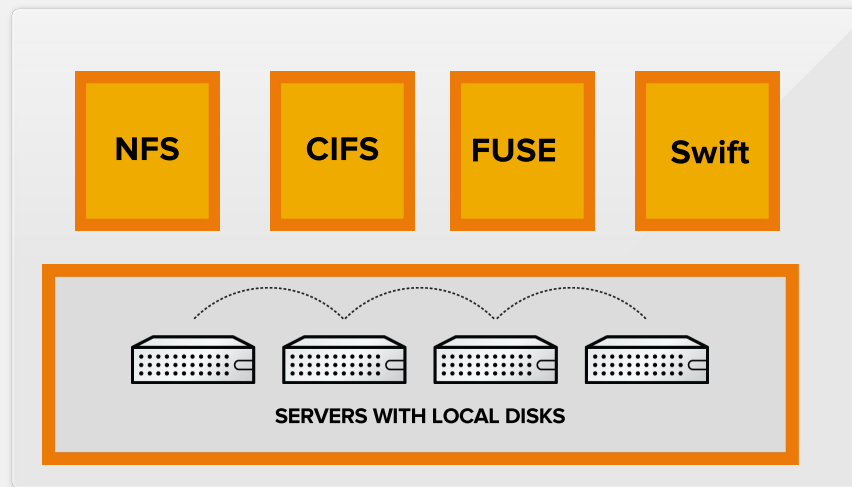
- Purpose-built as a distributed file store with a straightforward architecture suitable for public, private, and hybrid cloud
- Simple to install and configure, with a minimal hardware footprint
- Offers mature NFS, SMB and native interfaces for enterprise use

