



Red Hat Enterprise Virtualization 3.6

Installation Guide

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Red Hat Enterprise Virtualization Documentation Team

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Abstract

A comprehensive guide to installing Red Hat Enterprise Virtualization.

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PART I. INTRODUCTION TO RED HAT ENTERPRISE VIRTUALIZATION

CHAPTER 1. INTRODUCTION TO RED HAT ENTERPRISE VIRTUALIZATION

Red Hat Enterprise Virtualization is an enterprise-grade server and desktop virtualization platform built on Red Hat Enterprise Linux. This guide covers:

- The installation and configuration of a Red Hat Enterprise Virtualization Manager.
- The installation and configuration of the hypervisor hosts: RHEL-based hypervisors, Red Hat Enterprise Virtualization Hypervisor (RHEV-H), and Red Hat Virtualization Host (RHVH).
- Attach existing FCP storage to your Red Hat Enterprise Virtualization environment. More storage options can be found in the [Administration Guide](#).

Table 1.1. Red Hat Enterprise Virtualization Key Components

Component Name	Description
Red Hat Enterprise Virtualization Manager	A server that manages and provides access to the resources in the environment.
Hosts	Hosts are servers that provide the processing capabilities and memory resources used to run virtual machines.
Storage	Storage is used to store the data associated with virtual machines.



IMPORTANT

It is important to synchronize the system clocks of the hosts, Manager, and other servers in the environment to avoid potential timing or authentication issues. To do this, configure the Network Time Protocol (NTP) on each system to synchronize with the same NTP server.

CHAPTER 2. SYSTEM REQUIREMENTS

2.1. RED HAT ENTERPRISE VIRTUALIZATION MANAGER REQUIREMENTS

2.1.1. Hardware Requirements

The minimum and recommended hardware requirements outlined here are based on a typical small to medium sized installation. The exact requirements vary between deployments based on sizing and load.

The Red Hat Enterprise Virtualization Manager runs on Red Hat Enterprise Linux. To confirm whether or not specific hardware items are certified for use with Red Hat Enterprise Linux, see <https://access.redhat.com/ecosystem/#certifiedHardware>.

Table 2.1. Red Hat Enterprise Virtualization Manager Hardware Requirements

Resource	Minimum	Recommended
CPU	A dual core CPU.	A quad core CPU or multiple dual core CPUs.
Memory	4 GB of available system RAM if Data Warehouse is not installed and if memory is not being consumed by existing processes.	16 GB of system RAM.
Hard Disk	25 GB of locally accessible, writable, disk space.	50 GB of locally accessible, writable, disk space.
Network Interface	1 Network Interface Card (NIC) with bandwidth of at least 1 Gbps.	1 Network Interface Card (NIC) with bandwidth of at least 1 Gbps.

2.1.2. Browser Requirements

The following browser versions and operating systems can be used to access the Administration Portal and the User Portal.

Browser support is divided into tiers:

- Tier 1: Browser and operating system combinations that are fully tested and fully supported. Red Hat Engineering is committed to fixing issues with browsers on this tier.
- Tier 2: Browser and operating system combinations that are partially tested, and are likely to work. Limited support is provided for this tier. Red Hat Engineering will attempt to fix issues with browsers on this tier.
- Tier 3: Browser and operating system combinations that are not tested, but may work. Minimal support is provided for this tier. Red Hat Engineering will attempt to fix only minor issues with browsers on this tier.

Table 2.2. Browser Requirements

Support Tier	Operating System Family	Browser	Portal Access
Tier 1	Red Hat Enterprise Linux	Mozilla Firefox Extended Support Release (ESR) version	Administration Portal and User Portal
Tier 2	Windows	Internet Explorer 10 or later	Administration Portal and User Portal
	Any	Most recent version of Google Chrome or Mozilla Firefox	Administration Portal and User Portal
Tier 3	Any	Earlier versions of Google Chrome or Mozilla Firefox	Administration Portal and User Portal
	Any	Other browsers	Administration Portal and User Portal

2.1.3. Client Requirements

Virtual machine consoles can only be accessed using supported Remote Viewer (virt-viewer) clients on Red Hat Enterprise Linux and Windows. To install virt-viewer, see [Installing Supported Components](#) in the *Virtual Machine Management Guide*. Installing virt-viewer requires Administrator privileges.

SPICE console access is only available on other operating systems, such as OS X, through the unsupported SPICE HTML5 browser client.

Supported QXL drivers are available on Red Hat Enterprise Linux, Windows XP, and Windows 7.

SPICE support is divided into tiers:

- Tier 1: Operating systems on which remote-viewer has been fully tested and is supported.
- Tier 2: Operating systems on which remote-viewer is partially tested and is likely to work. Limited support is provided for this tier. Red Hat Engineering will attempt to fix issues with remote-viewer on this tier.

Table 2.3. Client Operating System SPICE Support

Support Tier	Operating System	SPICE Support
Tier 1	Red Hat Enterprise Linux 6	Fully supported on Red Hat Enterprise Linux 6.8 and above
Tier 1	Red Hat Enterprise Linux 7	Fully supported on Red Hat Enterprise Linux 7.2 and above

Support Tier	Operating System	SPICE Support
	Microsoft Windows 7	Fully supported on Microsoft Windows 7
Tier 2	Microsoft Windows 8	Supported when spice-vdagent is running on these guest operating systems
	Microsoft Windows 10	Supported when spice-vdagent is running on these guest operating systems

2.1.4. Operating System Requirements

The Red Hat Enterprise Virtualization Manager must be installed on a base installation of Red Hat Enterprise Linux 6.6 or later versions of Red Hat Enterprise Linux 6. Do not install any additional packages after the base installation because they may cause dependency issues when attempting to install the packages required by the Manager.

2.1.5. DNS Requirements

The Red Hat Virtualization Manager and all network communication requires reverse DNS lookup and the existence of a PTR record to avoid significant performance degradation.



NOTE

An entry in the `/etc/hosts` file is not sufficient because it does not provide reverse DNS lookup.

2.2. HYPERVISOR REQUIREMENTS

2.2.1. CPU Requirements

All CPUs must have support for the Intel® 64 or AMD64 CPU extensions, and the AMD-V™ or Intel VT® hardware virtualization extensions enabled. Support for the No eXecute flag (NX) is also required.

Table 2.4. Supported Hypervisor CPU Models

AMD	Intel	IBM
AMD Opteron G1	Intel Conroe	IBM POWER8
AMD Opteron G2	Intel Penryn	
AMD Opteron G3	Intel Nehalem	
AMD Opteron G4	Intel Westmere	

AMD	Intel	IBM
AMD Opteron G5	Intel Sandybridge	
	Intel Haswell	

Procedure 2.1. Checking if a Processor Supports the Required Flags

You must enable Virtualization in the BIOS. Power off and reboot the host after this change to ensure that the change is applied.

1. At the host's boot screen, press any key and select the **Boot** or **Boot with serial console** entry from the list.
2. Press **Tab** to edit the kernel parameters for the selected option.
3. Ensure there is a **Space** after the last kernel parameter listed, and append the **rescue** parameter.
4. Press **Enter** to boot into rescue mode.
5. At the prompt which appears, determine that your processor has the required extensions and that they are enabled by running this command:

```
# grep -E 'svm|vmx' /proc/cpuinfo | grep nx
```

If any output is shown, then the processor is hardware virtualization capable. If no output is shown, then it is still possible that your processor supports hardware virtualization. In some circumstances manufacturers disable the virtualization extensions in the BIOS. If you believe this to be the case, consult the system's BIOS and the motherboard manual provided by the manufacturer.

2.2.2. Memory Requirements

The amount of RAM required varies depending on guest operating system requirements, guest application requirements, and memory activity and usage of guests. You also need to take into account that KVM is able to overcommit physical RAM for virtualized guests. This allows for provisioning of guests with RAM requirements greater than what is physically present, on the basis that the guests are not all concurrently at peak load. KVM does this by only allocating RAM for guests as required and shifting underutilized guests into swap.

Table 2.5. Memory Requirements

Minimum	Maximum
2 GB of RAM	2 TB of RAM

2.2.3. Storage Requirements

Hypervisor hosts require local storage to store configuration, logs, kernel dumps, and for use as swap space. The minimum storage requirements of the Red Hat Enterprise Virtualization Hypervisor (RHEV-H) and Red Hat Virtualization Host (RHVH) are documented in this section. The storage requirements

for Red Hat Enterprise Linux hosts vary based on the amount of disk space used by their existing configuration but are expected to be greater than those of the RHEV-H and RHVH.

For RHEV-H and RHVH requirements, see the following table for the minimum supported internal storage for each version of the Hypervisor:

Table 2.6. Hypervisor Minimum Storage Requirements

Version	Root and RootBackup Partitions	Configuration Partition	Logging Partition	Data Partition	Swap Partition	Minimum Total
Red Hat Enterprise Virtualization Hypervisor 6	512 MB	8 MB	2048 MB	512 MB	8 MB	3.5 GB
Red Hat Enterprise Virtualization Hypervisor 7	8600 MB	8 MB	2048 MB	10240 MB	8 MB	20.4 GB
Red Hat Virtualization Host	6 GB	NA	8 GB	15 GB	1 GB	32 GB



IMPORTANT

If you are also installing the RHEV-M Virtual Appliance on RHEV-H, the minimum data partition is 60 GB.

By default, all disk space remaining after allocation of swap space will be allocated to the data partition.

For the recommended swap size, see <https://access.redhat.com/solutions/15244>.



IMPORTANT

The Red Hat Enterprise Virtualization Hypervisor does not support installation on `fakeraid` devices. Where a `fakeraid` device is present it must be reconfigured such that it no longer runs in RAID mode.

1. Access the RAID controller's BIOS and remove all logical drives from it.
2. Change controller mode to be non-RAID. This may be referred to as compatibility or JBOD mode.

Access the manufacturer provided documentation for further information related to the specific device in use.

2.2.4. PCI Device Requirements

Virtualization hosts must have at least one network interface with a minimum bandwidth of 1 Gbps. It is recommended that each virtualization host have two network interfaces with one dedicated to support network intensive activities such as virtual machine migration. The performance of such operations are limited by the bandwidth available.

2.2.5. Hardware Considerations For Device Assignment

If you plan to implement device assignment and PCI passthrough so that a virtual machine can use a specific PCIe device from a host, ensure the following requirements are met:

- CPU must support IOMMU (for example, VT-d or AMD-Vi). IBM POWER8 supports IOMMU by default.
- Firmware must support IOMMU.
- CPU root ports used must support ACS or ACS-equivalent capability.
- PCIe device must support ACS or ACS-equivalent capability.
- It is recommended that all PCIe switches and bridges between the PCIe device and the root port should support ACS. For example, if a switch does not support ACS, all devices behind that switch share the same IOMMU group, and can only be assigned to the same virtual machine.
- For GPU support, Red Hat Enterprise Linux 7 supports PCI device assignment of NVIDIA K-Series Quadro (model 2000 series or higher), GRID, and Tesla as non-VGA graphics devices. Currently up to two GPUs may be attached to a virtual machine in addition to one of the standard, emulated VGA interfaces. The emulated VGA is used for pre-boot and installation and the NVIDIA GPU takes over when the NVIDIA graphics drivers are loaded. Note that the NVIDIA Quadro 2000 is not supported, nor is the Quadro K420 card.

Refer to vendor specification and datasheets to confirm that hardware meets these requirements. After you have installed a hypervisor host, see [Appendix G, Configuring a Hypervisor Host for PCI Passthrough](#) for more information on how to enable the hypervisor hardware and software for device passthrough.

To implement SR-IOV, see [Hardware Considerations for Implementing SR-IOV](#) for more information.

The `lspci -v` command can be used to print information for PCI devices already installed on a system.

