Red Hat Gluster Storage 3.2

Configuring Red Hat Virtualization with Red Hat Gluster Storage

Integrating Red Hat Gluster Storage and Red Hat Virtualization

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Abstract

This document explains how to configure Red Hat Gluster Storage as a storage domain for Red Hat Virtualization in a non-hyperconverged configuration.

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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 Virtualization Manager. Red Hat 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.

From version 3.3 onward, Red Hat Virtualization supports 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 Virtualization and Red Hat Gluster Storage integration consists of:

- Red Hat Virtualization nodes.

  See the *Red Hat Virtualization Technical Reference* for an architectural overview: https://access.redhat.com/documentation/en-us/red_hat_virtualization/4.1/html/technical_reference/

- Red Hat Gluster Storage nodes.

  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 Virtualization integration with Red Hat Gluster Storage:
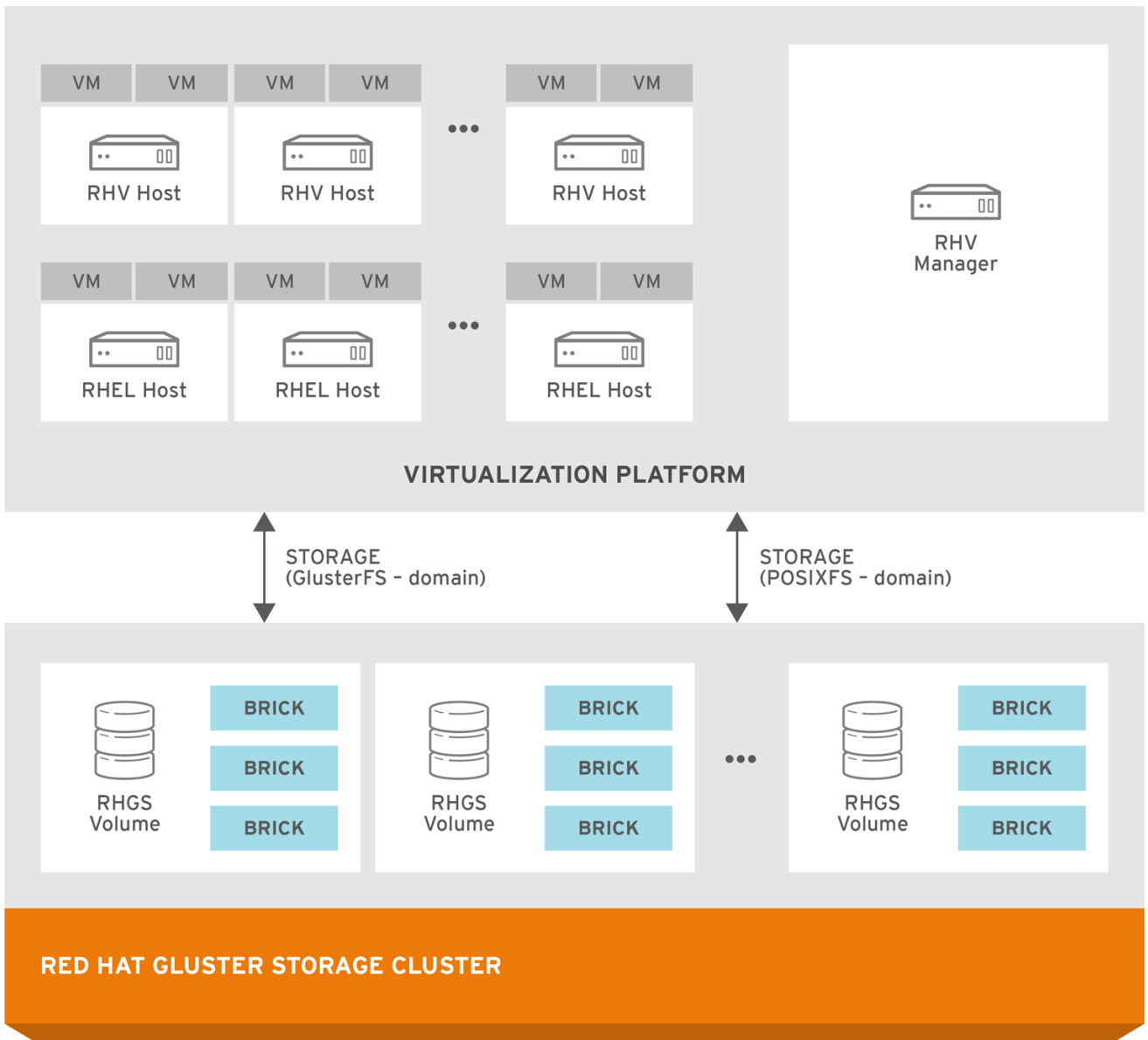
GLUSTER_445523_0417_35

Figure 1.1. Integration architecture
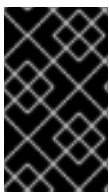
IMPORTANT

In Red Hat Virtualization 3.3 and later, 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 Virtualization.