Thriving  
Community

Hundreds of customers running in production

# GLUSTER ARCHITECTURE

Distributed scale out storage using industry standard hardware



Aggregates systems to one cohesive unit  
and presents using common protocols

# PAST

# Gluster's journey @ Red Hat



## **Stability & Performance**

2011–2013



## **Enterprise-Class Features**

2014–Present

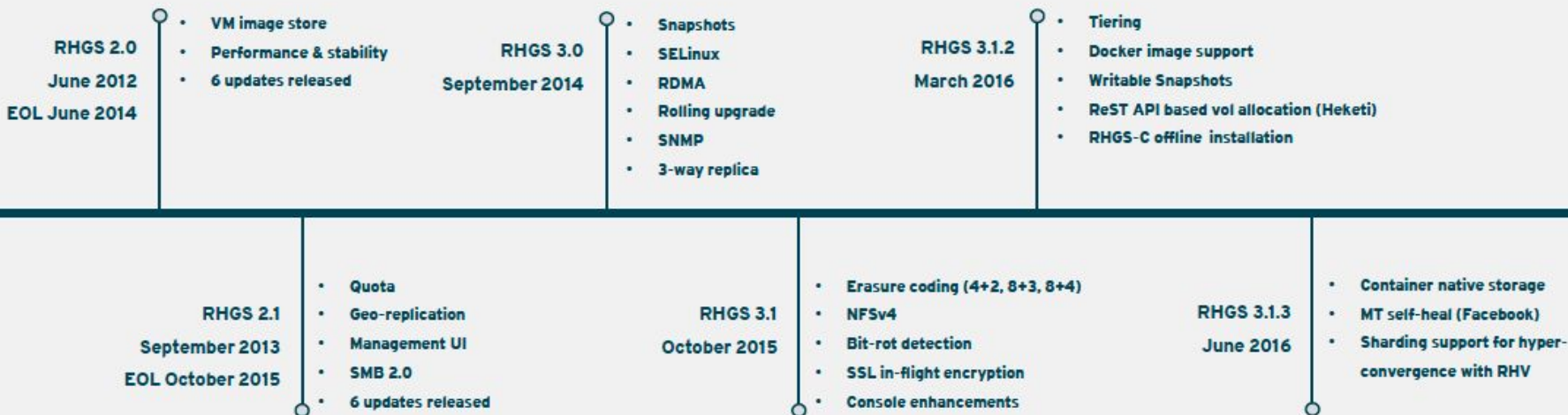


## **Enabling container-native storage & hyper-convergence**

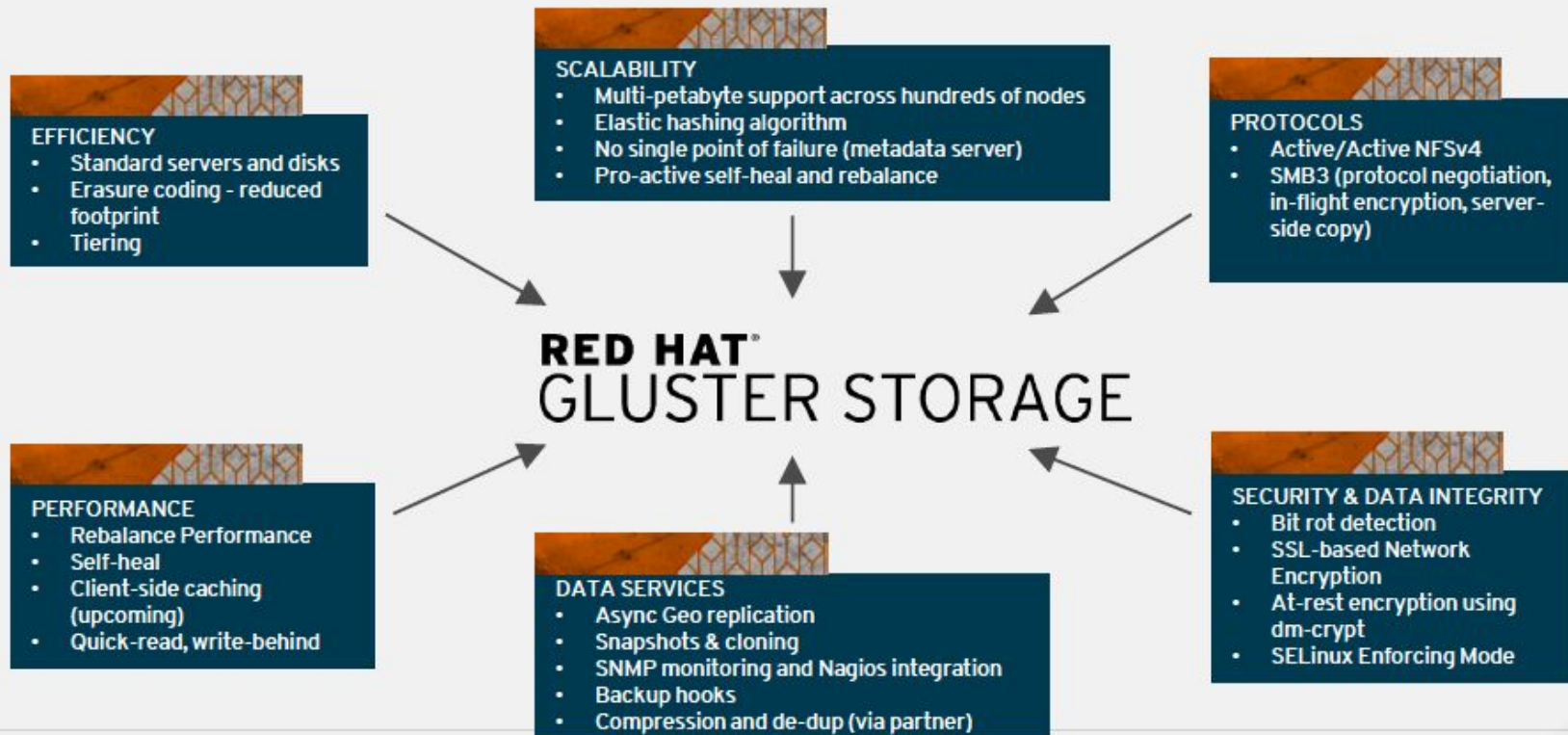
Now



# A STEADY FLOW OF INNOVATION

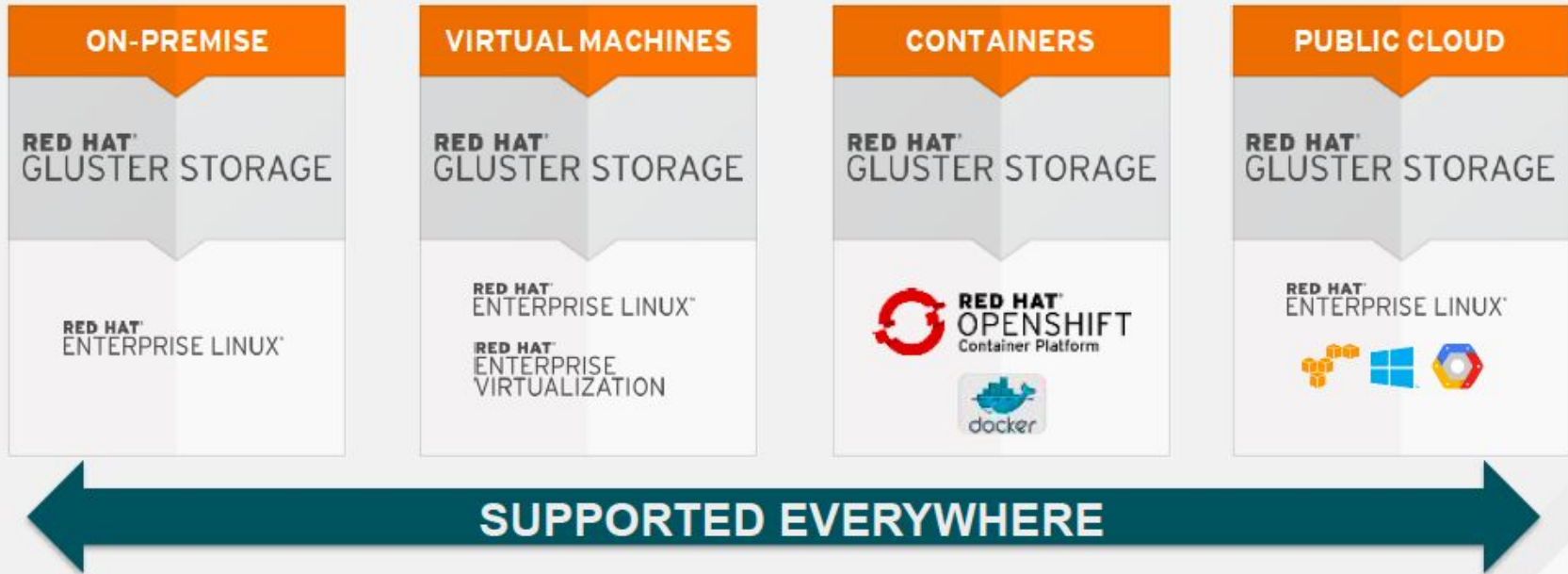


# Key Features: Red Hat Gluster Storage



# Flexible Deployment Options

- Same software bits across on-prem, VMs, containers and all three public clouds
- Applications can be ported across deployments without expensive re-writes
- Close integration with RHEL, RHV, and OpenShift



# RED HAT RECOGNIZED AS A STORAGE VISIONARY

Figure 1. Magic Quadrant for Distributed File Systems and Object Storage



**Red Hat Storage recognized as a Visionary** by Gartner in their first Magic Quadrant for Distributed File Systems and Object Storage.