2.3. FIREWALLS

2.3.1. Red Hat Enterprise Virtualization Manager Firewall Requirements

The Red Hat Enterprise Virtualization Manager requires that a number of ports be opened to allow network traffic through the system's firewall. The `engine-setup` script can configure the firewall automatically, but this overwrites any pre-existing firewall configuration.

Where an existing firewall configuration exists, you must manually insert the firewall rules required by the Manager instead. The `engine-setup` command saves a list of the `iptables` rules required in the `/usr/share/ovirt-engine/conf/iptables.example` file.

The firewall configuration documented here assumes a default configuration. Where non-default HTTP and HTTPS ports are chosen during installation, adjust the firewall rules to allow network traffic on the ports that were selected - not the default ports (80 and 443) listed here.

Table 2.7. Red Hat Enterprise Virtualization Manager Firewall Requirements

Port(s)	Protocol	Source	Destination	Purpose
-	ICMP	Red Hat Enterprise Virtualization Hypervisor(s) Red Hat Enterprise Linux host(s)	Red Hat Enterprise Virtualization Manager	When registering to the Red Hat Enterprise Virtualization Manager, virtualization hosts send an ICMP ping request to the Manager to confirm that it is online.
22	TCP	System(s) used for maintenance of the Manager including backend configuration, and software upgrades.	Red Hat Enterprise Virtualization Manager	Secure Shell (SSH) access. Optional.
2222	TCP	Clients accessing virtual machine serial consoles.	Red Hat Enterprise Virtualization Manager	Secure Shell (SSH) access to enable connection to virtual machine serial consoles.
80, 443	TCP	Administration Portal clients User Portal clients Red Hat Enterprise Virtualization Hypervisor(s) Red Hat Enterprise Linux host(s) REST API clients	Red Hat Enterprise Virtualization Manager	Provides HTTP and HTTPS access to the Manager.

Port(s)	Protocol	Source	Destination	Purpose
6100	TCP	Administration Portal clients User Portal clients	Red Hat Enterprise Virtualization Manager	Provides websocket proxy access for web-based console clients (noVNC and spice-htm15) when the websocket proxy is running on the Manager. If the websocket proxy is running on a different host, however, this port is not used.
7410	UDP	Red Hat Enterprise Virtualization Hypervisor(s) Red Hat Enterprise Linux host(s)	Red Hat Enterprise Virtualization Manager	Must be open for the Manager to receive Kdump notifications.

IMPORTANT

In environments where the Red Hat Enterprise Virtualization Manager is also required to export NFS storage, such as an ISO Storage Domain, additional ports must be allowed through the firewall. Grant firewall exceptions for the ports applicable to the version of NFS in use:

NFSv4

- TCP port **2049** for NFS.

NFSv3

- TCP and UDP port **2049** for NFS.
- TCP and UDP port **111** (**rpcbind/sunrpc**).
- TCP and UDP port specified with **MOUNTD_PORT="port"**
- TCP and UDP port specified with **STATD_PORT="port"**
- TCP port specified with **LOCKD_TCPPORT="port"**
- UDP port specified with **LOCKD_UDPPORT="port"**

The **MOUNTD_PORT**, **STATD_PORT**, **LOCKD_TCPPORT**, and **LOCKD_UDPPORT** ports are configured in the **/etc/sysconfig/nfs** file.

2.3.2. Hypervisor Firewall Requirements

Hypervisor hosts require a number of ports to be opened to allow network traffic through the system's firewall. In the case of the Red Hat Enterprise Virtualization Hypervisor and Red Hat Virtualization Host, these firewall rules are configured automatically. For Red Hat Enterprise Linux hosts however it is necessary to manually configure the firewall.

Table 2.8. Virtualization Host Firewall Requirements

Port(s)	Protocol	Source	Destination	Purpose
22	TCP	Red Hat Enterprise Virtualization Manager	Red Hat Enterprise Virtualization Hypervisor(s) Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Secure Shell (SSH) access. Optional.
2223	TCP	Red Hat Enterprise Virtualization Manager	Red Hat Enterprise Virtualization Hypervisor(s) Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Secure Shell (SSH) access to enable connection to virtual machine serial consoles.
161	UDP	Red Hat Enterprise Virtualization Hypervisor(s) Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Red Hat Enterprise Virtualization Manager	Simple network management protocol (SNMP). Only required if you want Simple Network Management Protocol traps sent from the hypervisor to one or more external SNMP managers. Optional.

Port(s)	Protocol	Source	Destination	Purpose
5900 - 6923	TCP	Administration Portal clients User Portal clients	Red Hat Enterprise Virtualization Hypervisor(s) Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Remote guest console access via VNC and SPICE. These ports must be open to facilitate client access to virtual machines.
5989	TCP, UDP	Common Information Model Object Manager (CIMOM)	Red Hat Enterprise Virtualization Hypervisor(s) Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Used by Common Information Model Object Managers (CIMOM) to monitor virtual machines running on the hypervisor. Only required if you want to use a CIMOM to monitor the virtual machines in your virtualization environment. Optional.
16514	TCP	Red Hat Enterprise Virtualization Hypervisor(s) Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Red Hat Enterprise Virtualization Hypervisor(s) Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Virtual machine migration using libvirt .
49152 - 49216	TCP	Red Hat Enterprise Virtualization Hypervisor(s) Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Red Hat Enterprise Virtualization Hypervisor(s) Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Virtual machine migration and fencing using VDSM. These ports must be open facilitate both automated and manually initiated migration of virtual machines.

Port(s)	Protocol	Source	Destination	Purpose
54321	TCP	Red Hat Enterprise Virtualization Manager	Red Hat Enterprise Virtualization Hypervisor(s)	VDSM communications with the Manager and other virtualization hosts.
		Red Hat Enterprise Virtualization Hypervisor(s)	Red Hat Virtualization Host(s)	
		Red Hat Virtualization Host(s)	Red Hat Enterprise Linux host(s)	
		Red Hat Enterprise Linux host(s)		

2.3.3. Directory Server Firewall Requirements

Red Hat Enterprise Virtualization requires a directory server to support user authentication. A number of ports must be opened in the directory server's firewall to support GSS-API authentication as used by the Red Hat Enterprise Virtualization Manager.

Table 2.9. Host Firewall Requirements

Port(s)	Protocol	Source	Destination	Purpose
88, 464	TCP, UDP	Red Hat Enterprise Virtualization Manager	Directory server	Kerberos authentication.
389, 636	TCP	Red Hat Enterprise Virtualization Manager	Directory server	Lightweight Directory Access Protocol (LDAP) and LDAP over SSL.

2.3.4. Database Server Firewall Requirements

Red Hat Enterprise Virtualization supports the use of a remote database server. If you plan to use a remote database server with Red Hat Enterprise Virtualization then you must ensure that the remote database server allows connections from the Manager.

Table 2.10. Host Firewall Requirements

Port(s)	Protocol	Source	Destination	Purpose
---------	----------	--------	-------------	---------

Port(s)	Protocol	Source	Destination	Purpose
5432	TCP, UDP	Red Hat Enterprise Virtualization Manager	PostgreSQL database server	Default port for PostgreSQL database connections.

If you plan to use a local database server on the Manager itself, which is the default option provided during installation, then no additional firewall rules are required.

PART II. INSTALLING THE RED HAT ENTERPRISE VIRTUALIZATION MANAGER

CHAPTER 3. RED HAT ENTERPRISE VIRTUALIZATION MANAGER

3.1. SUBSCRIBING TO THE REQUIRED ENTITLEMENTS

Once you have installed a Red Hat Enterprise Linux base operating system and made sure the system meets the requirements listed in the previous chapter, you must register the system with Red Hat Subscription Manager, and subscribe to the required entitlements to install the Red Hat Enterprise Virtualization Manager packages.

1. Register your system with the Content Delivery Network, entering your Customer Portal user name and password when prompted:

```
# subscription-manager register
```

2. Find the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** subscription pools and note down the pool IDs.

```
# subscription-manager list --available
```

3. Use the pool IDs located in the previous step to attach the entitlements to the system:

```
# subscription-manager attach --pool=pool_id
```



NOTE

To find out what subscriptions are currently attached, run:

```
# subscription-manager list --consumed
```

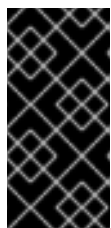
To list all enabled repositories, run:

```
# yum repolist
```

4. Disable all existing repositories:

```
# subscription-manager repos --disable=*
```

5. Enable the required repositories.



IMPORTANT

Red Hat Enterprise Virtualization 3.x has reached End Of Life (EOL). Users with Extended Lifecycle Support (ELS) must use the repositories in <https://access.redhat.com/solutions/3194482> to keep the environment up and running.

You have now subscribed your system to the required entitlements. Proceed to the next section to install the Red Hat Enterprise Virtualization Manager packages.

3.2. INSTALLING THE RED HAT ENTERPRISE VIRTUALIZATION MANAGER PACKAGES

Before you can configure and use the Red Hat Enterprise Virtualization Manager, you must install the `rhev` package and dependencies.

Procedure 3.1. Installing the Red Hat Enterprise Virtualization Manager Packages

1. To ensure all packages are up to date, run the following command on the machine where you are installing the Red Hat Enterprise Virtualization Manager:

```
# yum update
```

2. Run the following command to install the `rhev` package and dependencies.

```
# yum install rhvm
```

Proceed to the next step to configure your Red Hat Enterprise Virtualization Manager.

3.3. CONFIGURING THE RED HAT ENTERPRISE VIRTUALIZATION MANAGER

After you have installed the `rhev` package and dependencies, you must configure the Red Hat Enterprise Virtualization Manager using the `engine-setup` command. This command asks you a series of questions and, after you provide the required values for all questions, applies that configuration and starts the `ovirt-engine` service.

By default, `engine-setup` creates and configures the Manager database locally on the Manager machine. Alternatively, you can configure the Manager to use a remote database or a manually-configured local database; however, you must set up that database before running `engine-setup`. To set up a remote database see [Appendix D, *Preparing a Remote PostgreSQL Database for Use with the Red Hat Enterprise Virtualization Manager*](#). To set up a manually-configured local database, see [Appendix E, *Preparing a Local Manually-Configured PostgreSQL Database for Use with the Red Hat Enterprise Virtualization Manager*](#).

By default, `engine-setup` will configure a websocket proxy on the Manager. However, for security and performance reasons, the user can choose to configure it on a separate host. See [Appendix F, *Installing a Websocket Proxy on a Separate Machine*](#) for instructions.



NOTE

The `engine-setup` command guides you through several distinct configuration stages, each comprising several steps that require user input. Suggested configuration defaults are provided in square brackets; if the suggested value is acceptable for a given step, press Enter to accept that value.

Procedure 3.2. Configuring the Red Hat Enterprise Virtualization Manager

1. Run the `engine-setup` command to begin configuration of the Red Hat Enterprise Virtualization Manager:

```
# engine-setup
```


2. Press **Enter** to configure the Manager:

```
Configure Engine on this host (Yes, No) [Yes]:
```

3. Optionally allow access to a virtual machines's serial console from the command line.

```
Configure VM Console Proxy on this host (Yes, No) [Yes]:
```

Additional configuration is required on the client machine to use this feature. See [Opening a Serial Console to a Virtual Machine](#) in the *Virtual Machine Management Guide*

4. Optionally allow **engine-setup** to configure a websocket proxy server for allowing users to connect to virtual machines via the noVNC or HTML 5 consoles:

```
Configure WebSocket Proxy on this machine? (Yes, No) [Yes]:
```

To configure the websocket proxy on a separate machine, select **No** and refer to [Appendix F, Installing a WebSocket Proxy on a Separate Machine](#) for configuration instructions.

