



# Red Hat Gluster Storage

## 3.1

# Configuring Red Hat Enterprise Virtualization with Red Hat Gluster Storage

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Getting Started with Red Hat Gluster Storage 3.1 and Red Hat Enterprise Virtualization 3.4 or later.

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## Abstract

This document is a step-by-step guide for first-time users to install and configure a basic Red Hat Enterprise Virtualization environment and enable Red Hat Gluster Storage for virtualization.

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## Preface

Red Hat Gluster Storage is a software-only, scale-out storage solution that provides flexible and agile unstructured data storage for the enterprise. Red Hat Enterprise Virtualization uses a centralized shared storage system for virtual machine disk images, snapshots and templates.

This guide enables you to install and configure Red Hat Enterprise Virtualization and create virtual machines using Red Hat Gluster Storage as storage domains.

## Chapter 1. Introduction to Red Hat Gluster Storage for Virtualization

Red Hat provides a way to create and optimize Red Hat Gluster Storage volumes using the Red Hat Enterprise Virtualization Manager. Red Hat Enterprise Virtualization platform and Red Hat Gluster Storage platform comprise various components that work seamlessly together, enabling system administrators to install, configure, and manage a virtualized environment using Red Hat Gluster Storage as the virtual machine image store.

Red Hat Gluster Storage provides a POSIX-compatible file system that allows you to store virtual machine images in a Red Hat Gluster Storage Server cluster instead of network-attached storage (NAS) appliances or a storage area network (SAN) array.

Red Hat Enterprise Virtualization 3.3 and later versions support the use of POSIX-compliant file systems for storage. Red Hat Gluster Storage provides a POSIX-compatible file system in which you can create Red Hat Gluster Storage volumes as storage domains.

Red Hat Enterprise Virtualization and Red Hat Gluster Storage integration consists of:

- Red Hat Enterprise Virtualization environment.

See the *Red Hat Enterprise Virtualization Technical Reference* for an architectural overview:

[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Virtualization/3.6/html/Technical\\_Reference/index.html](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Virtualization/3.6/html/Technical_Reference/index.html)

- Red Hat Gluster Storage environment.

A Red Hat Gluster Storage environment consists of bricks that are used to build volumes. Different types of optimized storage volumes can be used as virtual machine stores to hold resources such as virtual disks, templates, and snapshots.

The following diagram illustrates Red Hat Enterprise Virtualization integration with Red Hat Gluster Storage:

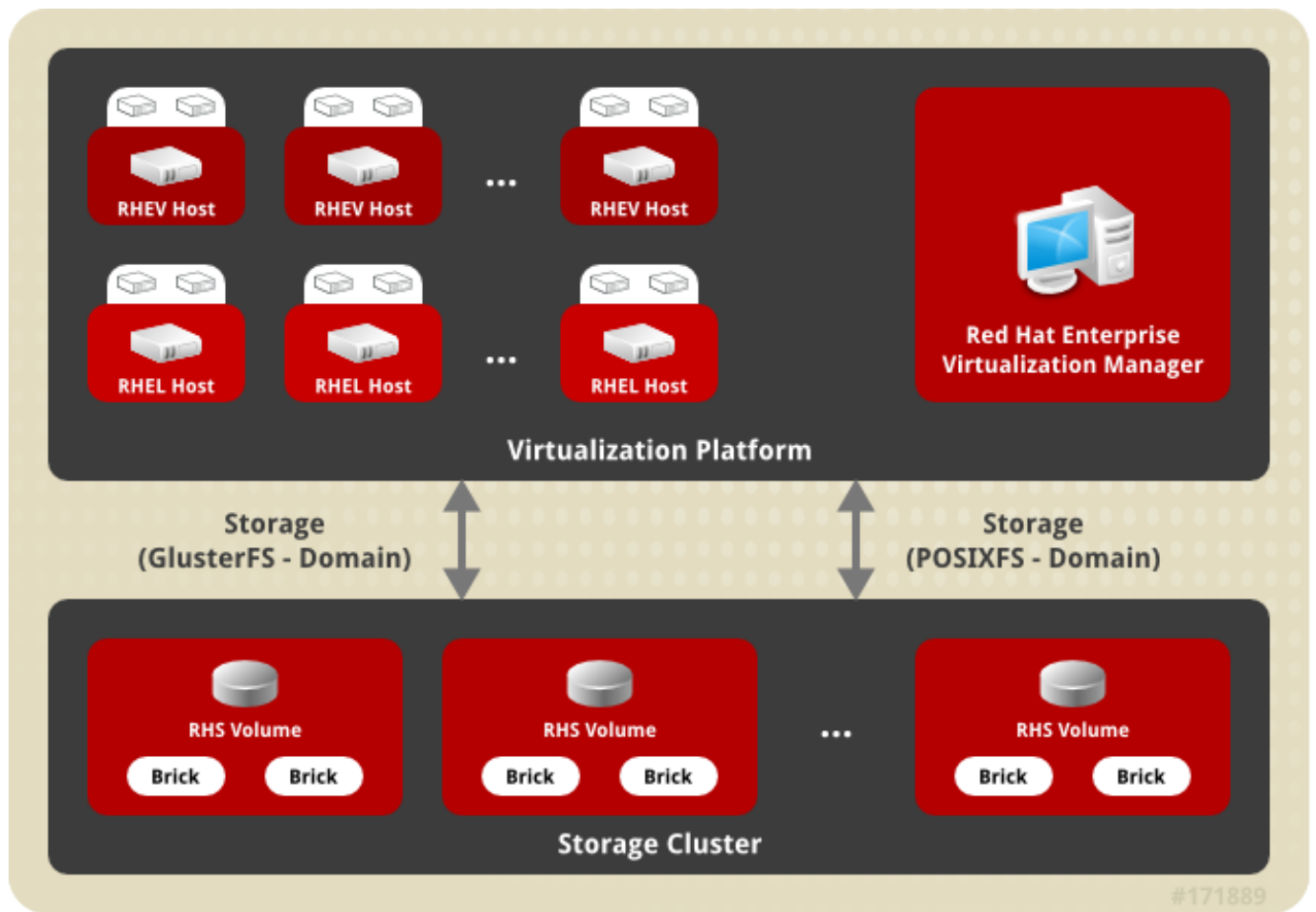


Figure 1.1. Integration architecture



**Important**

Red Hat Enterprise Virtualization 3.3 onwards, the **GlusterFS storage domain** uses the same access mechanism as the POSIXFS domain. The GlusterFS storage domain is introduced to support the **libgfapi** protocol in the future releases.