This graphic was published by Gartner, Inc. as part of a larger research document and should be evaluated in the context of the entire document. The Gartner document is available upon request at <https://engage.redhat.com/gartnermagic-quadrant-storage-s-201610121525>

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# Customer Momentum

The logo for goodtech, featuring the word "goodtech" in a lowercase, sans-serif font. The letter "g" is stylized with a small orange square above it.

“Red Hat Gluster Storage met our requirements in terms of being a **scalable**, standard-based and **future-secure solution** based on proven technology from a trusted vendor, and adhering to our **high demands on accessibility and security.**”  
~ Anders Hellquist, Infrastructure Architect

The logo for CASIO, featuring the word "CASIO" in a bold, blue, uppercase, sans-serif font.

“Our costs, including various **procurement costs and operating fees**, fell to less than half of what we had been before implementing Red Hat Gluster Storage. The solution’s **flexibility** enabled us to build a storage environment using commodity servers and its **ease of operational control** was also a major advantage.”  
~ Kazuyasu Yamazaki, Group Mgr, IT Infrastructure Group

# Customer Momentum

Across industry verticals, geographies, and use cases



# PRESENT & FUTURE

# Strong interest and sales in

- Software-defined alternative for File/NAS
- Container Storage across hybrid cloud
- Hyper-converged storage
- POSIX compatible Storage in Public Cloud



# Focus Area

Software-defined alternative for File/NAS

Container Storage across Hybrid Cloud

Hyper-converged storage

POSIX compatible Storage in Public Cloud

# Software-defined alternative for File/NAS

## Why Red Hat Gluster Storage?

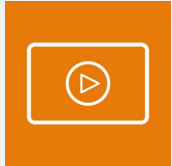
Superior price-performance

80% features, 30% cost

Migrate away from dead-end NAS appliances

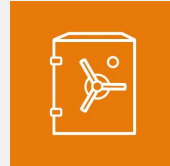
Comprehensive public cloud support!

# Use-Case Focus



## MEDIA REPOSITORY

like photos and videos, at enormously large scale



## BACKUP

where elasticity and recovery time is critical



## SURVEILLANCE

storage for customers with 1000+ cameras

# Roadmap - RHGS offering for File/NAS

## Red Hat Gluster Storage (2017)

### RHGS 3.2 (Mar 2017)

- Arbiter Volumes
- Metadata & Small files perf
- New capabilities in container
- Faster self-heal for EC & sharded volumes

# Roadmap - RHGS offering for File/NAS

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### RHGS 3.3 (Summer 2017)

- SMB performance enhancements (reduce lookups - negative lookup cache)
- Expanded EC configurations (8+2, 16+4 in addition to 4+2, 8+3 and 8+4)

# Roadmap - RHGS offering for File/NAS

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- SMB performance enhancements (reduce lookups - negative lookup cache)
- Expanded EC configurations (8+2, 16+4 in addition to 4+2, 8+3 and 8+4)

### RHGS 3.4 (Late 2017, Early 2018)


- Active-Active geo-replication (courtesy HALO replication from Facebook)
- Backup to public cloud

## Solutions, Ref Archs, P&S Guides (2017)

### Red Hat Summit (May 2017)

All-new Perf & Sizing Guide, featuring:

- 3.1.3 vs. 3.2 performance
- HDD vs. all-flash performance
- CCTV surveillance performance
- Detailed CPU/RAM/NIC consumption



Let's zoom in on some of the key upcoming  
features

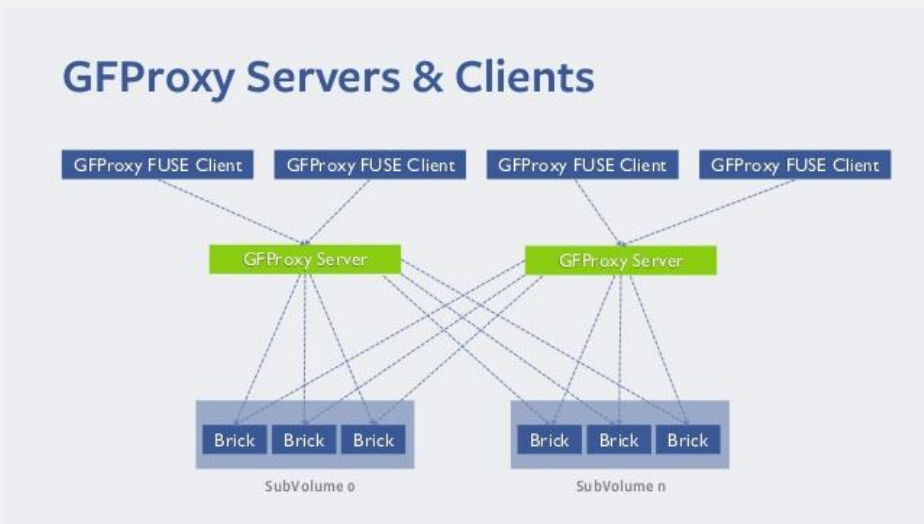
# Multi-master Replication (courtesy Facebook)