5. Press **Enter** to accept the automatically detected hostname, or enter an alternative hostname and press **Enter**. Note that the automatically detected hostname may be incorrect if you are using virtual hosts:

```
Host fully qualified DNS name of this server [autodetected host name]:
```

6. The **engine-setup** command checks your firewall configuration and offers to modify that configuration to open the ports used by the Manager for external communication such as TCP ports 80 and 443. If you do not allow **engine-setup** to modify your firewall configuration, then you must manually open the ports used by the Manager.

```
Setup can automatically configure the firewall on this system.
Note: automatic configuration of the firewall may overwrite current
settings.
Do you want Setup to configure the firewall? (Yes, No) [Yes]:
```

If you choose to automatically configure the firewall, and no firewall managers are active, you are prompted to select your chosen firewall manager from a list of supported options. Type the name of the firewall manager and press **Enter**. This applies even in cases where only one option is listed.

7. Choose to use either a local or remote PostgreSQL database as the Manager database:

```
Where is the Engine database located? (Local, Remote) [Local]:
```

- o If you select **Local**, the **engine-setup** command can configure your database automatically (including adding a user and a database), or it can connect to a preconfigured local database:

```
Setup can configure the local postgresql server automatically for
the engine to run. This may conflict with existing applications.
Would you like Setup to automatically configure postgresql and
```

```
create Engine database, or prefer to perform that manually?
(Automatic, Manual) [Automatic]:
```

- a. If you select **Automatic** by pressing **Enter**, no further action is required here.
- b. If you select **Manual**, input the following values for the manually-configured local database:

```
Engine database secured connection (Yes, No) [No]:
Engine database name [engine]:
Engine database user [engine]:
Engine database password:
```

- o If you select **Remote**, input the following values for the preconfigured remote database host:

```
Engine database host [localhost]:
Engine database port [5432]:
Engine database secured connection (Yes, No) [No]:
Engine database name [engine]:
Engine database user [engine]:
Engine database password:
```

8. Select **Gluster**, **Virt**, or **Both**:

```
Application mode (Both, Virt, Gluster) [Both]:
```

Both offers the greatest flexibility. In most cases, select **Both**. **Virt** application mode allows you to run virtual machines in the environment; **Gluster** application mode only allows you to manage GlusterFS from the Administration Portal.

9. Set a password for the automatically created administrative user of the Red Hat Enterprise Virtualization Manager:

```
Engine admin password:
Confirm engine admin password:
```

10. Set the default value for the `wipe_after_delete` flag, which wipes the blocks of a virtual disk when the disk is deleted.

```
Default SAN wipe after delete (Yes, No) [No]:
```

11. The Manager uses certificates to communicate securely with its hosts. This certificate can also optionally be used to secure HTTPS communications with the Manager. Provide the organization name for the certificate:

```
Organization name for certificate [autodetected domain-based name]:
```

12. By default, external SSL (HTTPS) communication with the Manager is secured with the self-signed certificate created earlier in the configuration to securely communicate with hosts. Alternatively, choose another certificate for external HTTPS connections; this does not affect how the Manager communicates with hosts:

■

```
Setup can configure apache to use SSL using a certificate issued
from the internal CA.
```

```
Do you wish Setup to configure that, or prefer to perform that
manually? (Automatic, Manual) [Automatic]:
```

13. Optionally allow **engine-setup** to make the landing page of the Manager the default page presented by the Apache web server:

```
Setup can configure the default page of the web server to present
the application home page. This may conflict with existing
applications.
```

```
Do you wish to set the application as the default web page of the
server? (Yes, No) [Yes]:
```

14. Optionally create an NFS share on the Manager to use as an ISO storage domain. The local ISO domain provides a selection of images that can be used in the initial setup of virtual machines:

- a. Configure an NFS share on this server to be used as an ISO Domain? (Yes, No) [Yes]:

- b. Specify the path for the ISO domain:

```
Local ISO domain path [/var/lib/exports/iso]:
```

- c. Specify the networks or hosts that require access to the ISO domain:

```
Local ISO domain ACL: 10.1.2.0/255.255.255.0(rw)
host01.example.com(rw) host02.example.com(rw)
```

The example above allows access to a single /24 network and two specific hosts. See the **exports(5)** man page for further formatting options.

- d. Specify a display name for the ISO domain:

```
Local ISO domain name [ISO_DOMAIN]:
```

15. Optionally, use the **engine-setup** command to allow a proxy server to broker transactions from the Red Hat Access plug-in:

```
Would you like transactions from the Red Hat Access Plugin sent from
the RHEV Manager to be brokered through a proxy server? (Yes, No)
[No]:
```

16. Review the installation settings, and press **Enter** to accept the values and proceed with the installation:

```
Please confirm installation settings (OK, Cancel) [OK]:
```

17. If you intend to link your Red Hat Enterprise Virtualization environment with a directory server, configure the date and time to synchronize with the system clock used by the directory server to avoid unexpected account expiry issues. See [Network Time Protocol Setup](#) in the *Red Hat Enterprise Linux Deployment Guide* for more information.

When your environment has been configured, the `engine-setup` command displays details about how to access your environment. If you chose to manually configure the firewall, `engine-setup` provides a custom list of ports that need to be opened, based on the options selected during setup. The `engine-setup` command also saves your answers to a file that can be used to reconfigure the Manager using the same values, and outputs the location of the log file for the Red Hat Enterprise Virtualization Manager configuration process.

Proceed to the next section to see how to connect to the Administration Portal as the `admin@internal` user. Then, proceed with setting up hypervisor hosts, and attaching storage.

3.4. CONNECTING TO THE ADMINISTRATION PORTAL

Access the Administration Portal using a web browser.

1. In a web browser, navigate to `https://your-manager-fqdn/ovirt-engine`, replacing `your-manager-fqdn` with the fully qualified domain name that you provided during installation.



IMPORTANT

The first time that you connect to the Administration Portal, you are prompted to trust the certificate being used to secure communications between your browser and the web server. You must accept this certificate.

2. Click **Administration Portal**.
3. Enter your **User Name** and **Password**. If you are logging in for the first time, use the user name `admin` in conjunction with the password that you specified during installation.
4. Select the domain against which to authenticate from the **Domain** list. If you are logging in using the internal `admin` user name, select the `internal` domain.
5. You can view the Administration Portal in multiple languages. The default selection will be chosen based on the locale settings of your web browser. If you would like to view the Administration Portal in a language other than the default, select your preferred language from the list.
6. Click **Login**.

The next chapter contains additional Manager related tasks which are optional. If the tasks are not applicable to your environment, proceed to [Part III, “Installing Hypervisor Hosts”](#).

CHAPTER 4. RED HAT ENTERPRISE VIRTUALIZATION MANAGER RELATED TASKS

4.1. REMOVING THE RED HAT ENTERPRISE VIRTUALIZATION MANAGER

You can use the `engine-cleanup` command to remove specific components or all components of the Red Hat Enterprise Virtualization Manager.



NOTE

A backup of the engine database and a compressed archive of the PKI keys and configuration are always automatically created. These files are saved under `/var/lib/ovirt-engine/backups/`, and include the date and `engine-` and `engine-pki-` in their file names respectively.

Procedure 4.1. Removing the Red Hat Enterprise Virtualization Manager

1. Run the following command on the machine on which the Red Hat Enterprise Virtualization Manager is installed:

```
# engine-cleanup
```

2. You are prompted whether to remove all Red Hat Enterprise Virtualization Manager components:

- o Type **Yes** and press **Enter** to remove all components:

```
Do you want to remove all components? (Yes, No) [Yes]:
```

- o Type **No** and press **Enter** to select the components to remove. You can select whether to retain or remove each component individually:

```
Do you want to remove Engine database content? All data will be lost (Yes, No) [No]:
```

```
Do you want to remove PKI keys? (Yes, No) [No]:
```

```
Do you want to remove PKI configuration? (Yes, No) [No]:
```

```
Do you want to remove Apache SSL configuration? (Yes, No) [No]:
```

3. You are given another opportunity to change your mind and cancel the removal of the Red Hat Enterprise Virtualization Manager. If you choose to proceed, the `ovirt-engine` service is stopped, and your environment's configuration is removed in accordance with the options you selected.

```
During execution engine service will be stopped (OK, Cancel) [OK]:
ovirt-engine is about to be removed, data will be lost (OK, Cancel)
[Cancel]:OK
```

4. Remove the Red Hat Enterprise Virtualization packages:

```
# yum remove rhevm* vds-m-bootstrap
```



4.2. CONFIGURING A LOCAL REPOSITORY FOR OFFLINE RED HAT ENTERPRISE VIRTUALIZATION MANAGER INSTALLATION

To install Red Hat Enterprise Virtualization Manager on a system that does not have a direct connection to the Content Delivery Network, download the required packages on a system that has Internet access, then create a repository that can be shared with the offline Manager machine. The system hosting the repository must be connected to the same network as the client systems where the packages are to be installed.

1. Install Red Hat Enterprise Linux 6 Server on a system that has access to the Content Delivery Network. This system downloads all the required packages, and distributes them to your offline system(s).



IMPORTANT

Ensure that the system used in this procedure has a large amount of free disk space available. This procedure downloads a large number of packages, and requires up to 50 GB of free disk space.

2. Register your system with the Content Delivery Network, entering your Customer Portal user name and password when prompted:

```
# subscription-manager register
```

3. Subscribe the system to all required entitlements:

1. Find the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** subscription pools and note down the pool IDs.

```
# subscription-manager list --available
```

2. Use the pool IDs located in the previous step to attach the entitlements to the system:

```
# subscription-manager attach --pool=pool_id
```

3. Disable all existing repositories:

```
# subscription-manager repos --disable=*
```

4. Enable the required repositories:

```
# subscription-manager repos --enable=rhel-6-server-rpms
# subscription-manager repos --enable=rhel-6-server-
supplementary-rpms
# subscription-manager repos --enable=rhel-6-server-rhev-3.6-
rpms
# subscription-manager repos --enable=jb-eap-6-for-rhel-6-server-
rpms
```

5. Ensure that all packages currently installed are up to date:

```
# yum update
```

4. Servers that are not connected to the Internet can access software repositories on other systems using File Transfer Protocol (FTP). To create the FTP repository, install and configure vsftpd:

- a. Install the vsftpd package:

```
# yum install vsftpd
```

- b. Start the **vsftpd** service, and ensure the service starts on boot:

```
# service vsftpd start
# chkconfig vsftpd on
```

- c. Create a sub-directory inside the **/var/ftp/pub/** directory. This is where the downloaded packages will be made available:

```
# mkdir /var/ftp/pub/rhevrepo
```

5. Download packages from all configured software repositories to the **rhevrepo** directory. This includes repositories for all Content Delivery Network subscription pools the system is subscribed to, and any locally configured repositories:

```
# reposync -l -p /var/ftp/pub/rhevrepo
```

This command downloads a large number of packages, and takes a long time to complete. The **-l** option enables yum plug-in support.

6. Install the createrepo package:

```
# yum install createrepo
```

7. Create repository metadata for each of the sub-directories where packages were downloaded under **/var/ftp/pub/rhevrepo**:

```
# for DIR in `find /var/ftp/pub/rhevrepo -maxdepth 1 -mindepth 1 -type d`; do createrepo $DIR; done;
```

8. Create a repository file, and copy it to the **/etc/yum.repos.d/** directory on the offline machine on which you will install the Manager.