## Chapter 2. Support Requirements

This chapter outlines the requirements for creating a supported integration of Red Hat Gluster Storage and Red Hat Enterprise Virtualization.

### 2.1. Prerequisites

Integrating Red Hat Gluster Storage with Red Hat Enterprise Virtualization has the following requirements:

- All installations of Red Hat Enterprise Virtualization and Red Hat Gluster Storage must have valid subscriptions to Red Hat Network channels and Subscription Management repositories.
- Red Hat Enterprise Virtualization installations must adhere to the requirements laid out in the *Red Hat Enterprise Virtualization Installation Guide*: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Virtualization/3.6/html/Installation\\_Guide/chap-System\\_Requirements.html](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Virtualization/3.6/html/Installation_Guide/chap-System_Requirements.html).
- Red Hat Gluster Storage installations must adhere to the requirements laid out in the *Red Hat Gluster Storage Installation Guide*: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Storage/3.1/html/Installation\\_Guide/chap-Planning\\_Red\\_Hat\\_Storage\\_Installation.html](https://access.redhat.com/documentation/en-US/Red_Hat_Storage/3.1/html/Installation_Guide/chap-Planning_Red_Hat_Storage_Installation.html).
- Red Hat Gluster Storage installations must be completely up to date with the latest patches and upgrades. Refer to the *Red Hat Gluster Storage 3.1 Installation Guide* to upgrade to the latest version: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Storage/3.1/html/Installation\\_Guide/index.html](https://access.redhat.com/documentation/en-US/Red_Hat_Storage/3.1/html/Installation_Guide/index.html).
- The versions of Red Hat Enterprise Virtualization and Red Hat Gluster Storage integrated must be compatible, according to the table in [Section 2.2, “Compatible Versions”](#).
- If you are using a QEMU/KVM hypervisor, ensure that the following SELinux booleans are enabled.

```
# setsebool -P sanlock_use_fusefs on
# setsebool -P virt_use_sanlock on
# setsebool -P virt_use_fusefs on
```

### 2.2. Compatible Versions

The following table indicates the product and package versions required to create a supported deployment of Red Hat Gluster Storage (RHGS) nodes managed by the specified version of Red Hat Enterprise Virtualization (RHEV).

**Table 2.1. Supported version information for Red Hat Gluster Storage**

RHGS version	gluster version	gluster op-version	RHEV version
3.0	3.6.0.28-1	30000	3.4
3.0 Update 1	3.6.0.29-1	30000	3.4
3.0 Update 2	3.6.0.29-3	30000	3.4
3.0 Update 3	3.6.0.42-1	30000	3.4
3.0 Update 4	3.6.0.53-1	30004	3.5
3.1	3.7.1-11	30703	3.5, 3.6
3.1 Update 1	3.7.1-16	30703	3.5, 3.6
3.1 Update 2	3.7.5-19	30707	3.5, 3.6

Red Hat Enterprise Virtualization uses a compatibility version to indicate the version of Red Hat Enterprise Virtualization that the data center is intended to be compatible with. This compatibility level must be the same throughout the cluster. Use the following table to determine an appropriate compatibility version for your versions of Red Hat Enterprise Virtualization and Red Hat Gluster Storage.

**Table 2.2. Cluster compatibility matrix**

RHEV Version	RHGS Version	Cluster Compatibility
3.4	3.0.z	3.4
	3.1.z	3.4
3.5	3.0, 3.0.1, 3.0.2, 3.0.3	3.4
	3.0.4	3.5
	3.1.z	3.5
3.6	3.0.z	3.4
	3.1.z	3.5

Red Hat Enterprise Virtualization 3.6 requires a compatibility setting of 3.5 when used with Red Hat Gluster Storage 3.1 because Red Hat Gluster Storage does not currently include the vdsmd package required to support a compatibility version of 3.6.

## Chapter 3. Enabling Red Hat Gluster Storage in Red Hat Enterprise Virtualization Manager

### 3.1. Using Red Hat Gluster Storage Volumes in the Red Hat Enterprise Virtualization Manager

Red Hat Enterprise Virtualization supports Red Hat Gluster Storage volumes as storage domains. Enabling Red Hat Gluster Storage volumes in Red Hat Enterprise Virtualization Manager requires installation and configuration of several components to create a functioning virtualization environment. You must install and configure each component in the following order:

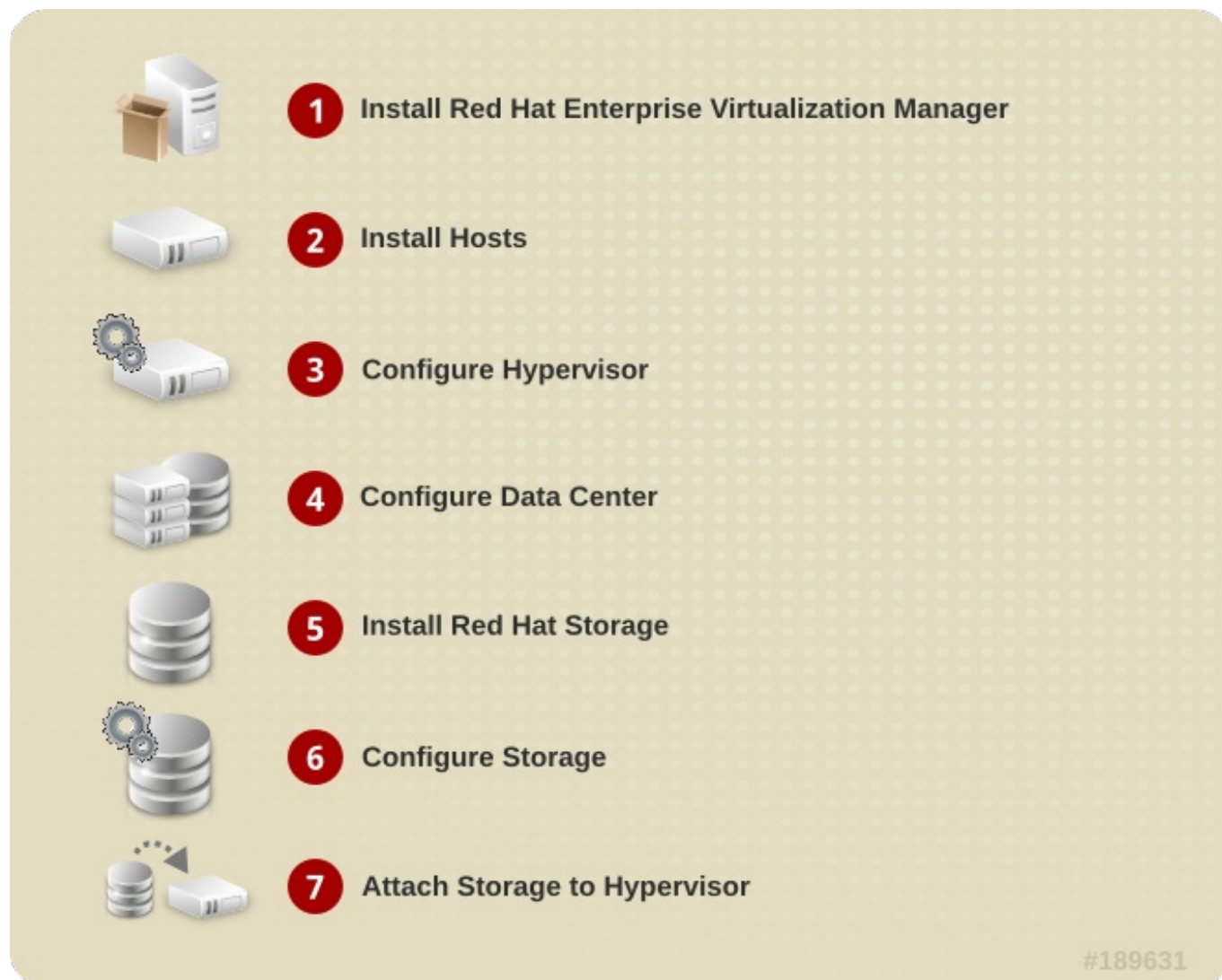


Figure 3.1. Installation Workflow

#### Procedure 3.1. To Enable Red Hat Gluster Storage in Red Hat Enterprise Virtualization Manager

##### 1. Install Red Hat Enterprise Virtualization Manager

The Red Hat Enterprise Virtualization Manager is the control center of the Red Hat Enterprise Virtualization environment. Ensure that Red Hat Enterprise Virtualization Manager is installed and configured.

Install and configure Red Hat Enterprise Virtualization Manager. See *Installing the Red Hat*

*Enterprise Virtualization Manager* in the *Red Hat Enterprise Virtualization Installation Guide* for more information: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Virtualization/3.6/html/Installation\\_Guide/part-Installing\\_Red\\_Hat\\_Enterprise\\_Virtualization.html](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Virtualization/3.6/html/Installation_Guide/part-Installing_Red_Hat_Enterprise_Virtualization.html).

## 2. Install Hosts

Install the virtual machine hosts using either Red Hat Enterprise Virtualization Hypervisor or Red Hat Enterprise Linux as hosts. Before beginning the installation process, ensure that all virtualization hosts meet the hardware requirements and that the installation of Red Hat Enterprise Virtualization Manager is complete.

You can use the following hypervisors as hosts:

- ✦ Red Hat Enterprise Virtualization Hypervisor 3.4
- ✦ Red Hat Enterprise Linux 6.3
- ✦ Red Hat Enterprise Linux 6.4
- ✦ Red Hat Enterprise Linux 6.5

During installation, set the fully qualified domain name (FQDN) and IP address for the server in order to avoid network conflicts. For information on installing the hypervisor, see *Installing Hypervisor Hosts* in the *Red Hat Enterprise Virtualization Installation Guide*:

[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Virtualization/3.6/html/Installation\\_Guide/part-Installing\\_Hypervisor\\_Hosts.html](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Virtualization/3.6/html/Installation_Guide/part-Installing_Hypervisor_Hosts.html).



### Note

You must install Red Hat Enterprise Linux 6.3, Red Hat Enterprise Linux 6.4 Server or Red Hat Enterprise Linux 6.5 on a system to use it as a virtualization host in a Red Hat Enterprise Virtualization environment. See *Installing Red Hat Enterprise Linux Hosts* in the *Red Hat Enterprise Virtualization Installation Guide* for details:

[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Virtualization/3.6/html/Installation\\_Guide/chap-Red\\_Hat\\_Enterprise\\_Linux\\_Hosts.html](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Virtualization/3.6/html/Installation_Guide/chap-Red_Hat_Enterprise_Linux_Hosts.html).

## 3. Subscribe hosts to channels or repositories

Red Hat Enterprise Linux hosts need to be registered and subscribed to a number of entitlements using either Subscription Manager or Red Hat Network Classic. For more information, see *Subscribing to Required Channels using RHN Classic* in the *Red Hat Enterprise Virtualization Installation Guide*: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Virtualization/3.6/html/Installation\\_Guide/Subscribing\\_to\\_Required\\_Channels\\_using\\_Subscription\\_Manager1.html](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Virtualization/3.6/html/Installation_Guide/Subscribing_to_Required_Channels_using_Subscription_Manager1.html).

Subscribe Red Hat Enterprise Linux 6.3, 6.4, and 6.5 hosts to the channels listed below:

- ✦ rhel-x86\_64-server-6
- ✦ rhel-x86\_64-rhev-mgmt-agent-6

Apart from the above channels, you must also subscribe to the Red Hat Gluster Storage 3.1 Native Client channels to get the latest version:

Run the `rhnc-channel --add --channel` command to subscribe the system to the correct Red Hat Gluster Storage Native Client channel:

- For Red Hat Enterprise Linux 7.x clients using Red Hat Satellite Server:

```
# rhnc-channel --add --channel=rhel-x86_64-server-rh-common-7
```

- For Red Hat Enterprise Linux 6.x clients:

```
# rhnc-channel --add --channel=rhel-x86_64-server-rhclient-6
```

- For Red Hat Enterprise Linux 5.x clients:

```
# rhnc-channel --add --channel=rhel-x86_64-server-rhclient-5
```

For information on how to install native clients, see *Installing Native Client* in the *Red Hat Gluster Storage Administration Guide*: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Gluster\\_Storage/3.1/html/Administration\\_Guide/chap-Accessing\\_Data\\_-\\_Setting\\_Up\\_Clients.html#Installing\\_Native\\_Client](https://access.redhat.com/documentation/en-US/Red_Hat_Gluster_Storage/3.1/html/Administration_Guide/chap-Accessing_Data_-_Setting_Up_Clients.html#Installing_Native_Client)