- Why?
  - Enable data federation across multiple-sites
- What?
  - Single Gluster volume spans multiple sites
  - Write/update a single Gluster volume from multiple geographical sites
  - Policy-based reconciliation of writes (last writer wins, one site always wins)
  - All reads are local, writes are propagated using self-heal to remote sites
- When?
  - End of CY 2017



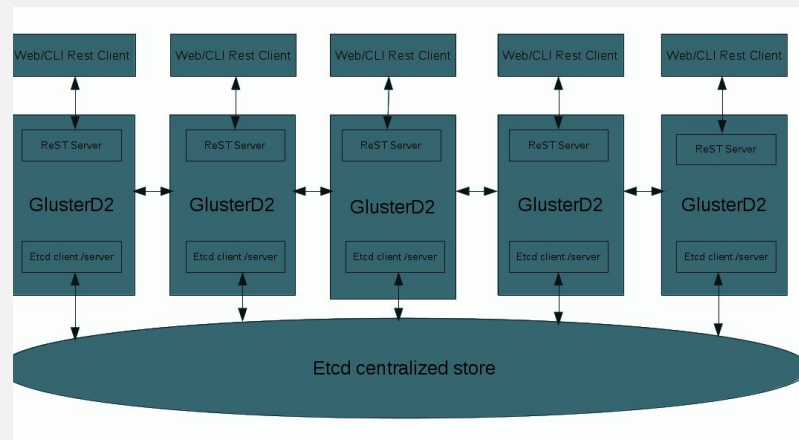
# GF Proxy (courtesy Facebook)

- Why?
  - Less frequent and minimally disruptive client upgrades for applications
  - Reduced churn as GlusterFS client changes less frequently
- What it is?
  - Thin, volume-topology aware client stack
  - Reduced footprint on the client
  - Distribution, Replication and Erasure Coding handled on the servers
- When?
  - CY 2018 with RHGS 4.0



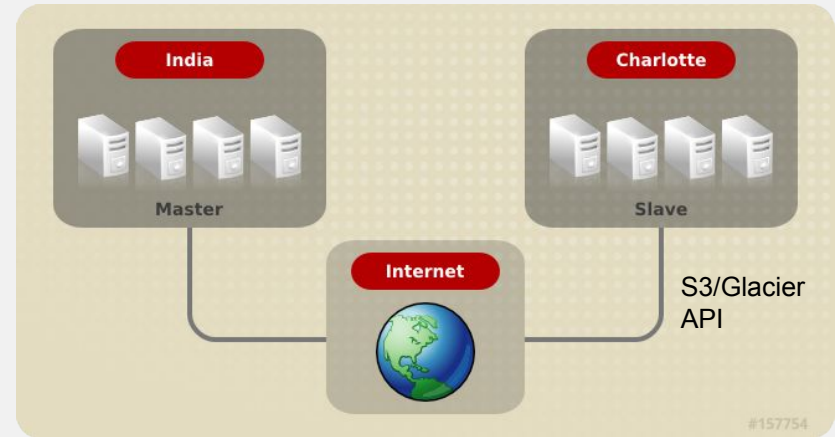
# GlusterD 2.0 - Next Gen Management Plane

- Why?
  - Expand the number of nodes per cluster
  - Streamlined cluster membership (reduce chatter)
  - Strongly consistent state management
- What?
  - Highly scalable management plane
  - Autonomous management - low admin intervention for DevOps, containerized workloads (“give me 32 TBs of erasure coded storage”)
- When?
  - CY 2018 with RHGS 4.0



# Backup data to object stores in Public Cloud

- Why?
  - Data management across hybrid cloud
- What it is?
  - Backup data in Gluster volumes to Amazon S3, Google Cloud Storage, Azure Storage etc.
  - Leverages changelog infrastructure used by geo-replication to synchronize data
  - HTTPs based data transfer vs ssh in geo-replication.
- When?
  - Late CY 2017/ Early CY 2018



# Focus Area

Software-defined alternative for File/NAS

**Container Storage across hybrid Cloud**

Hyper-converged storage

POSIX compatible Storage in Public Cloud

# Container Storage across Hybrid Cloud

## Why Red Hat Gluster Storage?

- RHGS provides consistent data management across the hybrid cloud for OpenShift - runs everywhere!
- Tight integration with RHGS running containerized inside OpenShift as kubernetes pods
- No need to throw away your existing SAN/NAS

# Container Storage – Use Cases

Persistent Storage for containerized apps

OpenShift Infra (Registry)