2.1. PREREQUISITES

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

- All installations of Red Hat Virtualization and Red Hat Gluster Storage must have valid subscriptions to Red Hat Network channels and Subscription Management repositories.

- Red Hat Virtualization installations must adhere to the requirements laid out in the *Red Hat Virtualization Installation Guide*: https://access.redhat.com/documentation/en-us/red_hat_virtualization/4.1/html-single/installation_guide/#System_Requirements.

- 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_gluster_storage/3.2/html/installation_guide/chap-planning_red_hat_storage_installation.

- Red Hat Gluster Storage installations must be completely up to date with the latest patches and upgrades. Refer to the *Red Hat Gluster Storage 3.2 Installation Guide* to upgrade to the latest version: https://access.redhat.com/documentation/en-us/red_hat_gluster_storage/3.2/html/installation_guide/.

- The versions of Red Hat Virtualization and Red Hat Gluster Storage integrated must be compatible, according to the table in Section 2.2, "Compatible Versions".

- A fully-qualified domain name must be set for each hypervisor and Red Hat Gluster Storage server node. Ensure that correct DNS records exist, and that the fully-qualified domain name is resolvable via both forward and reverse DNS lookup.

- To reduce the risk of split-brain conditions developing in the cluster, Red Hat requires three-way replication when using Red Hat Gluster Storage with Red Hat Virtualization. Three-way replication is provided by three-way replicated volumes (`replica 3`), three-way distributed replicated volumes (`replica count 3`), and arbitrated replicated and distributed arbitrated replicated volumes (`replica 3 arbiter 1`).

2.2. COMPATIBLE VERSIONS

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 Virtualization (RHV) are documented in the following knowledge base article: https://access.redhat.com/articles/2356261.

CHAPTER 3. ENABLING RED HAT GLUSTER STORAGE IN RED HAT VIRTUALIZATION MANAGER

3.1. USING RED HAT GLUSTER STORAGE VOLUMES IN THE RED HAT VIRTUALIZATION MANAGER

Red Hat Virtualization supports Red Hat Gluster Storage volumes as storage domains. Enabling Red Hat Gluster Storage volumes in Red Hat 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:
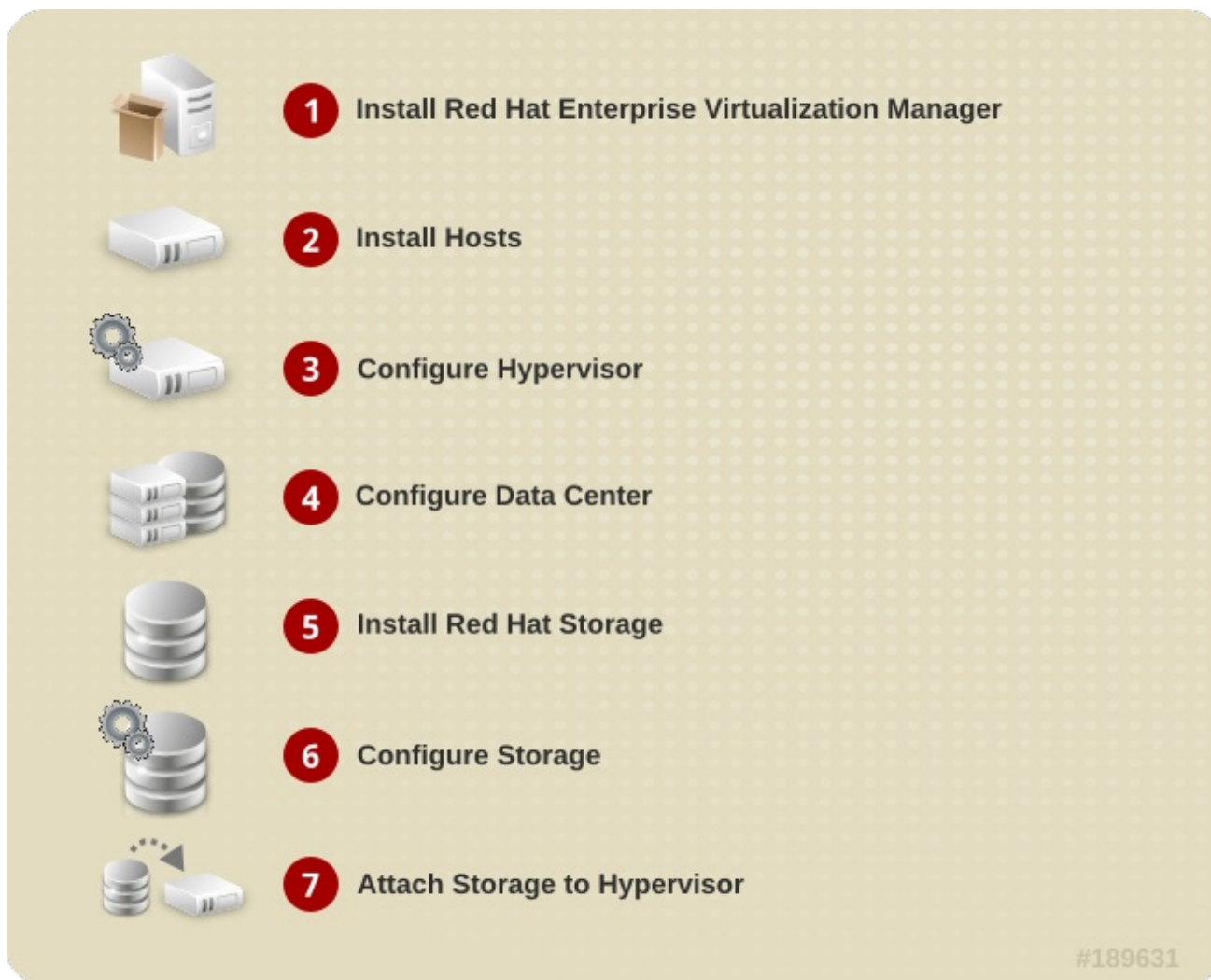
Figure 3.1. Installation Workflow