#### 4. Configure the Hypervisor

##### Red Hat Enterprise Virtualization Hypervisor host

Install Red Hat Enterprise Virtualization Hypervisor 3.4 on bare metal. See *Installing the Red Hat Enterprise Virtualization Hypervisor* chapter of the *Red Hat Enterprise Virtualization Installation Guide*: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Virtualization/3.6/html/Installation\\_Guide/part-Installing\\_Hypervisor\\_Hosts.html](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Virtualization/3.6/html/Installation_Guide/part-Installing_Hypervisor_Hosts.html)

##### Red Hat Enterprise Linux 6.3, 6.4, or 6.5 host

A Red Hat Enterprise Linux virtualization host must be registered and subscribed to a number of entitlements using either Subscription Manager or Red Hat Network Classic. See *Subscribing to Required Channels using RHN Classic* in the *Installing Red Hat Enterprise Linux Hosts* chapter of the *Red Hat Enterprise Virtualization Installation Guide* for more information.

Subscribe to the Red Hat Gluster Storage Native Client from the Additional Services Channels to ensure the server has the latest clients installed:

```
# yum install glusterfs-fuse glusterfs
```

For more information, see *Installing Native Client* in the *Red Hat Gluster Storage Administration Guide*: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Virtualization/3.6/html/Installation\\_Guide/chap-Red\\_Hat\\_Enterprise\\_Linux\\_Hosts.html](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Virtualization/3.6/html/Installation_Guide/chap-Red_Hat_Enterprise_Linux_Hosts.html).

#### 5. Configure the data centers

Define data centers and clusters to organize the virtualization hosts. The installation process creates a data center and associated cluster named **Default**.



## Note

A server can be a Red Hat Enterprise Virtualization Hypervisor or a Red Hat Enterprise Linux host. A trusted storage pool requires a minimum of one storage host, and at least one active virtualization host is required to connect the system to a storage pool.

### 6. Install Red Hat Gluster Storage

Install the latest version of Red Hat Gluster Storage on the system.

For more information on obtaining and installing the software, see the *Red Hat Gluster Storage Installation Guide*: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Storage/3.1/html/Installation\\_Guide/chap-Installing\\_Red\\_Hat\\_Storage.html](https://access.redhat.com/documentation/en-US/Red_Hat_Storage/3.1/html/Installation_Guide/chap-Installing_Red_Hat_Storage.html).

### 7. Configure Storage

Configure the Red Hat Gluster Storage installation for your requirements.

For instructions on creating a Red Hat Gluster Storage Volume, see chapter *Red Hat Gluster Storage Volume* in the *Red Hat Gluster Storage Administration Guide*:

[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Storage/3.1/html/Administration\\_Guide/chap-Red\\_Hat\\_Storage\\_Volumes.html](https://access.redhat.com/documentation/en-US/Red_Hat_Storage/3.1/html/Administration_Guide/chap-Red_Hat_Storage_Volumes.html).

Red Hat Enterprise Virtualization uses a centralized storage system for virtual machine disk images. Before adding storage, ensure that you have a working Red Hat Enterprise Virtualization Manager environment. You must be able to access the Administration Portal, and there must be at least one host connected with **Up** status.



## Note

Red Hat Gluster Storage recommends that you use Replicate or Distributed Replicate volume type for hosting virtual machine disk images.

### 8. Attach Storage to Hypervisor

Attach the Red Hat Gluster Storage volume as a storage domain.

Now you can create virtual machines and its disk images on the Red Hat Gluster Storage volumes. To optimize the virtual machines on the Red Hat Gluster Storage volumes, see [Section 3.2, “Optimizing Virtual Machines On Red Hat Gluster Storage Volumes”](#)

## 3.2. Optimizing Virtual Machines On Red Hat Gluster Storage Volumes

The readahead mechanism is essential for guest sequential read performance on virtual machines. The virtual machine-tuned profile provides insufficient readahead. You can optimize the virtual machine performance by changing the `multiply_disk_readahead 4` to `multiply_disk_readahead 16`. If you are running a Red Hat Enterprise Linux host, run the following commands to enable read-ahead.

#### 1. Install the Tune daemon

Install the tuned daemon that tunes the system settings dynamically.

```
# yum install tuned
```

## 2. Edit the virtual-guest profile

Edit the `/etc/tune-profiles/virtual-guest/ktune.sh` file.

Identify the line `multiply_disk_readahead 4` and replace it with `multiply_disk_readahead 16`

## 3. Apply the virtual-guest profile on the virtual machines

Activate the updated profile with the command:

```
# tuned-adm profile virtual-guest
```

## Chapter 4. Hosting Virtual Machine Images on Red Hat Gluster Storage volumes

Red Hat Gluster Storage provides a POSIX-compatible file system to store virtual machine images in Red Hat Gluster Storage volumes.

This chapter describes how to configure volumes using the command line interface, and how to prepare Red Hat Gluster Storage servers for virtualization using Red Hat Enterprise Virtualization Manager.

### 4.1. Configuring Volumes Using the Command Line Interface

Red Hat recommends configuring volumes before starting them. For information on creating volumes, see *Red Hat Gluster Storage Volumes* in the *Red Hat Gluster Storage Administration Guide*:

[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Storage/3.1/html/Administration\\_Guide/chap-Red\\_Hat\\_Storage\\_Volumes.html](https://access.redhat.com/documentation/en-US/Red_Hat_Storage/3.1/html/Administration_Guide/chap-Red_Hat_Storage_Volumes.html).



#### Important

Three-way replication (**replica 3** or **replica count 3**) is recommended for hosting virtual machine images.

#### Procedure 4.1. To Configure Volumes Using the Command Line Interface

1. Configure the Red Hat Gluster Storage volume using the following command:

```
# gluster volume set VOLNAME group virt
```



#### Important

After tagging the volume as **group virt**, use the volume for storing virtual machine images only and always access the volume through the glusterFS native client.