The configuration file can be created manually or with a script. Run the script below on the system hosting the repository, replacing **ADDRESS** in the **baseurl** with the IP address or fully qualified domain name of the system hosting the repository:

```
#!/bin/sh

REPOFILE="/etc/yum.repos.d/rhev.repo"

for DIR in `find /var/ftp/pub/rhevrepo -maxdepth 1 -mindepth 1 -type d`; do
```

```
echo -e "[`basename $DIR`]" > $REPOFILE
echo -e "name=`basename $DIR`" >> $REPOFILE
echo -e "baseurl=ftp://ADDRESS/pub/rhevrepo/`basename $DIR`" >>
$REPOFILE
echo -e "enabled=1" >> $REPOFILE
echo -e "gpgcheck=0" >> $REPOFILE
echo -e "\n" >> $REPOFILE
done;
```

9. Install the Manager packages on the offline system. See [Section 3.2, “Installing the Red Hat Enterprise Virtualization Manager Packages”](#) for instructions. Packages are installed from the local repository, instead of from the Content Delivery Network.
10. Configure the Manager. See [Section 3.3, “Configuring the Red Hat Enterprise Virtualization Manager”](#) for initial configuration instructions.
11. Continue with host, storage, and virtual machine configuration.

CHAPTER 5. DATA WAREHOUSE AND REPORTS

5.1. OVERVIEW OF CONFIGURING DATA WAREHOUSE AND REPORTS

The Red Hat Enterprise Virtualization Manager includes a comprehensive management history database, which can be utilized by any application to extract a range of information at the data center, cluster, and host levels. Installing Data Warehouse creates the `ovirt_engine_history` database, to which the Manager is configured to log information for reporting purposes. Red Hat Enterprise Virtualization Manager Reports functionality is also available as an optional component. Reports provides a customized implementation of JasperServer and JasperReports, an open source reporting tool capable of being embedded in Java-based applications. It produces reports that can be built and accessed via a web user interface, and then rendered to screen, printed, or exported to a variety of formats including PDF, Excel, CSV, Word, RTF, Flash, ODT and ODS. The Data Warehouse and Reports components are optional, and must be installed and configured in addition to the Manager setup.

Before proceeding with Data Warehouse and Reports installation you must first have installed and configured the Red Hat Enterprise Virtualization Manager. The Reports functionality depends on the presence of the Data Warehouse; Data Warehouse must be installed and configured before Reports.

It is recommended that you set the system time zone for all machines in your Data Warehouse/Reports deployment to UTC. This ensures that data collection is not interrupted by variations in your local time zone: for example, a change from summer time to winter time.

To calculate an estimate of the space and resources the `ovirt_engine_history` database will use, use the [RHEV Manager History Database Size Calculator](#) tool. The estimate is based on the number of entities and the length of time you have chosen to retain the history records.

5.2. DATA WAREHOUSE AND REPORTS CONFIGURATION NOTES

Behavior

The following behavior is expected in `engine-setup`:

Install the Data Warehouse package and the Reports package, run `engine-setup`, and answer **No** to configuring Data Warehouse and Reports:

```
Configure Data Warehouse on this host (Yes, No) [Yes]: No
Configure Reports on this host (Yes, No) [Yes]: No
```

Run `engine-setup` again; setup no longer presents the option to configure those services.

Workaround

To force `engine-setup` to present both options again, run `engine-setup --reconfigure-optional-components`.



NOTE

To configure only the currently installed Data Warehouse and Reports packages, and prevent setup from applying package updates found in enabled repositories, add the `--offline` option.

5.3. DATA WAREHOUSE AND REPORTS INSTALLATION OPTIONS

Data Warehouse and Reports installation requires between one and three machines, and can be configured in one of the following ways:

1. Install and configure both Data Warehouse and Reports on the machine on which the Manager is installed.

This configuration hosts the Data Warehouse and Reports services on your Manager machine. This requires only a single registered machine, and is the simplest to configure; however, it also requires that the services share CPU and memory, and increases the demand on the host machine. Users who require access to the Data Warehouse service or the Reports service will require access to the Manager machine itself.

2. Install and configure both Data Warehouse and Reports on one separate machine.

This configuration hosts Data Warehouse and Reports on a single, separate machine. This requires two registered machines; however, it reduces the load on the Manager machine, and avoids potential CPU and memory-sharing conflicts on that machine. Administrators can also allow user access to the Data Warehouse-Reports machine, without the need to grant access to the Manager machine. Note that the Data Warehouse and Reports services will still compete for resources on their single host.

3. Install and configure Data Warehouse on a separate machine, then install and configure Reports on a separate machine.

This configuration separates each service onto its own dedicated host. This requires three registered machines; however, it reduces the load on each individual machine, and allows each service to avoid potential conflicts caused by sharing CPU and memory with other processes. Administrators can also allow user access to one particular machine, without the need to grant access to either of the two other machines.

4. Install and configure Data Warehouse on the Manager machine, then install and configure Reports on a separate machine.

This configuration hosts Data Warehouse on the Manager machine, and Reports on a separate host. This requires two registered machines; however, it reduces the load on the Manager machine, and avoids some memory-sharing conflicts. Administrators can allow user access to the Reports machine, without the need to grant access to the Manager machine.

5. Install and configure Data Warehouse on a separate machine, then install and configure Reports on the Manager machine.

This configuration hosts Data Warehouse on a separate machine, and Reports on the Manager machine. This requires two registered machines; however, it reduces the load on the Manager machine, and avoids some memory-sharing conflicts. Administrators can allow user access to the Data Warehouse machine, without the need to grant access to the Manager machine.

If you choose to host the Data Warehouse database on a machine that is separate from the machine on which the Data Warehouse service is installed, you will require an additional machine for that purpose. The same is true if you choose to host the Reports database remotely.



NOTE

Detailed user, administration, and installation guides for JasperReports are available in `/usr/share/jasperreports-server-pro/docs/`

5.3.1. Installing and Configuring Data Warehouse and Reports on the Red Hat Enterprise Virtualization Manager

Overview

Install and configure Data Warehouse and Red Hat Enterprise Virtualization Manager Reports on the same machine as the Red Hat Enterprise Virtualization Manager.

Prerequisites

Ensure that you have completed the following prerequisites:

1. You must have installed and configured the Manager on this machine.
2. If you choose to use a remote Data Warehouse database or Reports database, you must set up each database before installing the Data Warehouse and Reports services. You must have the following information about each database host:
 - o The fully qualified domain name of the host
 - o The port through which the database can be reached (5432 by default)
 - o The database name
 - o The database user
 - o The database password
3. If you are using the self-hosted engine, you must move it to maintenance mode:

```
# hosted-engine --set-maintenance --mode=global
```

Procedure 5.1. Installing and Configuring Data Warehouse and Reports on the Red Hat Enterprise Virtualization Manager

1. Install the `rhevmdwh` package and the `rhevmdreports` package on the system where the Red Hat Enterprise Virtualization Manager is installed:

```
# yum install rhevmdwh rhevmdreports
```

2. Run the `engine-setup` command to begin configuration of Data Warehouse and Reports on the machine:

```
# engine-setup
```

3. Follow the prompts to configure Data Warehouse and Reports:

```
Configure Data Warehouse on this host (Yes, No) [Yes]:
Configure Reports on this host (Yes, No) [Yes]:
```

4. Press **Enter** to automatically configure the firewall, or type **No** and press **Enter** to maintain existing settings:

```
Setup can automatically configure the firewall on this system.
Note: automatic configuration of the firewall may overwrite current
settings.
Do you want Setup to configure the firewall? (Yes, No) [Yes]:
```

If you choose to automatically configure the firewall, and no firewall managers are active, you are prompted to select your chosen firewall manager from a list of supported options. Type the name of the firewall manager and press **Enter**. This applies even in cases where only one option is listed.

5. Answer the following questions about the Data Warehouse database and the Reports database:

```
Where is the DWH database located? (Local, Remote) [Local]:
Setup can configure the local postgresql server automatically for
the DWH to run. This may conflict with existing applications.
Would you like Setup to automatically configure postgresql and
create DWH database, or prefer to perform that manually? (Automatic,
Manual) [Automatic]:
Where is the Reports database located? (Local, Remote) [Local]:
Setup can configure the local postgresql server automatically for
the Reports to run. This may conflict with existing applications.
Would you like Setup to automatically configure postgresql and
create Reports database, or prefer to perform that manually?
(Automatic, Manual) [Automatic]:
```

Press **Enter** to choose the highlighted defaults, or type your alternative preference and then press **Enter**. If you select **Remote**, you are prompted to provide details about each remote database host.

6. Set a password for the Reports administrative users (**admin** and **superuser**). Note that the reports system maintains its own set of credentials that are separate to those used for the Manager:

```
Reports power users password:
```

You are prompted to enter the password a second time to confirm it.

7. For the configuration to take effect, the **ovirt-engine** service must be restarted. The **engine-setup** command prompts you:

```
During execution engine service will be stopped (OK, Cancel) [OK]:
```

Press **Enter** to proceed. The **ovirt-engine** service restarts automatically later in the command.

8. Confirm your installation settings:

```
Please confirm installation settings (OK, Cancel) [OK]:
```

Next Steps

Access the Reports Portal at <http://demo.redhat.com/ovirt-engine-reports>, replacing *demo.redhat.com* with the fully qualified domain name of the Manager. If during the Manager installation you selected a non-default HTTP port then append *:port* to the URL, replacing *:port* with the port that you chose.

Log in using the user name **admin** and the password you set during reports installation. Note that the first time you log in to Red Hat Enterprise Virtualization Manager Reports, a number of web pages are generated and, as a result, your initial attempt to log in may take some time to complete.

5.3.2. Installing and Configuring Data Warehouse and Reports Together on a Separate Machine

Overview

Install and configure Data Warehouse and Red Hat Enterprise Virtualization Manager Reports together on a separate host from that on which the Red Hat Enterprise Virtualization Manager is installed. Hosting the Data Warehouse service and the Reports service on a separate machine helps to reduce the load on the Manager machine. Note that hosting Data Warehouse and Reports on the same machine means that these processes will share CPU and memory.

Prerequisites

Ensure that you have completed the following prerequisites:

1. You must have installed and configured the Manager on a separate machine.
2. To set up the Data Warehouse and Reports machine, you must have the following:
 - A virtual or physical machine with Red Hat Enterprise Linux 6.6 or later versions of Red Hat Enterprise Linux 6 installed.
 - A subscription to the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** subscription pools.
 - The password from the Manager's `/etc/ovirt-engine/engine.conf.d/10-setup-database.conf` file.
 - Allowed access from the Data Warehouse-Reports machine to the Manager database machine's TCP port 5432.
3. If you choose to use a remote Data Warehouse database or Reports database, you must set up each database before installing the Data Warehouse and Reports services. You must have the following information about each database host:
 - The fully qualified domain name of the host
 - The port through which the database can be reached (5432 by default)
 - The database name
 - The database user
 - The database password

Procedure 5.2. Installing and Configuring Data Warehouse and Reports Together on a Separate Machine

1. Register your system with the Content Delivery Network, entering your Customer Portal user name and password when prompted:

```
# subscription-manager register
```

2. Find the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** subscription pools and note down the pool IDs.

```
# subscription-manager list --available
```

-
- 3. Use the pool IDs located in the previous step to attach the entitlements to the system:

```
# subscription-manager attach --pool=pool_id
```

- 4. Disable all existing repositories:

```
# subscription-manager repos --disable=*
```

- 5. Enable the required repositories:

```
# subscription-manager repos --enable=rhel-6-server-rpms
# subscription-manager repos --enable=rhel-6-server-supplementary-
rpms
# subscription-manager repos --enable=rhel-6-server-rhev-3.6-rpms
# subscription-manager repos --enable=jb-eap-6-for-rhel-6-server-
rpms
```

- 6. Ensure that all packages currently installed are up to date:

```
# yum update
```

- 7. Install the `rhev-dwh-setup` and `rhev-reports-setup` packages:

```
# yum install rhvm-dwh-setup rhvm-reports-setup
```

- 8. Run the `engine-setup` command to begin configuration of Data Warehouse and Reports on the machine:

```
# engine-setup
```

- 9. Follow the prompts to configure Data Warehouse and Reports:

```
Configure Data Warehouse on this host (Yes, No) [Yes]:
Configure Reports on this host (Yes, No) [Yes]:
```

- 10. Press **Enter** to automatically configure the firewall, or type **No** and press **Enter** to maintain existing settings:

```
Setup can automatically configure the firewall on this system.
Note: automatic configuration of the firewall may overwrite current
settings.
Do you want Setup to configure the firewall? (Yes, No) [Yes]:
```

If you choose to automatically configure the firewall, and no firewall managers are active, you are prompted to select your chosen firewall manager from a list of supported options. Type the name of the firewall manager and press **Enter**. This applies even in cases where only one option is listed.