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

1. **Install Red Hat Virtualization Manager**
   The Red Hat Virtualization Manager is the control center of the Red Hat Virtualization environment. Ensure that Red Hat Virtualization Manger is installed and configured.

   Install and configure Red Hat Virtualization Manager. See *Installing the Red Hat Virtualization Manager* in the *Red Hat Virtualization Installation Guide* for more information:
   https://access.redhat.com/documentation/en-us/red_hat_virtualization/4.1/html/installation_guide/part-installing_red_hat_enterprise_virtualization.

Ensure that the installation of Red Hat Virtualization Manager is complete before proceeding.

2. **Install Hosts**
   Install the host machines with either of the following operating systems:

   - Red Hat Virtualization Host 4

   - Red Hat Enterprise Linux 7 (with virtualization packages:
     https://access.redhat.com/documentation/en-
     us/red_hat_virtualization/4.1/html/installation_guide/subscribing_to_required_channels_us

   Ensure that all hosts meet the hardware requirements of the operating system before
   beginning the installation process.

   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 Virtualization Installation Guide*
   https://access.redhat.com/documentation/en-
   us/red_hat_virtualization/4.1/html/installation_guide/part-installing_hypervisor_hosts.

3. **Configure the data centers**
   Create data centers and clusters to organise the virtualization and storage hosts. Red Hat
   Gluster Storage servers must be managed in a separate data center to Red Hat Virtualization
   hosts, so at least two data centers are required. The installation process creates one data
   center and associated cluster named **Default**.

   The data center is expected to appear non-operational at this point in the process.

   > **NOTE**
   >
   > A virtualization host can have either a Red Hat Virtualization Host or a Red Hat
   > Enterprise Linux operating system. A trusted storage pool requires a minimum
   > of three Red Hat Gluster Storage servers, and at least one active virtualization
   > host is required to connect the system to a storage pool.

4. **Install Red Hat Gluster Storage**
   Install the latest version of Red Hat Gluster Storage on new servers (not the host machines).

   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_gluster_storage/3.2/html/installation_guide/chap-installing_red_hat_storage.

   If you want to configure combined virtualization hosts and storage servers, see the Red Hat
   Hyperconverged Infrastructure documentation:
   https://access.redhat.com/documentation/en-
   us/red_hat_hyperconverged_infrastructure/1.0/html/deploying_red_hat_hyperconverged_infras

5. **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_gluster_storage/3.2/html/administration_guide/chap-red_hat_storage_volumes.

Optimize your Red Hat Gluster Storage volumes for storing virtual machine images by following the instructions in Procedure 4.1, "To Configure Volumes Using the Command Line Interface".

> **NOTE**
>
> To reduce the risk of split-brain conditions developing in the cluster, Red Hat requires three-way replication when using Red Hat Gluster Storage with Red Hat Virtualization. Three-way replication is provided by the following volume types:
>
> - three-way replicated volumes (`replica 3`)
>
> - three-way distributed replicated volumes (`replica count 3`)
>
> - arbitrated replicated or distributed arbitrated replicated volumes (`replica 3 arbiter 1`)

6. **Attach Storage to Hypervisor**
   Check that you can access the Red Hat Virtualization Manager Administration Portal and that at least one virtualization host has **Up** status before you continue.