2. The **gluster volume set <VOLNAME> group virt** command configures the specified volume using the settings in the `/var/lib/glusterd/groups/virt` file. The following settings are the recommended defaults:

```
quick-read=off
read-ahead=off
io-cache=off
stat-prefetch=off
eager-lock=enable
remote-dio=on
quorum-type=auto
server-quorum-type=server
```





## Important

When you upgrade to Red Hat Gluster Storage 3.1, a new `virt` file is created in `/var/lib/glusterd/groups/virt.rpmnew`. Ensure to apply the new `virt` file on the existing volumes by renaming the `virt.rpmnew` file to `virt`, along with the customized settings.

All the performance-related settings other than `cluster.eager-lock` prevent caching within GlusterFS client stack, as it is the preferred mode for attaching disks to a virtual machine. The `cluster.eager-lock` option optimizes write performance with synchronous replication when there is a single writer to a file. For description on each of these performance-related settings, see chapter *Configuring Volume Options* in the *Red Hat Gluster Storage Administration Guide*:

[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Storage/3.1/html/Administration\\_Guide/chap-Managing\\_Red\\_Hat\\_Storage\\_Volumes.html#Configuring\\_Volume\\_Options](https://access.redhat.com/documentation/en-US/Red_Hat_Storage/3.1/html/Administration_Guide/chap-Managing_Red_Hat_Storage_Volumes.html#Configuring_Volume_Options).



## Note

**Server-Side** and **Client-Side Quorum** are enabled by default in the `/var/lib/glusterd/groups/virt` file to minimize split-brain scenarios. If **Server-Side Quorum** is not met, then the Red Hat Gluster Storage volumes become unavailable causing the Virtual Machines (VMs) to move to a paused state. If **Client-Side Quorum** is not met, although a replica pair in a Red Hat Gluster Storage volume is available in the read-only mode, the VMs move to a paused state.

Manual intervention is required to make the VMs resume the operations after the quorum is restored. Consistency is achieved at the cost of fault tolerance. If fault tolerance is preferred over consistency, disable server-side and client-side quorum with the commands:

```
# gluster volume reset <vol-name> server-quorum-type
# gluster volume reset <vol-name> quorum-type
```

For more information on these configuration settings, see *Managing Red Hat Gluster Storage Volumes* in the *Red Hat Gluster Storage Administration Guide*:

[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Storage/3.1/html/Administration\\_Guide/chap-Managing\\_Red\\_Hat\\_Storage\\_Volumes.html](https://access.redhat.com/documentation/en-US/Red_Hat_Storage/3.1/html/Administration_Guide/chap-Managing_Red_Hat_Storage_Volumes.html).

3. Set the brick permissions for **vds** and **kvm**. If you do not set the required brick permissions, creation of virtual machines fails.
  - a. Set the user and group permissions using the following commands:

```
# gluster volume set VOLNAME storage.owner-uid 36
# gluster volume set VOLNAME storage.owner-gid 36
```

- b. If you are using QEMU/KVM as a hypervisor, set the user and group permissions using the following commands:

```
# gluster volume set VOLNAME storage.owner-uid 107
# gluster volume set VOLNAME storage.owner-gid 107
```

**See Also:**

- [Section 5.4, “Optimizing Red Hat Gluster Storage Volumes for Virtual Machine Images”](#)

## 4.2. Configuring Virtual Machines on Red Hat Gluster Storage volumes using the Red Hat Enterprise Virtualization Manager

The following procedure describes how to add a Red Hat Gluster Storage server for virtualization using Red Hat Enterprise Virtualization Manager.

**Note**

It is recommended that you use a separate data center for Red Hat Gluster Storage nodes.

### Procedure 4.2. To Add a Red Hat Gluster Storage Server for Virtualization Using Red Hat Enterprise Virtualization Manager

1. Create a data center:
  - a. Select the **Data Centers** resource tab to list all data centers.
  - b. Click **New** to open the **New Data Center** window.

Name	Hypervisor-Data-Center
Description	
Type	Shared
Compatibility Version	3.4
Quota Mode	Disabled
Comment	

OK Cancel

Figure 4.1. New Data Center Window

- c. Enter the **Name** and **Description** of the data center.
- d. Select the storage **Type** as **Shared** from the drop-down menu.
- e. Select the **Quota Mode** as **Disabled**.
- f. Click **OK**.

The new data center is **Uninitialized** until you configure the cluster, host, and storage settings.

## 2. Create a cluster:

- a. Select the **Clusters** resource tab to list all clusters.
- b. Click **New** to open the **New Cluster** window.

**Figure 4.2. New Cluster Window**

- c. Select a **Data Center** for the cluster from the drop-down menu.
- d. Enter a **Name** and **Description** for the cluster.
- e. Select the **CPU Name** and **Compatibility Version** from the drop-down menus.
- f. Check **Enable Virt Service**.
- g. Click **OK**.

## 3. Add hosts:

- a. Select the **Hosts** resource tab to view a list of all hosts in the system.
- b. Click **New** to open the **New Host** window.

**Figure 4.3. New Host Window**



### Important

A Red Hat Enterprise Linux hypervisor and Red Hat Enterprise Virtualization hypervisor on a single VDSM cluster accessing the same virtual machine image store is not supported.

- c. Select the **Data Center** and **Host Cluster** for the new host from the drop-down menus.
- d. Enter the **Name**, **Address**, and **Root Password** of the new hypervisor host.
- e. Check **Automatically configure host firewall** if required.
- f. Click **OK**.

The new host appears in the list of hypervisor hosts with the status **Installing**. After the host is

activated, the status changes to **Up** automatically.

4. Create and configure volumes on the Red Hat Gluster Storage cluster using the command line interface. For information on creating and configuring volumes, see [Section 4.1, “Configuring Volumes Using the Command Line Interface”](#) and *Red Hat Gluster Storage Volumes* in the *Red Hat Gluster Storage Administration Guide*: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Storage/3.1/html/Administration\\_Guide/chap-Red\\_Hat\\_Storage\\_Volumes.html](https://access.redhat.com/documentation/en-US/Red_Hat_Storage/3.1/html/Administration_Guide/chap-Red_Hat_Storage_Volumes.html).
5. Add a storage domain using Red Hat Enterprise Virtualization Manager:
  - a. Select the **Storage** resource tab to list existing storage domains.
  - b. Click **New Domain** to open the New Domain window.