- 11. Press **Enter** to accept the automatically detected hostname, or enter an alternative hostname and press **Enter**:

```
Host fully qualified DNS name of this server [autodetected
hostname]:
```

12. Enter the fully qualified domain name of the Manager machine, and then press **Enter**:

```
Host fully qualified DNS name of the engine server []:
```

13. Answer the following questions about the Data Warehouse database and the Reports database:

```
Where is the DWH database located? (Local, Remote) [Local]:
Setup can configure the local postgresql server automatically for
the DWH to run. This may conflict with existing applications.
Would you like Setup to automatically configure postgresql and
create DWH database, or prefer to perform that manually? (Automatic,
Manual) [Automatic]:
Where is the Reports database located? (Local, Remote) [Local]:
Setup can configure the local postgresql server automatically for
the Reports to run. This may conflict with existing applications.
Would you like Setup to automatically configure postgresql and
create Reports database, or prefer to perform that manually?
(Automatic, Manual) [Automatic]:
```

Press **Enter** to choose the highlighted defaults, or type your alternative preference and then press **Enter**. If you select **Remote**, you are prompted to provide details about each remote database host.

14. Enter the fully qualified domain name and password for the Manager database machine. Press **Enter** to accept the default values in each other field:

```
Engine database host []: engine-db-fqdn
Engine database port [5432]:
Engine database secured connection (Yes, No) [No]:
Engine database name [engine]:
Engine database user [engine]:
Engine database password: password
```

15. Press **Enter** to allow setup to sign the Reports certificate and Apache certificate on the Manager via SSH:

```
Setup will need to do some actions on the remote engine server.
Either automatically, using ssh as root to access it, or you will be
prompted to manually perform each such action.
Please choose one of the following:
1 - Access remote engine server using ssh as root
2 - Perform each action manually, use files to copy content around
(1, 2) [1]:
```

16. Press **Enter** to accept the default SSH port, or enter an alternative port number and then press **Enter**:

```
ssh port on remote engine server [22]:
```

17. Enter the root password for the Manager machine:

```
root password on remote engine server manager-fqdn.com:
```

18. Press **Enter** to allow automatic configuration of SSL on Apache:

```
Setup can configure apache to use SSL using a certificate issued  
from the internal CA.  
Do you wish Setup to configure that, or prefer to perform that  
manually? (Automatic, Manual) [Automatic]:
```

19. Set a password for the Reports administrative users (**admin** and **superuser**). Note that the reports system maintains its own set of credentials that are separate to those used for the Manager:

```
Reports power users password:
```

You are prompted to enter the password a second time to confirm it.

20. Confirm your installation settings:

```
Please confirm installation settings (OK, Cancel) [OK]:
```

Next Steps

Access the Reports Portal at <http://demo.redhat.com/ovirt-engine-reports>, replacing *demo.redhat.com* with the fully qualified domain name of the Manager. If during the Manager installation you selected a non-default HTTP port then append *:port* to the URL, replacing *:port* with the port that you chose.

Log in using the user name **admin** and the password you set during reports installation. Note that the first time you log in to Red Hat Enterprise Virtualization Manager Reports, a number of web pages are generated and, as a result, your initial attempt to log in may take some time to complete.

5.3.3. Installing and Configuring Data Warehouse and Reports on Separate Machines

Overview

Install and configure Data Warehouse on a separate host from that on which the Red Hat Enterprise Virtualization Manager is installed, then install and configure Red Hat Enterprise Virtualization Manager Reports on a third machine. Hosting the Data Warehouse and Reports services on separate machines helps to reduce the load on the Manager machine. Separating Data Warehouse and Reports onto individual machines further reduces the demand each service places on its host machine, and avoids any conflicts caused by sharing CPU and memory with other processes.

Installing this scenario involves two key steps:

1. Install and configure Data Warehouse on a separate machine.
2. Install and configure Reports on a separate machine.

Prerequisites

Ensure that you have completed the following prerequisites:

1. You must have installed and configured the Manager on a separate machine.
2. To set up the Data Warehouse machine, you must have the following:
 - A virtual or physical machine with Red Hat Enterprise Linux 6.6 or later versions of Red Hat Enterprise Linux 6 installed.
 - A subscription to the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** subscription pools.
 - The password from the Manager's `/etc/ovirt-engine/engine.conf.d/10-setup-database.conf` file.
 - Allowed access from the Data Warehouse machine to the Manager database machine's TCP port 5432.
3. To set up the Reports machine, you must have the following:
 - A virtual or physical machine with Red Hat Enterprise Linux 6.6 or later versions of Red Hat Enterprise Linux 6 installed.
 - A subscription to the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** subscription pools.
 - The password from the Data Warehouse machine's `/etc/ovirt-engine-dwh/ovirt-engine-dwhd.conf.d/10-setup-database.conf` file.
 - Allowed access from the Reports machine to the Manager database machine's TCP port 5432.
4. If you choose to use a remote Data Warehouse database or Reports database, you must set up each database before installing the Data Warehouse and Reports services. You must have the following information about each database host:
 - The fully qualified domain name of the host
 - The port through which the database can be reached (5432 by default)
 - The database name
 - The database user
 - The database password

Procedure 5.3. Step 1: Installing and Configuring Data Warehouse on a Separate Machine

1. Register your system with the Content Delivery Network, entering your Customer Portal user name and password when prompted:

```
# subscription-manager register
```

2. Find the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** subscription pools and note down the pool IDs.

```
# subscription-manager list --available
```

3. Use the pool IDs located in the previous step to attach the entitlements to the system:

```
# subscription-manager attach --pool=pool_id
```

4. Disable all existing repositories:

```
# subscription-manager repos --disable=*
```

5. Enable the required repositories:

```
# subscription-manager repos --enable=rhel-6-server-rpms
# subscription-manager repos --enable=rhel-6-server-supplementary-
rpms
# subscription-manager repos --enable=rhel-6-server-rhev-3.6-rpms
# subscription-manager repos --enable=jb-eap-6-for-rhel-6-server-
rpms
```

6. Ensure that all packages currently installed are up to date:

```
# yum update
```

7. Install the `rhev-dwh-setup` package:

```
# yum install rhv-dwh-setup
```

8. Run the `engine-setup` command to begin configuration of Data Warehouse on the machine:

```
# engine-setup
```

9. Press **Enter** to configure Data Warehouse:

```
Configure Data Warehouse on this host (Yes, No) [Yes]:
```

10. Press **Enter** to automatically configure the firewall, or type **No** and press **Enter** to maintain existing settings:

```
Setup can automatically configure the firewall on this system.
Note: automatic configuration of the firewall may overwrite current
settings.
Do you want Setup to configure the firewall? (Yes, No) [Yes]:
```

If you choose to automatically configure the firewall, and no firewall managers are active, you are prompted to select your chosen firewall manager from a list of supported options. Type the name of the firewall manager and press **Enter**. This applies even in cases where only one option is listed.

11. Press **Enter** to accept the automatically detected hostname, or enter an alternative hostname and press **Enter**:

```
Host fully qualified DNS name of this server [autodetected host
name]:
```

12. Answer the following questions about the Data Warehouse database:

```
Where is the DWH database located? (Local, Remote) [Local]:
Setup can configure the local postgresql server automatically for
the DWH to run. This may conflict with existing applications.
Would you like Setup to automatically configure postgresql and
create DWH database, or prefer to perform that manually? (Automatic,
Manual) [Automatic]:
```

Press **Enter** to choose the highlighted defaults, or type your alternative preference and then press **Enter**. If you select **Remote**, you are prompted to provide details about the remote database host.

13. Enter the fully qualified domain name and password for the Manager database machine. Press **Enter** to accept the default values in each other field:

```
Engine database host []: engine-db-fqdn
Engine database port [5432]:
Engine database secured connection (Yes, No) [No]:
Engine database name [engine]:
Engine database user [engine]:
Engine database password: password
```

14. Confirm your installation settings:

```
Please confirm installation settings (OK, Cancel) [OK]:
```

Procedure 5.4. Step 2: Installing and Configuring Reports on a Separate Machine

1. Register your system with the Content Delivery Network, entering your Customer Portal user name and password when prompted:

```
# subscription-manager register
```

2. Find subscription pools containing the repositories required to install Reports:

```
# subscription-manager list --available | grep -A8 "Red Hat
Enterprise Linux Server"
# subscription-manager list --available | grep -A8 "Red Hat
Enterprise Virtualization"
```

3. Use the pool identifiers located in the previous step to attach the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** entitlements to the system:

```
# subscription-manager attach --pool=pool_id
```

4. Disable all existing repositories:

```
# subscription-manager repos --disable=*
```

5. Enable the required repositories:

```
# subscription-manager repos --enable=rhel-6-server-rpms
# subscription-manager repos --enable=rhel-6-server-supplementary-
rpms
# subscription-manager repos --enable=rhel-6-server-rhev-3.6-rpms
# subscription-manager repos --enable=jb-eap-6-for-rhel-6-server-
rpms
```

6. Ensure that all packages currently installed are up to date:

```
# yum update
```

7. Install the `rhev-reports-setup` package:

```
# yum install rhel-6-server-rhev-3.6-rpms
```

8. Run the `engine-setup` command to begin configuration of Reports on the machine:

```
# engine-setup
```

9. Press **Enter** to configure Reports:

```
Configure Reports on this host (Yes, No) [Yes]:
```

10. Press **Enter** to automatically configure the firewall, or type **No** and press **Enter** to maintain existing settings:

```
Setup can automatically configure the firewall on this system.
Note: automatic configuration of the firewall may overwrite current
settings.
```

```
Do you want Setup to configure the firewall? (Yes, No) [Yes]:
```

If you choose to automatically configure the firewall, and no firewall managers are active, you are prompted to select your chosen firewall manager from a list of supported options. Type the name of the firewall manager and press **Enter**. This applies even in cases where only one option is listed.

11. Press **Enter** to accept the automatically detected hostname, or enter an alternative hostname and press **Enter**:

```
Host fully qualified DNS name of this server [autodetected host
name]:
```

12. Enter the fully qualified domain name of the Manager machine, and then press **Enter**:

```
Host fully qualified DNS name of the engine server []:
```

13. Answer the following questions about the Reports database:

```
Where is the Reports database located? (Local, Remote) [Local]:
Setup can configure the local postgresql server automatically for
the Reports to run. This may conflict with existing applications.
```

Would you like Setup to automatically configure postgresql and create Reports database, or prefer to perform that manually? (Automatic, Manual) [Automatic]:

Press **Enter** to choose the highlighted defaults, or type your alternative preference and then press **Enter**. If you select **Remote**, you are prompted to provide details about the remote database host.