   Create a new storage domain with a `Data` domain function and the `GlusterFS` storage type. For further information, see the *Adding a Red Hat Gluster Storage Volume as a Storage Domain* section in the Red Hat Virtualization *Administration Guide*:
   https://access.redhat.com/documentation/en-us/red_hat_virtualization/4.1/html/administration_guide/sect-using_red_hat_gluster_storage_as_a_storage_domain

You can now create virtual machines and its disk images on the Red Hat Gluster Storage volumes by following the instructions in Section 4.2, "Configuring Virtual Machines on Red Hat Gluster Storage volumes using the Red Hat Virtualization Manager".

3.2. OPTIMIZING VIRTUAL MACHINES RUNNING ON RED HAT GLUSTER STORAGE VOLUMES

The readahead mechanism is essential for sequential read performance on virtual machines. For virtual machines that run on Red Hat Gluster Storage, the `virtual-guest` profile does not provide sufficient readahead by default. You can improve virtual machine performance by editing the `virtual-guest` profile to provide a more suitable readahead value.

1. **Install the Tune daemon**
   Install the tuned daemon that tunes the system settings dynamically.

   ```
   # yum install tuned
   ```

2. **On the virtual machine, edit the virtual-guest profile**
   In the `/etc/tune-profiles/virtual-guest/ktune.sh` file, change the value of the `multiply_disk_readahead` option to **16**.

3. **Apply the modified virtual-guest profile on the virtual machines**
   Activate the modified 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 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_gluster_storage/3.2/html/administration_guide/chap-red_hat_storage_volumes.

> **IMPORTANT**
>
> Hosting virtual machine images requires the consistency of three-way replication, which is provided by three-way replicated volumes, three-way distributed replicated volumes, arbitrated replicated volumes, and distributed arbitrated replicated volumes.

Procedure 4.1. To Configure Volumes Using the Command Line Interface

1. **Configure the rhgs-random-io tuned profile**
   Install the tuned tuning daemon and configure Red Hat Gluster Storage servers to use the `rhgs-random-io` profile:

   ```
   # yum install tuned
   # tuned-adm profile rhgs-random-io
   ```

   For more information on available tuning profiles, refer to the `tuned-adm` man page, or see the *Red Hat Gluster Storage 3.2 Administration Guide* https://access.redhat.com/documentation/en-us/red_hat_gluster_storage/3.2/html/administration_guide/.

2. **Review virt volume group configuration details**
   The settings stored in the `/var/lib/glusterd/groups/virt` file are used to configure volumes in the `virt` volume group.

   > **IMPORTANT**
   >
   > When you upgrade, a new virt file may be 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.

   By default, the `/var/lib/glusterd/groups/virt` file contains the following recommended settings.

   ```
   performance.quick-read=off
   performance.read-ahead=off
   ```

```
performance.io-cache=off
performance.stat-prefetch=off
performance.low-prio-threads=32
network.remote-dio=enable
cluster.eager-lock=enable
cluster.quorum-type=auto
cluster.server-quorum-type=server
cluster.data-self-heal-algorithm=full
cluster.locking-scheme=granular
cluster.shd-max-threads=8
cluster.shd-wait-qlength=10000
features.shard=on
user.cifs=off
```

With the exception of **cluster.eager-lock**, **features.shard**, and **cluster.data-self-heal-algorithm**, these settings 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. The **features.shard** option enables sharding behavior. The **cluster.data-self-heal-algorithm** option specifies how self-heal operations are performed. For more information about any of these settings, see the *Red Hat Gluster Storage 3.2 Administration Guide*: https://access.redhat.com/documentation/en-US/Red_Hat_Storage/3.2/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 the following sections in the *Red Hat Gluster Storage Administration Guide*:

- https://access.redhat.com/documentation/en-us/red_hat_gluster_storage/3.2/html/administration_guide/chap-managing_red_hat_storage_volumes

- https://access.redhat.com/documentation/en-us/red_hat_gluster_storage/3.2/html/administration_guide/chap-managing_red_hat_storage_volumes#Configuring_Volume_Options

3. **Assign volumes to virt group**
   Red Hat recommends assigning volumes that store virtual machine images to the `virt` volume group so that these volumes can use common configuration details for their common use case. This has the same effect as the `Optimize for Virt Store` option in the management console.

   ```
   # gluster volume set VOLNAME group virt
   ```
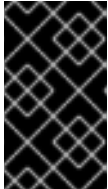
   > **IMPORTANT**
   >
   > After tagging the volume as `group virt`, use the volume for storing virtual machine images only and always access the volume through the glusterFS native client.