**Figure 4.4. New Domain Window**

- c. Enter a **Name** for the storage domain.
- d. Select a shared **Data Center** to associate with the storage domain.
- e. Select **Data / glusterFS** from the **Domain Function/Storage Type** drop-down menu.
- f. Select a host from the **Use Host** drop-down menu.
- g. Enter the **Path** of a Red Hat Gluster Storage server in the cluster. For example, **RHS-Server : /VOLNAME**

- h. Enter **glusterfs** as **VFS Type**. This selection is made by default if the data center is of type **glusterFS**.
- i. Enter the applicable Red Hat Gluster Storage native client **Mount Options**. Enter multiple mount options separated by commas. For more information on native client mount options, see *Accessing Data - Setting up Clients* in the *Red Hat Gluster Storage Administration Guide*: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Gluster\\_Storage/3.1/html/Administration\\_Guide/chap-Accessing\\_Data\\_-\\_Setting\\_Up\\_Clients.html](https://access.redhat.com/documentation/en-US/Red_Hat_Gluster_Storage/3.1/html/Administration_Guide/chap-Accessing_Data_-_Setting_Up_Clients.html).
- j. Click **OK**.
- k. Click **Activate** to activate the new Red Hat Gluster Storage domain.

The screenshot shows the 'Storage' management interface. At the top, there are navigation links: 'New Domain', 'Import Domain', 'Edit', 'Remove', and 'Red Hat Access: Support'. Below this is a table with columns: 'Domain Name', 'Domain Type', 'Storage Type', 'Format', 'Cross Data-Center Status', 'Total Space', 'Free Space', 'Description', and 'Comment'. One row is visible: 'RHS-Storage' (Domain Name), 'Data (gluster)' (Domain Type), 'glusterfs' (Storage Type), 'xfs' (Format), 'Active' (Cross Data-Center Status), '48 GiB' (Total Space), '48 GiB' (Free Space), and an empty 'Description' and 'Comment'.

Below the table are tabs: 'General', 'Data Center', 'Virtual Machines', 'Templates', 'Disks', and 'Permissions'. The 'Data Center' tab is selected. Below the tabs are links: 'Attach', 'Detach', 'Activate', and 'Maintenance'. At the bottom, there is another table with columns: 'Name' and 'Domain Status in Data-Center'. One row is visible: 'Hypervisor-Data-Center' (Name) and 'Active' (Domain Status in Data-Center).

**Figure 4.5. Activated Red Hat Gluster Storage Domain**

You can now create virtual machines using Red Hat Gluster Storage as storage domains. For more information on creating virtual machines, see the *Red Hat Enterprise Virtualization Virtual Machine Management Guide*: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Virtualization/3.6/html/Virtual\\_Machine\\_Management\\_Guide/index.html](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Virtualization/3.6/html/Virtual_Machine_Management_Guide/index.html).



## Note

To prevent the risk of split brain incidents on Red Hat Gluster Storage domains, the use of shareable disks on Red Hat Gluster Storage domains is disabled. Attempting to create a shareable disk brings up a warning in the administration portal which recommends the use of Quorum on the Red Hat Gluster Storage server to ensure data integrity.

This policy is not enforced on Red Hat Gluster Storage domains created on a POSIX domain with GlusterFS specified as the virtual file system type.

## Chapter 5. Managing Red Hat Gluster Storage Servers and Volumes using Red Hat Enterprise Virtualization Manager

You can create and configure Red Hat Gluster Storage volumes using Red Hat Enterprise Virtualization Manager 3.3 and above versions, by creating a cluster with the **Enable Gluster Service** option enabled.

A volume is a logical collection of bricks where each brick is an export directory on a server in the trusted storage pool. Most of the management operations for Red Hat Gluster Storage happen on these volumes. You can use Red Hat Enterprise Virtualization Manager to create and start new volumes featuring a single global namespace.



### Note

With the exception of the volume operations described in this section, all other Red Hat Gluster Storage functionalities must be executed from the command line.

### 5.1. Creating a Data Center

1. Select the **Data Centers** resource tab to list all data centers in the results list.
2. Click the **New** button to open the **New Data Center** window.

Name	RHGS-Data-Center
Description	
Storage Type	Shared
Compatibility Version	3.5
Quota Mode	Disabled
Comment	

Figure 5.1. New Data Center Window

3. Enter the **Name** and **Description** of the data center.
4. Set **Type** to **Shared** from the drop-down menu.

Set **Quota Mode** as **Disabled**.

5. Click **OK**.

The new data center is added to the virtualization environment. It will remain **Uninitialized** until a cluster, host, and storage are configured.

## 5.2. Creating a Cluster

1. Create a cluster with the gluster service enabled.

The screenshot shows the 'New Cluster' dialog box with the following configuration:

- Data Center:** RHGS-Data-Center
- Name:** RHGS-Cluster
- Description:** (empty)
- Comment:** (empty)
- CPU Type:** (empty)
- Compatibility Version:** 3.5
- CPU Architecture:** undefined
- Enable Virt Service:**
- Enable Gluster Service:**
- Import existing gluster configuration:**
- Address:** (empty)
- SSH Fingerprint:** (empty)
- Password:** (empty)

**Figure 5.2. New Cluster Window**

2. Select the **Compatibility Version** from the drop-down menu.
3. Click **OK**.

## 5.3. Adding Red Hat Gluster Storage Server to the Cluster

There are two ways to add hosts. You can either add new hosts or import the existing gluster configuration into a cluster.

✦ *To import an existing gluster configuration:*

- ✦ Select **Enable Gluster Service**.
- ✦ Select **Import existing gluster configuration**. With this option you can import the existing Gluster configurations into a cluster.



- ✦ Provide the IP address of one of the hosts.
- ✦ *To add new hosts:*
  - ✦ Use the drop-down lists to select the **Data Center** and **Host Cluster** for the new host.
  - ✦ Click **OK**.

The new host displays in the list of hosts with a status of **Installing**. The host is activated and the status changes to **Up** automatically.

You can manage the lifecycle of a volume using hook scripts. For more information, see chapter *Managing Gluster Hooks* in the *Red Hat Gluster Storage Console Administration Guide*



### Note

To add multiple servers to a cluster, you must first add a Red Hat Gluster Storage server to the cluster. An error message appears if you add multiple servers in the first attempt.