Compliments of  redhat

Red Hat Special Edition

# Container Storage

FOR  
**DUMMIES**<sup>®</sup>  
A Wiley Brand

**Learn:**

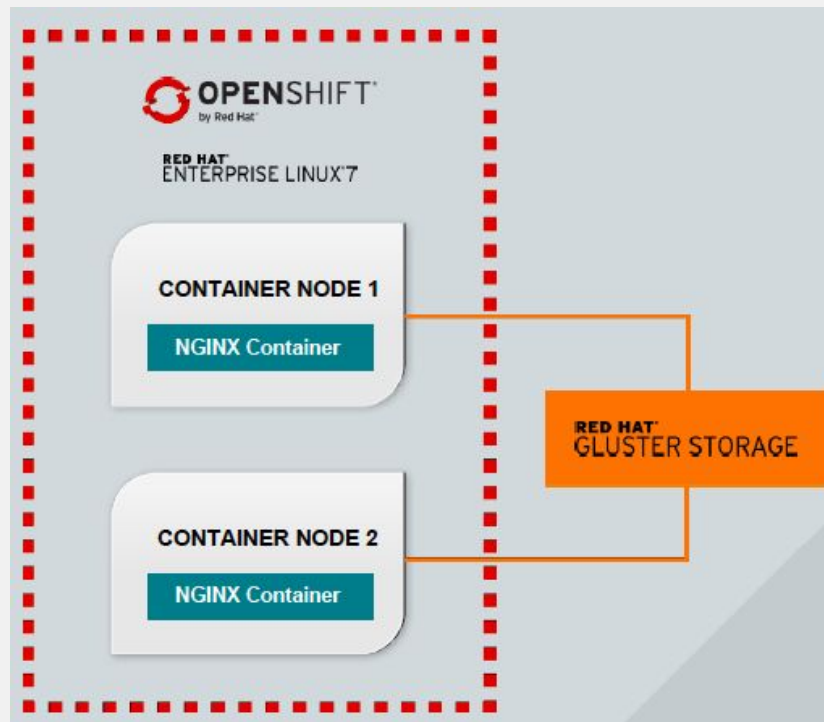
- Persistent storage for modern applications
- Storage for and in containers
- Dynamic storage provisioning for developers

Ed Tittel  
Sayan Saha  
Steve Watt  
Michael Adam  
Irshad Raihan



# Deployment Option-1: Container Ready Storage (CRS)

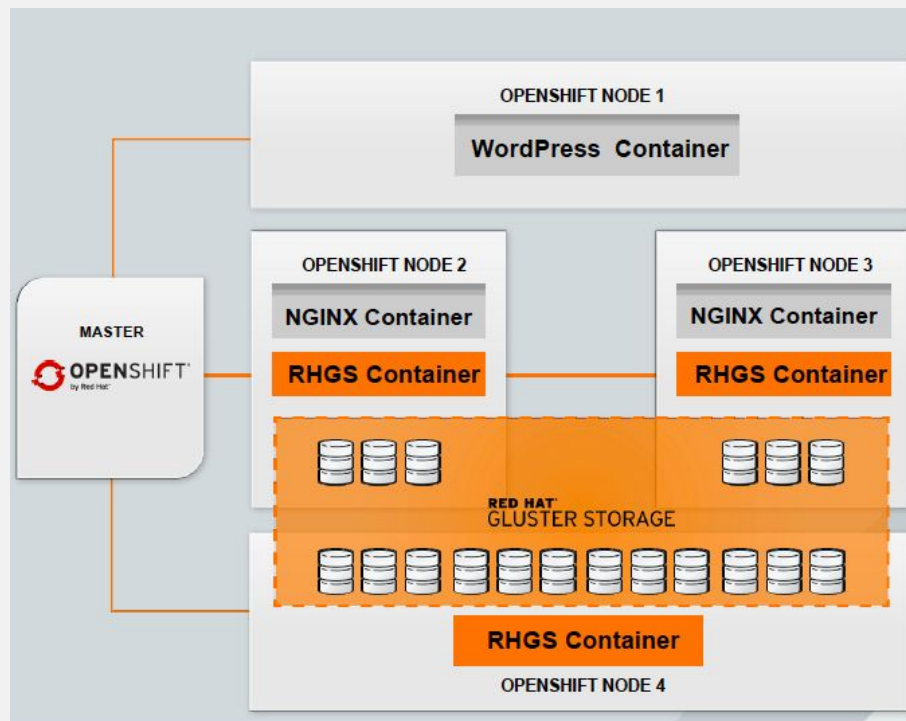
- Storage provided by a dedicated Red Hat Gluster Storage Cluster over the network outside OpenShift
- Red Hat Gluster Storage can run bare metal or VMs
- Storage and compute can scale independently





## Deployment Option-2: Container-Native Storage (CNS)

- Fully featured scale-out storage platform (RHGS) runs inside OpenShift in containers (kubernetes pods)
- Application and storage containers can be co-located
- Storage services managed, scaled and upgraded like app containers



# Zooming In on Deployment Options

- **Container Ready Storage (CRS) serving out storage to OpenShift with:**
  - RHGS in stand-alone bare-metal storage clusters
  - RHGS inside VMs fronting Enterprise Storage Arrays
  - RHGS in AWS, Azure and Google Cloud
- **Container-Native Storage (CNS)**
  - RHGS runs containerized inside OpenShift Container Platform (always with Heketi)
  - CNS runs anywhere OCP runs!

# Container Storage Roadmap

## CONTAINER NATIVE STORAGE (2017)

CNS 3.4 (Jan 2017)

- Dynamic provisioning
- Storage Classes
- Usability (cns-deploy)
- Upstream project launch  
gluster-kubernetes

# Container Storage Roadmap

## CONTAINER NATIVE STORAGE (2017)

CNS 3.4 (Jan 2017)

- Dynamic provisioning
- Storage Classes
- Usability (cns-deploy)
- Upstream project launch gluster-kubernetes

CNS 3.5 (April 2017)

- Registry back-end for OCP in CNS
- Expand Day-2 ops
- Basic Support for replication, snapshots etc.