4. **Allow KVM and VDSM brick access**
   Set the brick permissions for **vdsm** 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
   ```

5. **Configure granular healing**
   Red Hat recommends setting `cluster.granular-entry-heal` to **enable** for this use case. To configure granular healing, run the following commands.

   ```
   # gluster volume set VOLNAME cluster.granular-entry-heal enable
   ```

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 VIRTUALIZATION MANAGER

The following procedure describes how to add a Red Hat Gluster Storage server for virtualization using Red Hat Virtualization Manager.
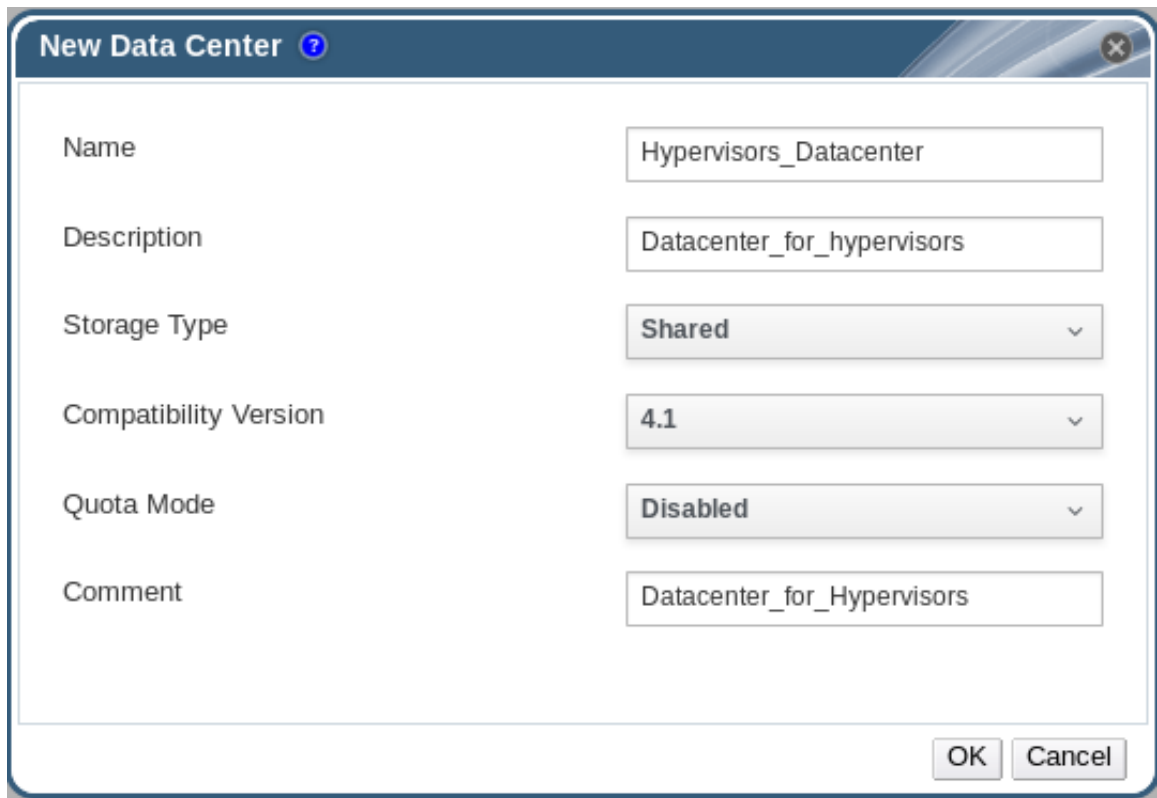
> **NOTE**
>
> It is recommended that you use a separate data center for Red Hat Gluster Storage nodes.

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

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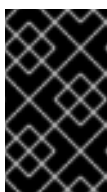
> **IMPORTANT**
>
> A Red Hat Enterprise Linux hypervisor and Red Hat Virtualization hypervisor on a single VDSM cluster accessing the same virtual machine image store is not supported.

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_gluster_storage/3.2/html/administration_guide/chap-red_hat_storage_volumes.

5. Add a storage domain using Red Hat 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. Set the **Domain Function** to **Data** and the **Storage Type** to **GlusterFS**.

   f. Select a host from the **Host to Use** drop-down menu.

   g. Check the **Use managed gluster volume** checkbox and select the appropriate volume from the **Gluster** dropdown menu.

NOTE