**New Host** ?

<b>General</b>	Data Center <span style="float: right;">RHGS-Data-Center</span> Host Cluster <span style="float: right;">RHGS-Cluster</span> <input type="checkbox"/> Use Foreman Hosts Providers
Power Management	Name <span style="float: right;">RHGSS-Node-01</span>
SPM	Comment <span style="float: right;"></span>
Console	Address <span style="float: right;"></span>
Network Provider	SSH Port <span style="float: right;">22</span>
<b>Authentication</b>	
User Name <span style="float: right;">root</span>	
<input checked="" type="radio"/> Password <span style="float: right;"></span>	
<input type="radio"/> SSH Public Key	
<input checked="" type="checkbox"/> <b>Advanced Parameters</b>	
Automatically configure host firewall <span style="float: right;"><input checked="" type="checkbox"/></span>	
Use JSON protocol <span style="float: right;"><input checked="" type="checkbox"/></span>	
SSH Fingerprint <span style="float: right;"></span>	
<input style="width: 100%;" type="text"/> Enter host fingerprint or <a href="#">fetch</a> manually from host	

Figure 5.3. New Host window

## 5.4. Optimizing Red Hat Gluster Storage Volumes for Virtual Machine Images

If you have not already optimized the Red Hat Gluster Storage Volumes for hosting Virtual Machines images by selecting the option **Optimize for Virt Store**, while creating a volume, ensure to perform this step:

- On the **Volumes** tab, select the volume to configure and click **Optimize for Virt Store**.

The volume is configured and **group**, **storage-owner-uid**, and **storage-owner-gid** options are set.

Name	Cluster	Volume Type	Bricks	Space Used	Activities
VM-Image-Store	RHGS-Cluster	Replicate	▲ 2 ▼ 0	0%	

Figure 5.4. Volume Options

For more information on each **volume set** tunable options, see *Managing Red Hat Gluster Storage Volumes* in the *Red Hat Gluster Storage Administration Guide*:

[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Storage/3.1/html/Administration\\_Guide/chap-Managing\\_Red\\_Hat\\_Storage\\_Volumes.html](https://access.redhat.com/documentation/en-US/Red_Hat_Storage/3.1/html/Administration_Guide/chap-Managing_Red_Hat_Storage_Volumes.html).

## 5.5. Starting the Red Hat Gluster Storage Volume

- In the **Volumes** tab, select the new volume and click **Start** to start the volume.

The volume status changes to **Up**.



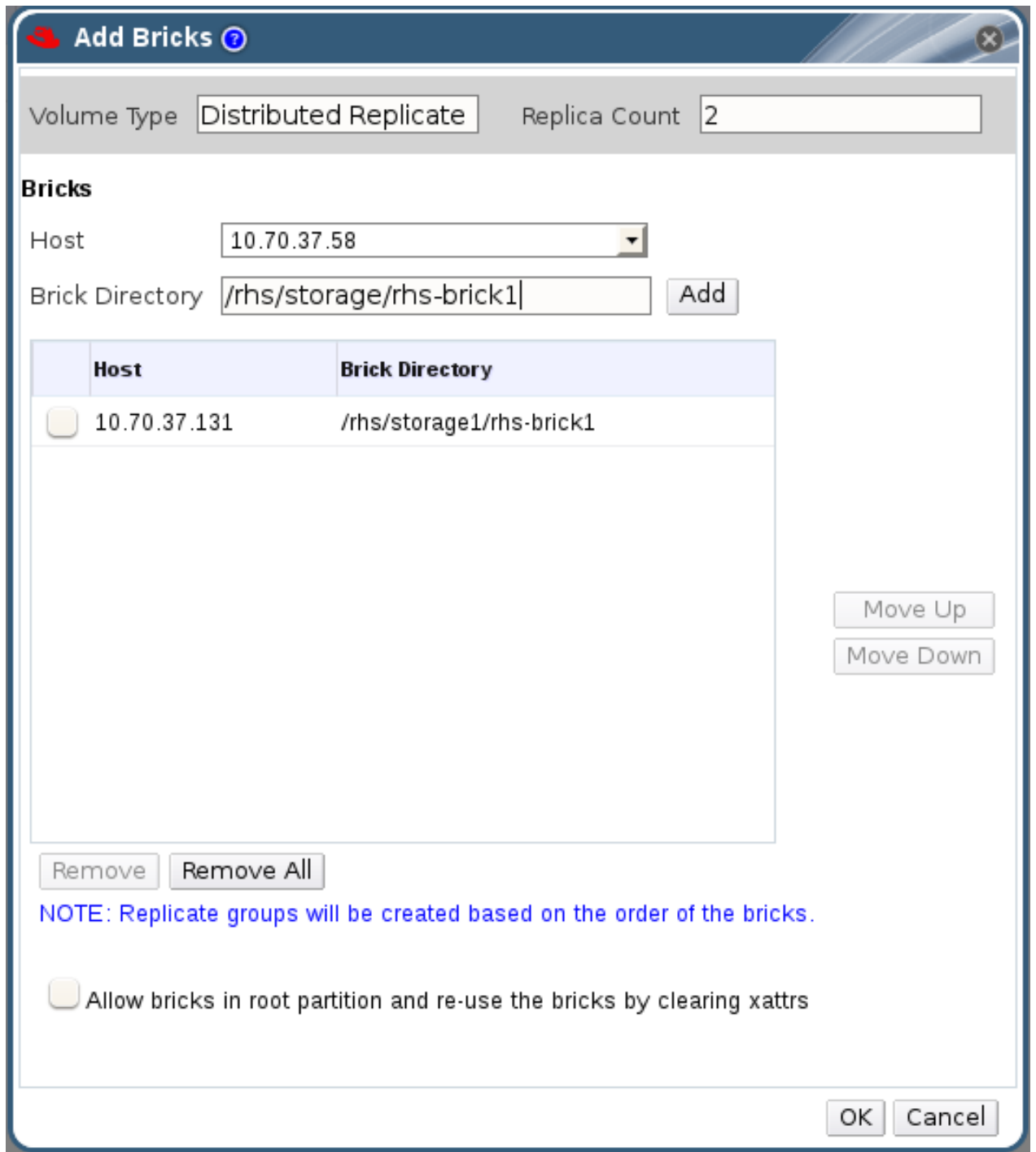
### Note

If you are using Red Hat Gluster Storage Volumes for hosting Virtual Machine images, you must optimize the volume before attaching the volume to the storage domain.

## 5.6. Adding Bricks to Volumes

1. Click **Add Bricks** to add bricks to your volume.

A brick is the basic unit of storage, represented by an export directory on a server in the storage cluster. You can expand or shrink your cluster by adding new bricks or deleting existing bricks.