## Ref Archs, P&S Guides (2017)

Red Hat Summit (May 2017)

Integrated OpenShift on AWS Ref Arch:

- Existing OCP on AWS stepwise guide, plus
- Configuring storage via Gluster CNS
- Configuring storage via Gluster CRS
- Configuring Registry via Gluster

# Container Storage Roadmap

## CONTAINER NATIVE STORAGE (2017)

### CNS 3.4 (Jan 2017)

- Dynamic provisioning
- Storage Classes
- Usability (cns-deploy)
- Upstream project launch gluster-kubernetes

### CNS 3.5 (April 2017)

- Registry back-end for OCP in CNS
- Expand Day-2 ops
- Basic Support for replication, snapshots etc.

### CNS 3.6 (Summer 2017) + CNS 3.7 (Fall 2017)

- OCP Main Registry back-end
- High Volume density per cluster - PVs
- Proper support for block (RWO workloads) via iSCSI
- Light-weight s3 object store for OpenShift

## Solutions, Ref Archs, P&S Guides (2017)

### Red Hat Summit (May 2017)

#### Integrated OpenShift on AWS Ref Arch:

- Existing OCP on AWS stepwise guide, plus
- Configuring storage via Gluster CNS
- Configuring storage via Gluster CRS
- Configuring Registry via Gluster

### Summer 2017

- Integrated OCP/CNS Test Drive
- OCP/CNS Perf & Sizing Guide (Bare Metal reference platform)

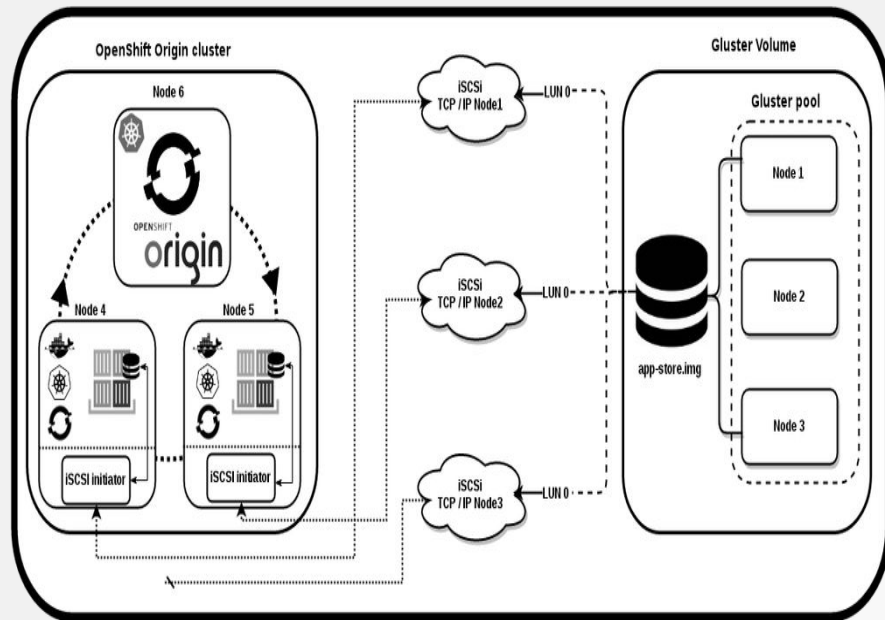
Red Hat is making strong investments in RHGS to make it the default storage platform for OpenShift

# Brick Multiplexing

- Why?
  - Radically lower CPU, memory and port consumption/usage
  - Order of magnitude increase in the number of volumes per cluster especially for OpenShift storage
- What it is?
  - Move from 1 brick per process to multiple bricks per process
  - Many bricks can consume **one** port, **one** set of global data structures, and **one** pool of global threads
  - Configurable number of bricks per Server Process
  - Provides more flexibility for I/O scheduling across volumes
- When?
  - Summer 2017 for container-storage use-cases

# Gluster-Block support for OpenShift/Container Storage

- Why
  - Proper and low latency block support for containerized workloads needing RWO access mode as defined by kubernetes
- What
  - iSCSI access to volumes with tcmu-runner and libgfs2
  - Orchestration of block devices managed by gluster-block
  - New gluster-block provisioner for kubernetes
- When
  - Summer CY 2017





# S3 support for OpenShift

- Why?
  - s3 support for developers and application teams building cloud-native apps
- What it is?
  - Gluster-s3 container provides a S3 interface to a gluster volume
  - Embedded as a micro-service inside OpenShift
  - Targeted for binary build archival, backups and registry storage in OpenShift
- When?
  - 2-H CY 2017

# RHGS based Container Storage – Differentiators

- Storage can run as a set of micro-services inside OpenShift - no external appliance needed
- Consistent storage platform across the hybrid cloud
- Multi purpose (RWO, RWX, object), flexible & versatile

# Summit Announce: OpenShift and Container Native Storage (CNS) on AWS

- **What Did We Announce?**

- Reference Architecture for deploying OpenShift with CNS persistence layer on AWS
- Ansible quickstart playbooks for automating deployments

- **Why:**

- Provides OpenShift deployments with common storage abstraction layer across private and public cloud infrastructures.
- Enhances application portability through common persistence layer semantics.

- **Examples:**

- Multiple NGINX web server instances writing concurrently to a common Persistent Volume.
- Single MySQL database instance writing to a fast StorageClass Persistent Volume.