14. Enter the fully qualified domain name and password for your Data Warehouse database host. Press **Enter** to accept the default values in each other field:

```
DWH database host []: dwh-db-fqdn
DWH database port [5432]:
DWH database secured connection (Yes, No) [No]:
DWH database name [ovirt_engine_history]:
DWH database user [ovirt_engine_history]:
DWH database password: password
```

15. Press **Enter** to allow setup to sign the Reports certificate and Apache certificate on the Manager via SSH:

```
Setup will need to do some actions on the remote engine server.
Either automatically, using ssh as root to access it, or you will be
prompted to manually perform each such action.
Please choose one of the following:
1 - Access remote engine server using ssh as root
2 - Perform each action manually, use files to copy content around
(1, 2) [1]:
```

16. Press **Enter** to accept the default SSH port, or enter an alternative port number and then press **Enter**:

```
ssh port on remote engine server [22]:
```

17. Enter the root password for the Manager machine:

```
root password on remote engine server manager-fqdn.com:
```

18. Press **Enter** to allow automatic configuration of SSL on Apache:

```
Setup can configure apache to use SSL using a certificate issued
from the internal CA.
Do you wish Setup to configure that, or prefer to perform that
manually? (Automatic, Manual) [Automatic]:
```

19. Set a password for the Reports administrative users (**admin** and **superuser**). Note that the reports system maintains its own set of credentials that are separate to those used for the Manager:

```
Reports power users password:
```

You are prompted to enter the password a second time to confirm it.

20. Confirm your installation settings:

Please confirm installation settings (OK, Cancel) [OK]:

Next Steps

Access the Reports Portal at `http://demo.redhat.com/ovirt-engine-reports`, replacing `demo.redhat.com` with the fully qualified domain name of the Manager. If during the Manager installation you selected a non-default HTTP port then append `:port` to the URL, replacing `:port` with the port that you chose.

Log in using the user name `admin` and the password you set during reports installation. Note that the first time you log in to Red Hat Enterprise Virtualization Manager Reports, a number of web pages are generated and, as a result, your initial attempt to log in may take some time to complete.

5.3.4. Installing and Configuring Data Warehouse on the Red Hat Enterprise Virtualization Manager and Reports on a Separate Machine

Overview

Install and configure Data Warehouse on the same system as the Red Hat Enterprise Virtualization Manager, then install and configure Red Hat Enterprise Virtualization Manager Reports on a separate machine. Hosting the Reports service on a separate machine helps to reduce the load on the Manager machine.

Installing this scenario involves two key steps:

1. Install and configure Data Warehouse on the Manager machine.
2. Install and configure Reports on a separate machine.

Prerequisites

Ensure that you have completed the following prerequisites:

1. You must have installed and configured the Manager on one machine. This is the machine on which you are installing Data Warehouse.
2. To set up the Reports machine, you must have the following:
 - o A virtual or physical machine with Red Hat Enterprise Linux 6.6 or later versions of Red Hat Enterprise Linux 6 installed.
 - o A subscription to the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** entitlement pools.
 - o The password from the Data Warehouse machine's `/etc/ovirt-engine-dwh/ovirt-engine-dwhd.conf.d/10-setup-database.conf` file.
 - o Allowed access from the Reports machine to the Manager database machine's TCP port 5432.
3. If you choose to use a remote Data Warehouse database or Reports database, you must set up each database before installing the Data Warehouse and Reports services. You must have the following information about each database host:
 - o The fully qualified domain name of the host

- o The port through which the database can be reached (5432 by default)
 - o The database name
 - o The database user
 - o The database password
4. If you are using the self-hosted engine, you must move it to maintenance mode:

```
# hosted-engine --set-maintenance --mode=global
```

Procedure 5.5. Step 1: Installing and Configuring Data Warehouse on the Manager Machine

1. Install the `rhev-dwh` package:

```
# yum install rhev-dwh
```

2. Run the `engine-setup` command to begin configuration of Data Warehouse on the machine:

```
# engine-setup
```

3. Press **Enter** to configure Data Warehouse:

```
Configure Data Warehouse on this host (Yes, No) [Yes]:
```

4. Press **Enter** to automatically configure the firewall, or type **No** and press **Enter** to maintain existing settings:

```
Setup can automatically configure the firewall on this system.
Note: automatic configuration of the firewall may overwrite current
settings.
Do you want Setup to configure the firewall? (Yes, No) [Yes]:
```

If you choose to automatically configure the firewall, and no firewall managers are active, you are prompted to select your chosen firewall manager from a list of supported options. Type the name of the firewall manager and press **Enter**. This applies even in cases where only one option is listed.

5. Answer the following questions about the Data Warehouse database:

```
Where is the DWH database located? (Local, Remote) [Local]:
Setup can configure the local postgresql server automatically for
the DWH to run. This may conflict with existing applications.
Would you like Setup to automatically configure postgresql and
create DWH database, or prefer to perform that manually? (Automatic,
Manual) [Automatic]:
```

Press **Enter** to choose the highlighted defaults, or type your alternative preference and then press **Enter**. If you select **Remote**, you are prompted to provide details about the remote database host.

6. For the configuration to take effect, the `ovirt-engine` service must be restarted. The `engine-setup` command prompts you:

```
During execution engine service will be stopped (OK, Cancel) [OK]:
```

Press **Enter** to proceed. The `ovirt-engine` service restarts automatically later in the command.

7. Confirm your installation settings:

```
Please confirm installation settings (OK, Cancel) [OK]:
```

Procedure 5.6. Step 2: Installing and Configuring Reports on a Separate Machine

1. Register your system with the Content Delivery Network, entering your Customer Portal user name and password when prompted:

```
# subscription-manager register
```

2. Find the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** subscription pools and note down the pool IDs.

```
# subscription-manager list --available
```

3. Use the pool IDs located in the previous step to attach the entitlements to the system:

```
# subscription-manager attach --pool=pool_id
```

4. Disable all existing repositories:

```
# subscription-manager repos --disable=*
```

5. Enable the required channels:

```
# subscription-manager repos --enable=rhel-6-server-rpms
# subscription-manager repos --enable=rhel-6-server-supplementary-rpms
# subscription-manager repos --enable=rhel-6-server-rhev-3.6-rpms
# subscription-manager repos --enable=jb-eap-6-for-rhel-6-server-rpms
```

6. Ensure that all packages currently installed are up to date:

```
# yum update
```

7. Install the `rhev-reports-setup` package:

```
# yum install rhv-reports-setup
```

8. Run the `engine-setup` command to begin configuration of Reports on the machine:

■


```
# engine-setup
```

9. Press **Enter** to configure Reports:

```
Configure Reports on this host (Yes, No) [Yes]:
```

10. Press **Enter** to automatically configure the firewall, or type **No** and press **Enter** to maintain existing settings:

```
Setup can automatically configure the firewall on this system.
Note: automatic configuration of the firewall may overwrite current
settings.
Do you want Setup to configure the firewall? (Yes, No) [Yes]:
```

If you choose to automatically configure the firewall, and no firewall managers are active, you are prompted to select your chosen firewall manager from a list of supported options. Type the name of the firewall manager and press **Enter**. This applies even in cases where only one option is listed.

11. Press **Enter** to accept the automatically detected hostname, or enter an alternative hostname and press **Enter**:

```
Host fully qualified DNS name of this server [autodetected host
name]:
```

12. Enter the fully qualified domain name of the Manager machine, and then press **Enter**:

```
Host fully qualified DNS name of the engine server []:
```

13. Answer the following questions about the Reports database:

```
Where is the Reports database located? (Local, Remote) [Local]:
Setup can configure the local postgresql server automatically for
the Reports to run. This may conflict with existing applications.
Would you like Setup to automatically configure postgresql and
create Reports database, or prefer to perform that manually?
(Automatic, Manual) [Automatic]:
```

Press **Enter** to choose the highlighted defaults, or type your alternative preference and then press **Enter**. If you select **Remote**, you are prompted to provide details about the remote database host.

14. Enter the fully qualified domain name and password for your Data Warehouse database host. Press **Enter** to accept the default values in each other field:

```
DWH database host []: dwh-db-fqdn
DWH database port [5432]:
DWH database secured connection (Yes, No) [No]:
DWH database name [ovirt_engine_history]:
DWH database user [ovirt_engine_history]:
DWH database password: password
```

15. Press **Enter** to allow setup to sign the Reports certificate and Apache certificate on the Manager via SSH:

```
Setup will need to do some actions on the remote engine server.
Either automatically, using ssh as root to access it, or you will be
prompted to manually perform each such action.
Please choose one of the following:
1 - Access remote engine server using ssh as root
2 - Perform each action manually, use files to copy content around
(1, 2) [1]:
```

16. Press **Enter** to accept the default SSH port, or enter an alternative port number and then press **Enter**:

```
ssh port on remote engine server [22]:
```

17. Enter the root password for the Manager machine:

```
root password on remote engine server manager-fqdn.com:
```

18. Press **Enter** to allow automatic configuration of SSL on Apache:

```
Setup can configure apache to use SSL using a certificate issued
from the internal CA.
Do you wish Setup to configure that, or prefer to perform that
manually? (Automatic, Manual) [Automatic]:
```

19. Set a password for the Reports administrative users (**admin** and **superuser**). Note that the reports system maintains its own set of credentials that are separate to those used for the Manager:

```
Reports power users password:
```

You are prompted to enter the password a second time to confirm it.

20. Confirm your installation settings:

```
Please confirm installation settings (OK, Cancel) [OK]:
```

Next Steps

Access the Reports Portal at <http://demo.redhat.com/ovirt-engine-reports>, replacing *demo.redhat.com* with the fully qualified domain name of the Manager. If during the Manager installation you selected a non-default HTTP port then append *:port* to the URL, replacing *:port* with the port that you chose.

Log in using the user name **admin** and the password you set during reports installation. Note that the first time you log in to Red Hat Enterprise Virtualization Manager Reports, a number of web pages are generated and, as a result, your initial attempt to log in may take some time to complete.

5.3.5. Installing and Configuring Data Warehouse on a Separate Machine and Reports on the Red Hat Enterprise Virtualization Manager

Overview

Install and configure Data Warehouse on a separate host from that on which the Red Hat Enterprise Virtualization Manager is installed, then install and configure Red Hat Enterprise Virtualization Manager Reports on the Manager machine. Hosting the Data Warehouse service on a separate machine helps to reduce the load on the Manager machine. Note that hosting the Manager and Reports on the same machine means that these processes will share CPU and memory.

Installing this scenario involves two key steps:

1. Install and configure Data Warehouse on a separate machine.
2. Install and configure Reports on the Manager machine.

Prerequisites

Ensure that you have completed the following prerequisites:

1. You must have installed and configured the Manager on a separate machine.
2. To set up the Data Warehouse machine, you must have the following:
 - o A virtual or physical machine with Red Hat Enterprise Linux 6.6 or later versions of Red Hat Enterprise Linux 6 installed.
 - o A subscription to the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** entitlement pools.
 - o The password from the Manager's `/etc/ovirt-engine/engine.conf.d/10-setup-database.conf` file.
 - o Allowed access from the Data Warehouse machine to the Manager database machine's TCP port 5432.
3. To set up the Reports machine, you must have the following:
 - o The password from the Data Warehouse machine's `/etc/ovirt-engine-dwh/ovirt-engine-dwhd.conf.d/10-setup-database.conf` file.
4. If you choose to use a remote Data Warehouse database or Reports database, you must set up each database before installing the Data Warehouse and Reports services. You must have the following information about each database host:
 - o The fully qualified domain name of the host
 - o The port through which the database can be reached (5432 by default)
 - o The database name
 - o The database user
 - o The database password
5. If you are using the self-hosted engine, you must move it to maintenance mode:

```
# hosted-engine --set-maintenance --mode=global
```

Procedure 5.7. Step 1: Installing and Configuring Data Warehouse on a Separate Machine

1. Register your system with the Content Delivery Network, entering your Customer Portal user name and password when prompted:

```
# subscription-manager register
```

2. Find the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** subscription pools and note down the pool IDs.

```
# subscription-manager list --available
```

3. Use the pool IDs located in the previous step to attach the entitlements to the system:

```
# subscription-manager attach --pool=pool_id
```

4. Disable all existing repositories:

```
# subscription-manager repos --disable=*
```

5. Enable the required channels:

```
# subscription-manager repos --enable=rhel-6-server-rpms
# subscription-manager repos --enable=rhel-6-server-supplementary-rpms
# subscription-manager repos --enable=rhel-6-server-rhev-3.6-rpms
# subscription-manager repos --enable=jb-eap-6-for-rhel-6-server-rpms
```

6. Ensure that all packages currently installed are up to date:

```
# yum update
```

7. Install the `rhev-dwh-setup` package:

```
# yum install rhev-dwh-setup
```

8. Run the `engine-setup` command to begin configuration of Data Warehouse on the machine:

```
# engine-setup
```

9. Press **Enter** to configure Data Warehouse:

```
Configure Data Warehouse on this host (Yes, No) [Yes]:
```

10. Press **Enter** to automatically configure the firewall, or type **No** and press **Enter** to maintain existing settings:

```
Setup can automatically configure the firewall on this system.
Note: automatic configuration of the firewall may overwrite current
settings.
Do you want Setup to configure the firewall? (Yes, No) [Yes]:
```

If you choose to automatically configure the firewall, and no firewall managers are active, you are prompted to select your chosen firewall manager from a list of supported options. Type the name of the firewall manager and press **Enter**. This applies even in cases where only one option is listed.