This dropdown menu is only populated with volumes whose nodes are managed by Red Hat Virtualization Manager. See Chapter 5, *Managing Red Hat Gluster Storage Servers and Volumes using Red Hat Virtualization Manager* for instructions on how to set up management of your Red Hat Gluster Storage nodes by Red Hat Virtualization Manager.

h. 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 *Creating Access to Volumes* in the *Red Hat Gluster Storage Administration Guide* https://access.redhat.com/documentation/en-us/red_hat_gluster_storage/3.2/html/administration_guide/chap-accessing_data_-_setting_up_clients. Note that only the native client is supported when integrating Red Hat Gluster Storage and Red Hat Virtualization.

i. Click **OK**.

You can now create virtual machines using Red Hat Gluster Storage as a storage domain. For more information on creating virtual machines, see the *Red Hat Virtualization Virtual Machine Management Guide*: https://access.redhat.com/documentation/en-us/red_hat_virtualization/4.1/html/virtual_machine_management_guide/.

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 VIRTUALIZATION MANAGER

You can create and configure Red Hat Gluster Storage volumes using Red Hat Virtualization Manager 3.3 or later by creating a separate cluster with the `Enable Gluster Service` option enabled.

> **NOTE**
>
> Red Hat Gluster Storage nodes must be managed in a separate cluster to Red Hat Virtualization hosts. If you want to configure combined management of virtualization hosts and storage servers, see the Red Hat Hyperconverged Infrastructure documentation: https://access.redhat.com/documentation/en-us/red_hat_hyperconverged_infrastructure/1.0/html/deploying_red_hat_hyperconverged

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 Virtualization Manager to create and start new volumes featuring a single global namespace.