**Figure 5.5. Add Bricks**

2. Enter the path for the brick and click **OK**.
3. In the **Allow Access From** field, specify volume access control as a comma-separated list of IP addresses or hostnames.

By default, an asterisk (\*) is used as a wildcard to specify ranges of addresses such as IP addresses or hostnames. You need to use IP-based authentication for Gluster and NFS exports.

4. Click **OK** to create the volume.

The new volume is added and it appears on the **Volumes** tab.

You can reuse a brick by selecting **Allow bricks in root partition and reuse the bricks by clearing xattrs**

You can create a storage domain using the optimized volume and manage it using Red Hat Enterprise Virtualization Manager. See the *Red Hat Gluster Storage 3.1 Console Administration Guide* for more information on managing volumes such as start, stop, expand, shrink, add and edit volume options:

[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Storage/3.1/html/Console\\_Administration\\_Guide/index.html](https://access.redhat.com/documentation/en-US/Red_Hat_Storage/3.1/html/Console_Administration_Guide/index.html).

## 5.7. Performing Asynchronous Tasks

From the Red Hat Enterprise Virtualization Manager 3.4 release onwards, you can perform asynchronous tasks on the Red Hat Gluster Storage volume such as rebalance and remove brick operations.

For detailed instructions on performing these asynchronous tasks, see the *Red Hat Gluster Storage Console Administration Guide*: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Storage/3.1/html/Console\\_Administration\\_Guide/index.html](https://access.redhat.com/documentation/en-US/Red_Hat_Storage/3.1/html/Console_Administration_Guide/index.html).

## Chapter 6. Recommended Best Practices and Troubleshooting

- ✦ Enable the server side quorum at all times for the Red Hat Gluster Storage volumes hosting virtual machine images. For more information see *Configuring Server-Side Quorum* in the *Red Hat Gluster Storage Administration Guide*: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Storage/3.1/html/Administration\\_Guide/sect-Managing\\_Split-brain.html#sect-Preventing\\_Split-brain](https://access.redhat.com/documentation/en-US/Red_Hat_Storage/3.1/html/Administration_Guide/sect-Managing_Split-brain.html#sect-Preventing_Split-brain).
- ✦ Red Hat Gluster Storage Volumes that serve as Red Hat Enterprise Virtualization Master Storage Domain contain SANLocks and have the Red Hat Gluster Storage volume profile set to **virt**. This enables the Client Side Quorum and avoids the inconsistency problems for Multiple Writer situations. For more information see *Configuring Client-Side Quorum* in the *Red Hat Gluster Storage Administration Guide*: [https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Storage/3.1/html/Administration\\_Guide/sect-Managing\\_Split-brain.html#sect-Preventing\\_Split-brain](https://access.redhat.com/documentation/en-US/Red_Hat_Storage/3.1/html/Administration_Guide/sect-Managing_Split-brain.html#sect-Preventing_Split-brain).
- ✦ To reduce the risk of split-brain conditions developing in the cluster, Red Hat recommends using three-way replication when you create Red Hat Gluster Storage volumes. This involves setting **replica 3** when creating replicate volumes, or **replica count 3** when creating distributed-replicated volumes.

### 6.1. Troubleshooting the Integration

- ✦ *Red Hat Gluster Storage 3.1 Volumes do not get mounted with Red Hat Enterprise Virtualization Hypervisor 3.3 and 3.4 versions as the glusterfs native clients available in those Hypervisors are not compatible with Red Hat Gluster Storage 3.1 servers.*

In order to make use of Red Hat Gluster Storage 3.1 volumes in Red Hat Enterprise Virtualization Hypervisor 3.3 and 3.4 versions, disable the `readdir-ahead` option on those volumes. This makes the volumes compatible with the older native client available with Red Hat Enterprise Virtualization Hypervisor 3.3 and 3.4.

```
# gluster volume set <vol> readdir-ahead off
```

## Appendix A. Revision History

<b>Revision 3.1-11</b>	<b>Wed Mar 09 2016</b>	<b>Laura Bailey</b>
Moved compatibility information into the prerequisites section.		
<b>Revision 3.1-10</b>	<b>Tue Mar 08 2016</b>	<b>Laura Bailey</b>
Adding direct links to make locating external material easier. Clarifying prerequisites.		
<b>Revision 3.1-9</b>	<b>Mon Feb 22 2016</b>	<b>Laura Bailey</b>
Building for RHGS 3.1 Update 2 Release.		
<b>Revision 3.1-8</b>	<b>Tue Dec 15 2015</b>	<b>Laura Bailey</b>
Narrowed scope of compatibility table, BZ#1251401.		
<b>Revision 3.1-7</b>	<b>Tue Dec 08 2015</b>	<b>Laura Bailey</b>
Replaced multiple compatibility tables with a single table, BZ#1251401. Adjusting readability of compatibility table, BZ#1251401.		
<b>Revision 3.1-5</b>	<b>Tue Nov 03 2015</b>	<b>Laura Bailey</b>
Rebuilding for async release.		
<b>Revision 3.1-4</b>	<b>Tue Oct 27 2015</b>	<b>Laura Bailey</b>
Added extra note recommending 3-way replication (BZ#1260863)		
<b>Revision 3.1-3</b>	<b>Thu Oct 09 2015</b>	<b>Laura Bailey</b>
Added recommendation re. 3-way replication (BZ#1260863) Updated the RHEV 3.5 and 3.4 compatibility tables (BZ#258514, BZ#1270131)		
<b>Revision 3.1-1</b>	<b>Tue July 28 2015</b>	<b>Ella Deon Ballard</b>
Adding sort_order.		
<b>Revision 3-24</b>	<b>Tue Jul 28 2015</b>	<b>Rakesh Ghatvisave</b>
Final version for 3.1 release.		
<b>Revision 3-23</b>	<b>Wed Jul 22 2015</b>	<b>Rakesh Ghatvisave</b>
Modified compatibility matrix and updated screenshots in Chapter 4.		
<b>Revision 3-22</b>	<b>Fri Mar 13 2015</b>	<b>Pavithra Srinivasan</b>
Moved to gitlab.		
<b>Revision 3-20</b>	<b>Wed Feb 11 2015</b>	<b>Pavithra Srinivasan</b>
Bugfix		
<b>Revision 3-12</b>	<b>Mon Oct 20 2014</b>	<b>Pavithra Srinivasan</b>
Version for 3.0 GA release		