11. Press **Enter** to accept the automatically detected hostname, or enter an alternative hostname and press **Enter**:

```
Host fully qualified DNS name of this server [autodetected host name]:
```

12. Answer the following questions about the Data Warehouse database:

```
Where is the DWH database located? (Local, Remote) [Local]:
Setup can configure the local postgresql server automatically for
the DWH to run. This may conflict with existing applications.
Would you like Setup to automatically configure postgresql and
create DWH database, or prefer to perform that manually? (Automatic,
Manual) [Automatic]:
```

Press **Enter** to choose the highlighted defaults, or type your alternative preference and then press **Enter**. If you select **Remote**, you are prompted to provide details about the remote database host.

13. Enter the fully qualified domain name and password for the Manager database machine. Press **Enter** to accept the default values in each other field:

```
Engine database host []: engine-db-fqdn
Engine database port [5432]:
Engine database secured connection (Yes, No) [No]:
Engine database name [engine]:
Engine database user [engine]:
Engine database password: password
```

14. Confirm your installation settings:

```
Please confirm installation settings (OK, Cancel) [OK]:
```

Procedure 5.8. Step 2: Installing and Configuring Reports on the Manager Machine

1. Install the `rhevms-reports` package:

```
# yum install rhevm-reports
```

2. Run the `engine-setup` command to begin configuration of Reports on the machine:

```
# engine-setup
```

3. Press **Enter** to configure Reports:

```
Configure Reports on this host (Yes, No) [Yes]:
```

- Press **Enter** to automatically configure the firewall, or type **No** and press **Enter** to maintain existing settings:

```
Setup can automatically configure the firewall on this system.
Note: automatic configuration of the firewall may overwrite current
settings.
Do you want Setup to configure the firewall? (Yes, No) [Yes]:
```

If you choose to automatically configure the firewall, and no firewall managers are active, you are prompted to select your chosen firewall manager from a list of supported options. Type the name of the firewall manager and press **Enter**. This applies even in cases where only one option is listed.

- Answer the following questions about the Reports database:

```
Where is the Reports database located? (Local, Remote) [Local]:
Setup can configure the local postgresql server automatically for
the Reports to run. This may conflict with existing applications.
Would you like Setup to automatically configure postgresql and
create Reports database, or prefer to perform that manually?
(Automatic, Manual) [Automatic]:
```

Press **Enter** to choose the highlighted defaults, or type your alternative preference and then press **Enter**. If you select **Remote**, you are prompted to provide details about the remote database host.

- Enter the fully qualified domain name and password for your Data Warehouse database host. Press **Enter** to accept the default values in each other field:

```
DWH database host []: dwh-db-fqdn
DWH database port [5432]:
DWH database secured connection (Yes, No) [No]:
DWH database name [ovirt_engine_history]:
DWH database user [ovirt_engine_history]:
DWH database password: password
```

- Set a password for the Reports administrative users (**admin** and **superuser**). Note that the reports system maintains its own set of credentials that are separate to those used for the Manager:

```
Reports power users password:
```

You are prompted to enter the password a second time to confirm it.

- For the configuration to take effect, the **ovirt-engine** service must be restarted. The **engine-setup** command prompts you:

```
During execution engine service will be stopped (OK, Cancel) [OK]:
```

Press **Enter** to proceed. The **ovirt-engine** service restarts automatically later in the command.

- Confirm your installation settings:

-

Please confirm installation settings (OK, Cancel) [OK]:

Next Steps

Access the Reports Portal at `http://demo.redhat.com/ovirt-engine-reports`, replacing `demo.redhat.com` with the fully qualified domain name of the Manager. If during the Manager installation you selected a non-default HTTP port then append `:port` to the URL, replacing `:port` with the port that you chose.

Log in using the user name `admin` and the password you set during reports installation. Note that the first time you log in to Red Hat Enterprise Virtualization Manager Reports, a number of web pages are generated and, as a result, your initial attempt to log in may take some time to complete.

5.4. MIGRATING DATA WAREHOUSE AND REPORTS TO SEPARATE MACHINES

Migrate the Data Warehouse service, the Reports service, or both from the Red Hat Enterprise Virtualization Manager to separate machines. Hosting the Data Warehouse service and the Reports service on separate machines reduces the load on each individual machine, and allows each service to avoid potential conflicts caused by sharing CPU and memory with other processes.

Migrate the Data Warehouse service and connect it with the existing `ovirt_engine_history` database, or optionally migrate the `ovirt_engine_history` database to a new database machine before migrating the Data Warehouse service. If the `ovirt_engine_history` database is hosted on the Manager, migrating the database in addition to the Data Warehouse service further reduces the competition for resources on the Manager machine. You can migrate the database to the same machine onto which you will migrate the Data Warehouse service, or to a machine that is separate from both the Manager machine and the new Data Warehouse service machine.

5.4.1. Migrating the Data Warehouse Database to a Separate Machine

Optionally migrate the `ovirt_engine_history` database before you migrate the Data Warehouse service. This procedure uses `pg_dump` to create a database backup, and `psql` to restore the backup on the new database machine. The `pg_dump` command provides flexible options for backing up and restoring databases; for more information on options that may be suitable for your system, see the `pg_dump` manual page.

The following procedure assumes that a PostgreSQL database has already been configured on the new machine. To migrate the Data Warehouse service only, see [Section 5.4.2, “Migrating the Data Warehouse Service to a Separate Machine”](#).



IMPORTANT

If the existing Data Warehouse database is connected to an existing Reports service, you must reconfigure that service by running `engine-setup` and entering the details of the new Data Warehouse database when prompted. If you do not do this, the Reports service is still connected to the old database, and does not receive any new data.

Procedure 5.9. Migrating the Data Warehouse Database to a Separate Machine

1. On the existing database machine, dump the `ovirt_engine_history` database into a SQL script file:

```
# pg_dump ovirt_engine_history > ovirt_engine_history.sql
```

2. Copy the script file from the existing database machine to the new database machine.
3. Restore the `ovirt_engine_history` database on the new database machine:

```
# psql -d ovirt_engine_history -f ovirt_engine_history.sql
```

The command above assumes that the database on the new machine is also named `ovirt_engine_history`.

5.4.2. Migrating the Data Warehouse Service to a Separate Machine

Migrate a Data Warehouse service that was installed and configured on the Red Hat Enterprise Virtualization Manager to a dedicated host machine. Hosting the Data Warehouse service on a separate machine helps to reduce the load on the Manager machine. Note that this procedure migrates the Data Warehouse service only; to migrate the Data Warehouse database (also known as the `ovirt_engine_history` database) prior to migrating the Data Warehouse service, see [Section 5.4.1, “Migrating the Data Warehouse Database to a Separate Machine”](#).

Installing this scenario involves four key steps:

1. Set up the new Data Warehouse machine.
2. Stop the Data Warehouse service on the Manager machine.
3. Configure the new Data Warehouse machine.
4. Remove the Data Warehouse package from the Manager machine.

Prerequisites

Ensure that you have completed the following prerequisites:

1. You must have installed and configured the Manager and Data Warehouse on the same machine.
2. To set up the new Data Warehouse machine, you must have the following:
 - o A virtual or physical machine with Red Hat Enterprise Linux 6.6 or later versions of Red Hat Enterprise Linux 6 installed.
 - o A subscription to the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** entitlement pools.
 - o The password from the Manager's `/etc/ovirt-engine/engine.conf.d/10-setup-database.conf` file.
 - o Allowed access from the Data Warehouse machine to the Manager database machine's TCP port 5432.
 - o The `ovirt_engine_history` database credentials from the Manager's `/etc/ovirt-engine-dwh/ovirt-engine-dwhd.conf.d/10-setup-database.conf` file. If you migrated the `ovirt_engine_history` database using [Section 5.4.1, “Migrating the Data Warehouse Database to a Separate Machine”](#), retrieve the credentials you defined during the database setup on that machine.

Procedure 5.10. Step 1: Setting up the New Data Warehouse Machine

1. Register your system with the Content Delivery Network, entering your Customer Portal user name and password when prompted:

```
# subscription-manager register
```

2. Find the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** subscription pools and note down the pool IDs.

```
# subscription-manager list --available
```

3. Use the pool IDs located in the previous step to attach the entitlements to the system:

```
# subscription-manager attach --pool=pool_id
```

4. Disable all existing repositories:

```
# subscription-manager repos --disable=*
```

5. Enable the required channels:

```
# subscription-manager repos --enable=rhel-6-server-rpms
# subscription-manager repos --enable=rhel-6-server-supplementary-
rpms
# subscription-manager repos --enable=rhel-6-server-rhev-3.6-rpms
# subscription-manager repos --enable=jb-eap-6-for-rhel-6-server-
rpms
```

6. Ensure that all packages currently installed are up to date:

```
# yum update
```

7. Install the `rhev-dwh-setup` package:

```
# yum install rhev-dwh-setup
```

Procedure 5.11. Step 2: Stopping the Data Warehouse Service on the Manager Machine

1. Stop the Data Warehouse service:

```
# service ovirt-engine-dwhd stop
```

2. If the `ovirt_engine_history` database, the Manager database, or both are hosted on the Manager machine and were configured by a previous version (Red Hat Enterprise Virtualization 3.4 or prior) that was then upgraded, you must allow the new Data Warehouse machine to access them. Edit the `/var/lib/pgsql/data/postgresql.conf` file and modify the `listen_addresses` line so that it matches the following:

```
listen_addresses = '*'
```

If the line does not exist or has been commented out, add it manually.

If one or both databases are hosted on a remote machine, you must manually grant access by editing the `postgres.conf` file on each machine, and adding the `listen_addresses` line, as above. If both databases are hosted on the Manager machine and were configured during a clean setup of Red Hat Enterprise Virtualization Manager 3.5, access is granted by default.

3. Restart the postgresql service:

```
# service postgresql restart
```

Procedure 5.12. Step 3: Configuring the New Data Warehouse Machine

1. Run the `engine-setup` command to begin configuration of Data Warehouse on the machine:

```
# engine-setup
```

2. Press **Enter** to configure Data Warehouse:

```
Configure Data Warehouse on this host (Yes, No) [Yes]:
```

3. Press **Enter** to automatically configure the firewall, or type **No** and press **Enter** to maintain existing settings:

```
Setup can automatically configure the firewall on this system.  
Note: automatic configuration of the firewall may overwrite current  
settings.
```

```
Do you want Setup to configure the firewall? (Yes, No) [Yes]:
```

If you choose to automatically configure the firewall, and no firewall managers are active, you are prompted to select your chosen firewall manager from a list of supported options. Type the name of the firewall manager and press **Enter**. This applies even in cases where only one option is listed.