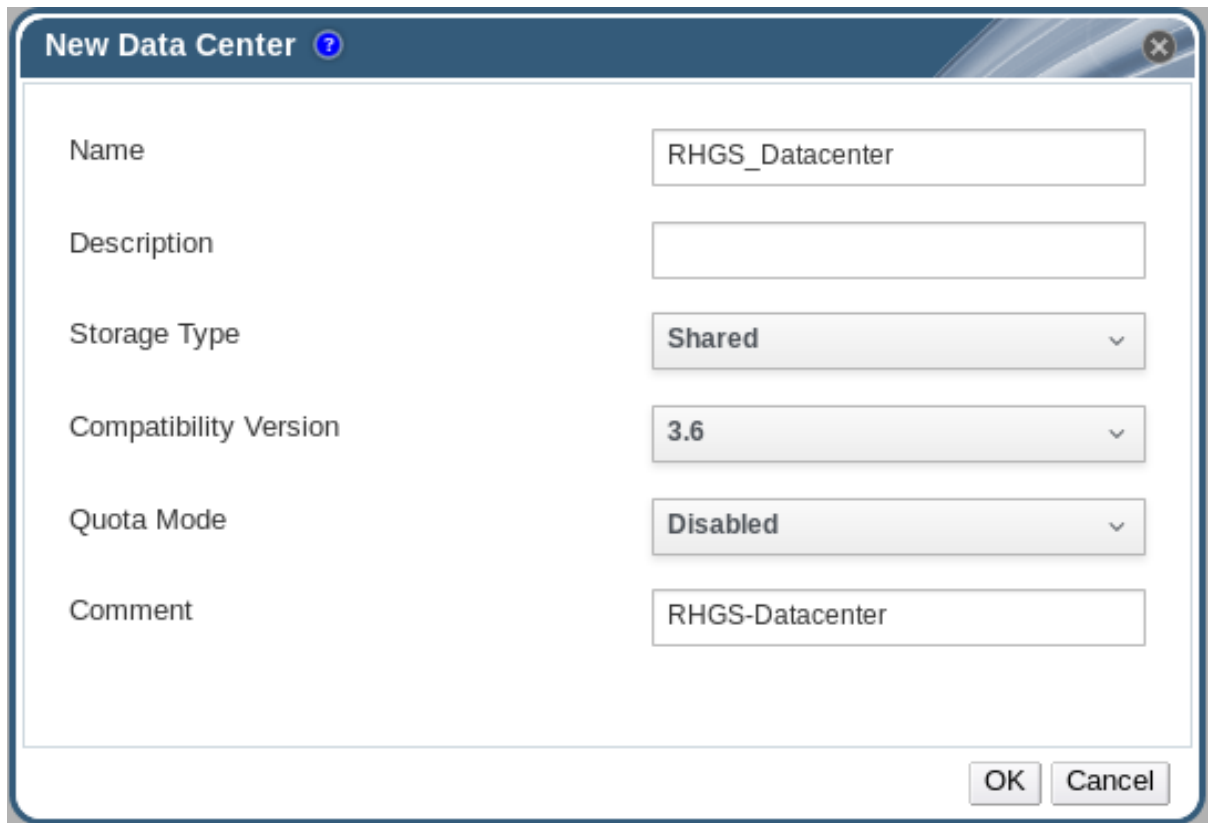
> **NOTE**
>
> With the exception of the volume operations described in this section, all other Red Hat Gluster Storage functionalities must be executed from the command line.

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.

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

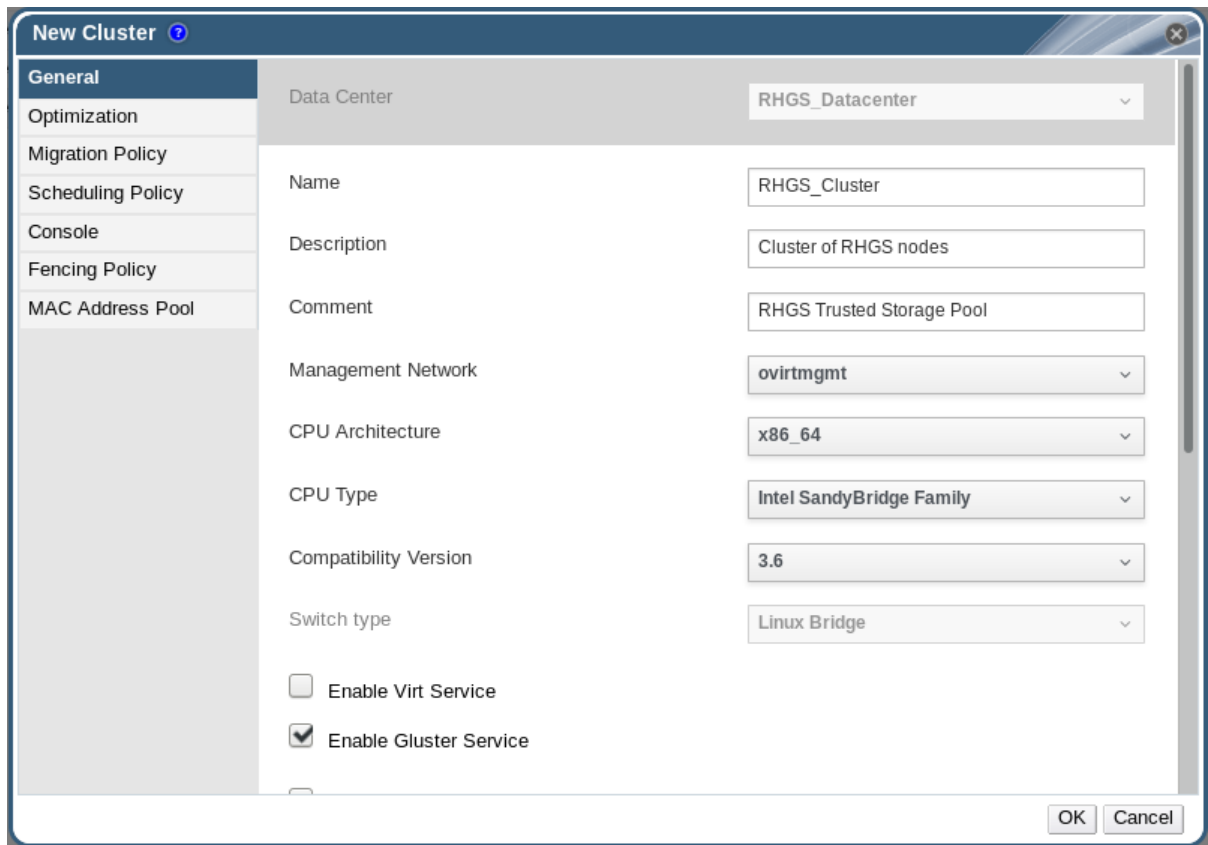1. Create a cluster with the gluster service enabled.

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:*

  1. Select **Enable Gluster Service**.

  2. Select **Import existing gluster configuration**. With this option you can import the existing Gluster configurations into a cluster.

  3. Provide the IP address of one of the hosts.

- *To add new hosts:*

  1. Use the drop-down lists to select the **Data Center** and **Host Cluster** for the new host.

  2. 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.

Figure 5.3. New Host window

5.4. OPTIMIZING RED HAT GLUSTER STORAGE VOLUMES FOR VIRTUAL MACHINE IMAGES

If you have not already selected `Optimize for Virt Store` while creating a volume, select this option now to optimize your storage for virtual machine images. This has the same effect as adding the volume to the `virt` group.

- 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.

| Data Centers | Clusters | Hosts | Networks | Storage | Disks | Virtual Machines | Pools | Templates | Volumes | Users |

New Remove Start Stop Rebalance Optimize for Virt Store Profiling ▼

|	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_gluster_storage/3.2/html/administration_guide/chap-managing_red_hat_storage_volumes.