# Focus Area

Software-defined alternative for File/NAS  
Container Storage across Hybrid Cloud  
**Hyper-converged storage with RHV**  
POSIX compatible Storage in Public Cloud

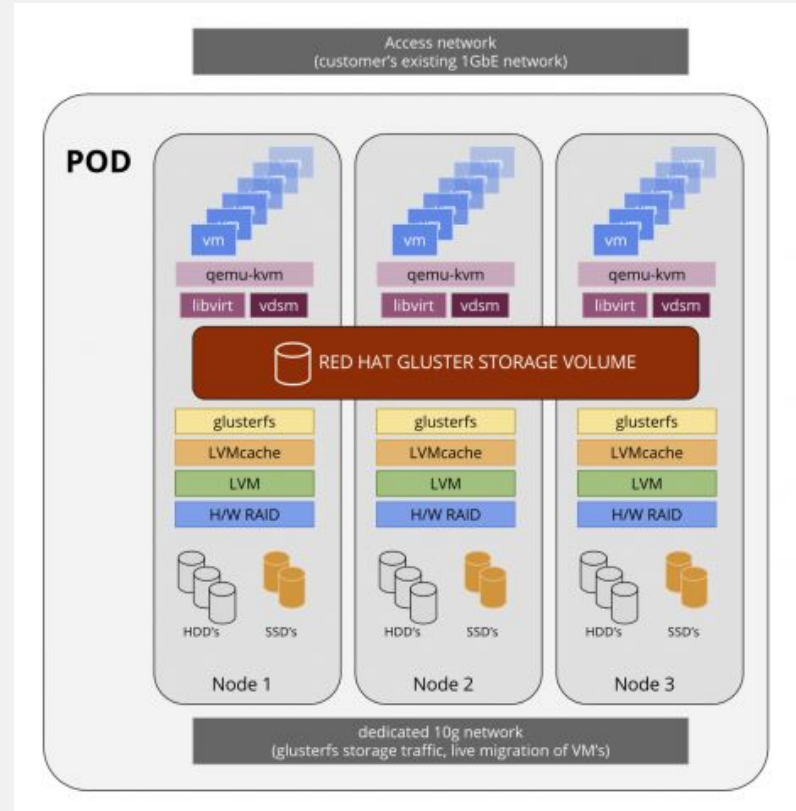
# Hyper-converged storage with RHV

## Why?

- Customers are looking for true open source alternatives to proprietary HCI solutions
- Price-performance
- Pricing & hardware selection flexibility

# Hyperconverged VM store with RHV + RHGS

- World's first HCI solution with true open source components (oVirt + Gluster)
- Single SKU product with unified management & life-cycle
- Initial Use-Case: Remote-Office-Branch-Office (ROBO)/edge computing
- Arbitrarily Volumes Supported - Low footprint (full 3-way replication not needed!)
- Ansible based wizard driven deployment



# 6 steps to nirvana

RED HAT VIRTUALIZATION HOST 4.1 (EL7.3)

192.168.124.204 Dashboard Virtualization

Dashboard

Hosted Engine

Virtual Machines

## Hosted Engine Setup

Configure and install a highly-available virtual machine which will run oVirt Engine to manage multiple compute nodes, or add this system to an existing hosted engine cluster.

Standard

Hosted Engine with Gluster

Start

Gluster Deployment

Hosts Packages Volumes Bricks Review

1 2 3 4 5

Yum Repos

Packages

Yum Update

GPG Check

Cancel < Back Next >

Gluster Deployment

Hosts Packages Volumes Bricks Review

1 2 3 4 5

LV Name	Device	Size	Mount Point	Thinp	RAID	Stripe Size	Disk Count
engine	sdb	100	/gluster_bricks/engine	<input type="checkbox"/>	raid5	256	12
data	sdk	500	/gluster_bricks/data	<input checked="" type="checkbox"/>	raid5	256	12
vmstore	sdk	500	/gluster_bricks/vmstore	<input checked="" type="checkbox"/>	raid5	256	12

[Add Bricks](#)

Cancel < Back Next >

Gluster Deployment

Hosts Packages Volumes Bricks Review

1 2 3 4 5

Host1 192.168.33.101

Host2 192.168.33.102

Host3 192.168.33.103

[Add Host](#)

**2**

**1** gdeploy will login to gluster hosts as root user using passwordless ssh connections. Make sure, passwordless ssh is configured for all gluster hosts.

Cancel < Back Next >

Gluster Deployment

Hosts Packages Volumes Bricks Review

1 2 3 4 5

Name	Volume Type	Arbiter	Brick Dirs
engine	Replicate	<input checked="" type="checkbox"/>	/gluster_bricks/engine/engine
data	Replicate	<input checked="" type="checkbox"/>	/gluster_bricks/data/data
vmstore	Replicate	<input checked="" type="checkbox"/>	/gluster_bricks/vmstore/vmstore

[Add Volume](#)

Cancel < Back Next >

Gluster Deployment

Hosts Packages Volumes Bricks Review

1 2 3 4 5

**6**

```
##Generated Gdeploy configuration: /tmp/gdeployConfig.conf
#Gdeploy configuration generated by cockpit-gluster plugin
[hosts]
192.168.33.101
192.168.33.102
192.168.33.103

[distype]
raid5

[discount]
12

[stripesize]
```