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**.
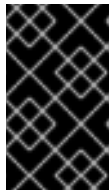
  IMPORTANT

  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.
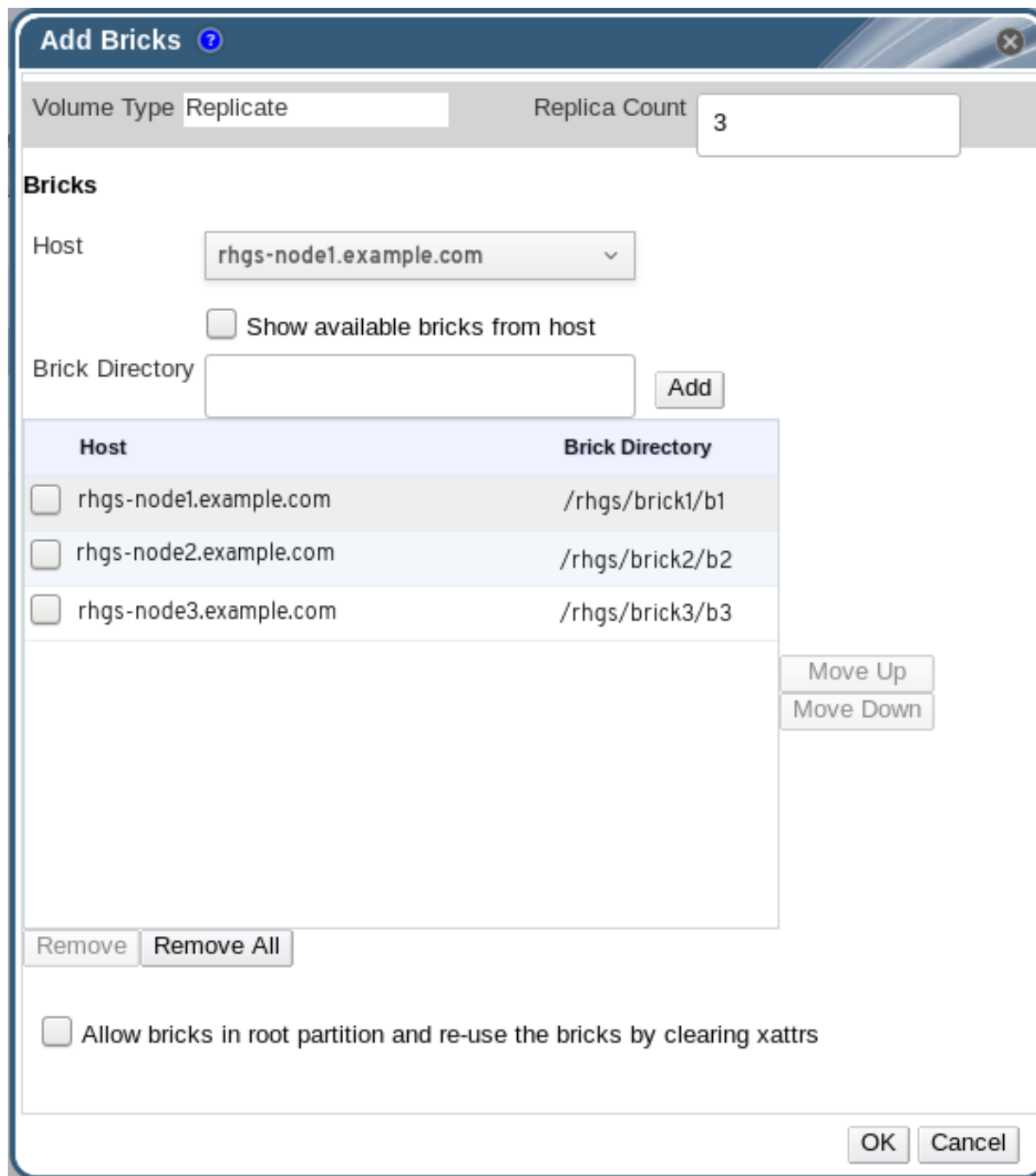
Figure 5.5. Add Bricks

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 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 Virtualization Manager. See the *Red Hat Gluster Storage 3.2 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_gluster_storage/3.2/html/console_administration_guide/.

5.7. PERFORMING ASYNCHRONOUS TASKS

From the Red Hat 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_gluster_storage/3.2/html/console_administration_guide/.

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_gluster_storage/3.2/html/administration_guide/sect-managing_split-brain#sect-Preventing_Split-brain.

- Red Hat Gluster Storage Volumes that serve as Red Hat 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_gluster_storage/3.2/html/administration_guide/sect-managing_split-brain#sect-Preventing_Split-brain.

- To reduce the risk of split-brain conditions developing in the cluster, Red Hat requires three-way replication when using Red Hat Gluster Storage with Red Hat Virtualization. Three-way replication is provided by three-way replicated volumes (`replica 3`), three-way distributed replicated volumes (`replica count 3`), and arbitrated replicated and distributed arbitrated replicated volumes (`replica 3 arbiter 1`).

APPENDIX A. REVISION HISTORY

Revision 3.2-2   **Fri Mar 17 2017**   **Laura Bailey**

    Updated the virt group profile to reflect new defaults in version 3.2. (BZ#1405348, BZ#1424908)

    Clarified support for RHV-RHGS integration mount protocols. (BZ#1402409)