Cancel < Back Deploy >

# Roadmap

## Red Hat Virt + Red Hat Gluster Storage Hyper-Converged

### Limited Availability (GA soon)

- ROBO use-case
- DR support
- Up to 9-node HCI clusters
- Ansible based wizard driven install

### Summer 2017

- Libgfapi integration - high performance
- UI enhancements
- OVS support

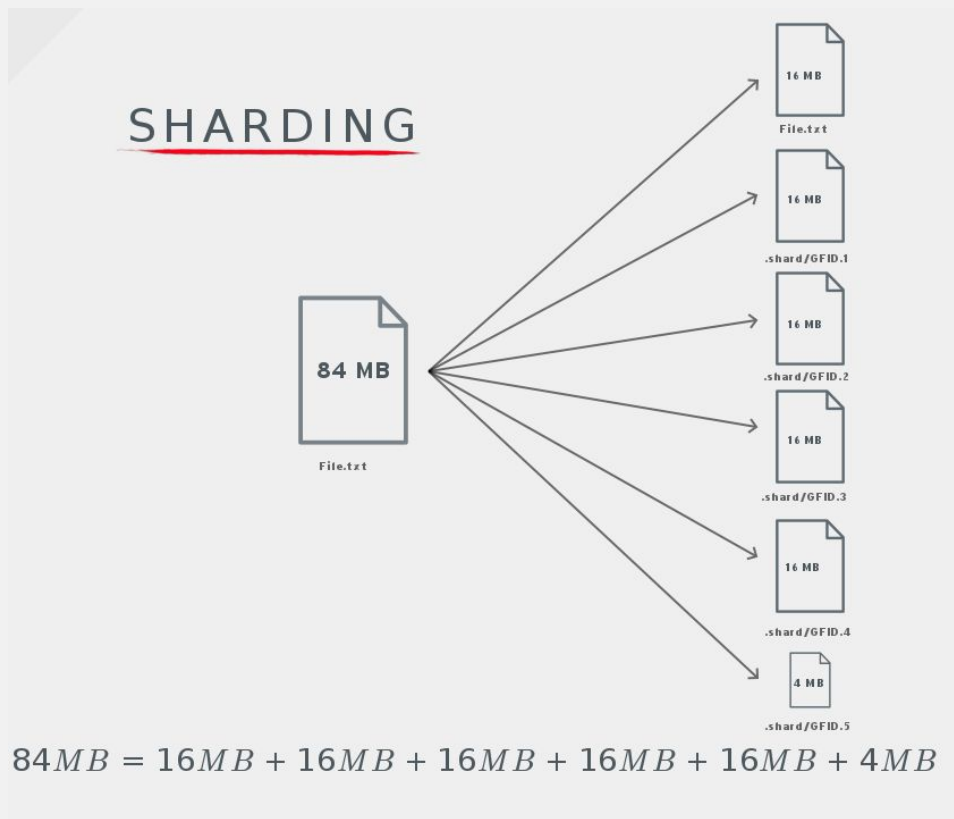
### Winter 2017

- Expand Scale
- Ultra-small: Start with 1-node, expand to 2 or 3
- Validated partner appliance (tentative)



# Sharding

- Why?
  - Better back-end for large files like Virtual Machine disks.
- What it is?
  - Chunk VM image files into smaller fragments across the storage cluster
  - Efficient healing and parallelized i/o
  - File sizes are not bound by disk or brick limits
- When?
  - Shipping now



# Focus Area

Software-defined alternative for File/NAS

Container Storage across Hybrid Cloud

Hyper-converged storage with RHV

**POSIX compatible Storage in Public Cloud**

# POSIX compatible Storage in Public Cloud

## Why?

- Public clouds seen as alternative to data center!
- Customers want to run the same apps, up there!
- Spotty support for POSIX compatible storage in public cloud

# “Lift & Shift” to Public Cloud

## Public Cloud 2016 & 2017

### Summer 2016

- Published “Admin Guide” for AWS, Azure, Goog Cloud
- Azure Ready images (VHDs)
- Goog Ready image (qcow2)

### Spring/Summer 2017

- Highly Available NFS and SMB support



# Container-Native Storage for Modern Applications with OpenShift and Red Hat Gluster Storage

Thursday, May 4th, 11:30 PM - 12:15 PM, Room # 157A

Sayan Saha  
Director, Product Management, Storage Business, Red Hat

Michael Adam  
Engineering Manager, Container-Native Storage, Red Hat

Annette Clewett  
Senior Storage Architect, Storage Business, Red Hat

Daniel Messer  
Technical Marketing, Storage Business, Red Hat

# MODERNIZING STORAGE INFRASTRUCTURE WITH OPEN SCALE-OUT STORAGE

Wolfgang Schulze, Storage Practice Lead

Wednesday, May 3, 12:30 PM - 1:15 PM

Located at the Consulting Discovery Zone at the Services Showcase in the Partner Pavilion

To learn more, visit [red.ht/discoveryzone](https://red.ht/discoveryzone)



# THANK YOU



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[youtube.com/user/RedHatVideos](https://youtube.com/user/RedHatVideos)

The logo consists of a white speech bubble shape with a tail pointing downwards. Inside the bubble, the words "RED HAT" are in a smaller, bold, red sans-serif font, and "SUMMIT" is in a larger, bold, red sans-serif font below it.

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**LEARN. NETWORK.  
EXPERIENCE  
OPEN SOURCE.**