4. Press **Enter** to accept the automatically detected hostname, or enter an alternative hostname and press **Enter**:

```
Host fully qualified DNS name of this server [autodetected host  
name]:
```

5. Answer the following question about the location of the `ovirt_engine_history` database:

```
Where is the DWH database located? (Local, Remote) [Local]: Remote
```

Type the alternative option as shown above and then press **Enter**.

6. Enter the fully qualified domain name and password for your `ovirt_engine_history` database host. Press **Enter** to accept the default values in each other field:

```
DWH database host []: dwh-db-fqdn  
DWH database port [5432]:  
DWH database secured connection (Yes, No) [No]:
```

```
DWH database name [ovirt_engine_history]:
DWH database user [ovirt_engine_history]:
DWH database password: password
```

7. Enter the fully qualified domain name and password for the Manager database machine. Press **Enter** to accept the default values in each other field:

```
Engine database host []: engine-db-fqdn
Engine database port [5432]:
Engine database secured connection (Yes, No) [No]:
Engine database name [engine]:
Engine database user [engine]:
Engine database password: password
```

8. Press **Enter** to create a backup of the existing Data Warehouse database:

```
Would you like to backup the existing database before upgrading it?
(Yes, No) [Yes]:
```

The time and space required for the database backup depends on the size of the database. It may take several hours to complete. If you choose not to back up the database here, and **engine-setup** fails for any reason, you will not be able to restore the database or any of the data within it. The location of the backup file appears at the end of the setup script.

9. Confirm that you want to permanently disconnect the existing Data Warehouse service from the Manager:

```
Do you want to permanently disconnect this DWH from the engine?
(Yes, No) [No]:
```

10. Confirm your installation settings:

```
Please confirm installation settings (OK, Cancel) [OK]:
```

Procedure 5.13. Step 4: Removing the Data Warehouse Package from the Manager Machine

1. Remove the Data Warehouse package:

```
# yum remove rhelm-dwh
```

This step prevents the Data Warehouse service from attempting to automatically restart after an hour.

2. Remove the Data Warehouse files:

```
# rm -rf /etc/ovirt-engine-dwh /var/lib/ovirt-engine-dwh
```

The Data Warehouse service is now hosted on a separate machine from that on which the Manager is hosted.

5.4.3. Migrating the Reports Service to a Separate Machine

Migrate a Reports service that was installed and configured on the Red Hat Enterprise Virtualization Manager to a dedicated host machine. Hosting the Reports service on a separate machine helps to reduce the load on the Manager machine. Note that this procedure migrates the Reports service only. The Reports database (also known as the `ovirt_engine_reports` database) cannot be migrated; you must create a new `ovirt_engine_reports` database when you configure Reports on the new machine. Saved ad hoc reports can be migrated from the Manager machine to the new Reports machine. Migrate the Reports service only after the Manager and Data Warehouse have been configured.

Installing this scenario involves three key steps:

1. Configure the new Reports machine.
2. Migrate any saved reports to the new Reports machine.
3. Remove the Reports service from the Manager machine.

Prerequisites

Ensure that you have completed the following prerequisites:

1. You must have installed and configured the Manager and Reports on the same machine.
2. You must have installed and configured Data Warehouse, either on the Manager machine or on a separate machine.
3. To set up the new Reports machine, you must have the following:
 - o A virtual or physical machine with Red Hat Enterprise Linux 6.6 or later versions of Red Hat Enterprise Linux 6 installed
 - o A subscription to the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** entitlement pools
 - o The password from the Data Warehouse machine's `/etc/ovirt-engine-dwh/ovirt-engine-dwhd.conf.d/10-setup-database.conf` file
 - o Allowed access from the Reports machine to the Manager database machine's TCP port 5432

Procedure 5.14. Step 1: Configuring the New Reports Machine

1. Register your system with the Content Delivery Network, entering your Customer Portal user name and password when prompted:

```
# subscription-manager register
```

2. Find the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** subscription pools and note down the pool IDs.

```
# subscription-manager list --available
```

3. Use the pool IDs located in the previous step to attach the entitlements to the system:

```
# subscription-manager attach --pool=pool_id
```

4. Disable all existing repositories:

```
# subscription-manager repos --disable=*
```

5. Enable the required channels:

```
# subscription-manager repos --enable=rhel-6-server-rpms
# subscription-manager repos --enable=rhel-6-server-supplementary-
rpms
# subscription-manager repos --enable=rhel-6-server-rhev-3.6-rpms
# subscription-manager repos --enable=jb-eap-6-for-rhel-6-server-
rpms
```

6. Ensure that all packages currently installed are up to date:

```
# yum update
```

7. Install the `rhev-reports-setup` package:

```
# yum install rhv-reports-setup
```

8. Run the `engine-setup` command to begin configuration of Reports on the machine:

```
# engine-setup
```

9. Press **Enter** to configure Reports:

```
Configure Reports on this host (Yes, No) [Yes]:
```

10. Press **Enter** to automatically configure the firewall, or type **No** and press **Enter** to maintain existing settings:

```
Setup can automatically configure the firewall on this system.
Note: automatic configuration of the firewall may overwrite current
settings.
Do you want Setup to configure the firewall? (Yes, No) [Yes]:
```

If you choose to automatically configure the firewall, and no firewall managers are active, you are prompted to select your chosen firewall manager from a list of supported options. Type the name of the firewall manager and press **Enter**. This applies even in cases where only one option is listed.

11. Press **Enter** to accept the automatically detected hostname, or enter an alternative hostname and press **Enter**:

```
Host fully qualified DNS name of this server [autodetected host
name]:
```

12. Enter the fully qualified domain name of the Manager machine, and then press **Enter**:

```
Host fully qualified DNS name of the engine server []:
```

13. Answer the following questions about the `ovirt_engine_reports` database. Press **Enter** to allow setup to create and configure a local database:

```
Where is the Reports database located? (Local, Remote) [Local]:
Setup can configure the local postgresql server automatically for
the Reports to run. This may conflict with existing applications.
Would you like Setup to automatically configure postgresql and
create Reports database, or prefer to perform that manually?
(Automatic, Manual) [Automatic]:
```

14. Enter the fully qualified domain name and password for your `ovirt_engine_history` database host. Press **Enter** to accept the default values in each other field:

```
DWH database host []: dwh-db-fqdn
DWH database port [5432]:
DWH database secured connection (Yes, No) [No]:
DWH database name [ovirt_engine_history]:
DWH database user [ovirt_engine_history]:
DWH database password: password
```

15. Press **Enter** to allow setup to sign the Reports certificate and Apache certificate on the Manager via SSH:

```
Setup will need to do some actions on the remote engine server.
Either automatically, using ssh as root to access it, or you will be
prompted to manually perform each such action.
Please choose one of the following:
1 - Access remote engine server using ssh as root
2 - Perform each action manually, use files to copy content around
(1, 2) [1]:
```

16. Press **Enter** to accept the default SSH port, or enter an alternative port number and then press **Enter**:

```
ssh port on remote engine server [22]:
```

17. Enter the root password for the Manager machine:

```
root password on remote engine server manager-fqdn.com:
```

18. Press **Enter** to allow automatic configuration of SSL on Apache:

```
Setup can configure apache to use SSL using a certificate issued
from the internal CA.
Do you wish Setup to configure that, or prefer to perform that
manually? (Automatic, Manual) [Automatic]:
```

19. Set a password for the Reports administrative users (`admin` and `superuser`). Note that the reports system maintains its own set of credentials that are separate to those used for the Manager:

```
Reports power users password:
```

You are prompted to enter the password a second time to confirm it.

20. Confirm your installation settings:

```
Please confirm installation settings (OK, Cancel) [OK]:
```

Procedure 5.15. Step 2: Migrating Saved Reports to the New Reports Machine

1. On the Manager machine, run the `ovirt-engine-reports-tool` command:

```
# ovirt-engine-reports-tool
```

2. Enter the number that corresponds to the export option, and press **Enter**:

```
(2) Export Jasperreports saved reports to a zip file
(1, 2, 3) []: 2
```

3. Enter the absolute path for the zip file to export saved reports to, and press **Enter**:

```
Filename to export saved reports to: /tmp/saved-reports.zip
```

4. Copy the zip file to the new Reports machine:

```
# scp /tmp/saved-reports.zip reports-machine-fqdn:/tmp/
```

5. On the new Reports machine, run the `ovirt-engine-reports-tool` command:

```
# ovirt-engine-reports-tool
```

6. Enter the number that corresponds to the import option, and press **Enter**:

```
(3) Import a saved reports zip file to Jasperreports
(1, 2, 3) []: 3
```

7. Enter the absolute path of the zip file from which to import, and press **Enter**:

```
Filename to import saved reports from: /tmp/saved-reports.zip
```

When the command completes, the saved reports are visible in the Reports Portal of the new Reports machine.

Procedure 5.16. Step 3: Removing the Reports Service from the Manager Machine

1. Stop the Reports service:

```
# service ovirt-engine-reportsd stop
```

2. Remove the Reports package:

```
# yum remove rhevm-reports
```

3. Remove the Reports files:

```
# rm -rf /etc/ovirt-engine-reports /var/lib/ovirt-engine-reports
```

4. Remove the Reports database and user. The default name for both is **ovirt_engine_reports**:

```
# su - postgres  
$ psql  
postgres=# drop database ovirt_engine_reports;  
postgres=# drop user ovirt_engine_reports;
```



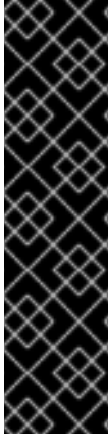
NOTE

You can configure more than one working Reports instance, and continue to log in and view reports from an older instance; however, the Manager will directly connect to and have SSO with only the last Reports instance that was configured using **engine-setup**. This means that the Administration Portal includes dashboards from and direct links to only the most recent Reports installation.

PART III. INSTALLING HYPERVISOR HOSTS

CHAPTER 6. INTRODUCTION TO HYPERVISOR HOSTS

Red Hat Enterprise Virtualization supports three types of hypervisor hosts: Red Hat Enterprise Virtualization Hypervisor (RHEV-H), Red Hat Virtualization Host (RHVH), and Red Hat Enterprise Linux host (RHEL-based hypervisor). You can use any combination of hypervisor types in your Red Hat Enterprise Virtualization environment.



IMPORTANT

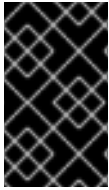
In new Red Hat Enterprise Virtualization 3.6 environments, Red Hat recommends installing RHVH 3.6 because it provides an upgrade path to the most recent version of Red Hat Virtualization through the Manager. Installations that use RHEV-H require a full reinstall of the hypervisors to upgrade to the most recent version of Red Hat Virtualization. See [Section 8.1, “Installing Red Hat Virtualization Host”](#) for more information.

For more information about upgrading with RHEV-H, see [Upgrading to Red Hat Enterprise Virtualization 3.6](#) in the *Upgrade Guide*. RHEV-H installations should be converted to RHVH 3.6 as part of the upgrade.

Table 6.1. Hypervisor Hosts

Host Type	Other Names	Description
Red Hat Enterprise Virtualization Hypervisor	RHEV-H, thin host	<p>This is a minimal operating system based on Red Hat Enterprise Linux 7. It is distributed as an ISO file and is a closed system. Filesystem access and root access are limited. Yum is disabled.</p> <p>This download is available on the Customer Portal and is named RHEV-H Image.</p>
Red Hat Virtualization Host	RHVH, thin host, Next Generation RHVH	<p>Like RHEV-H, this is a minimal operating system based on Red Hat Enterprise Linux 7. It is distributed as an ISO file from the Customer Portal and contains only the packages required for the machine to act as a host. This is the latest thin host available for Red Hat Enterprise Virtualization. Yum is enabled.</p> <p>This download is available on the Customer Portal and is named Next Generation RHV-H Image.</p>

Host Type	Other Names	Description
Red Hat Enterprise Linux Host	RHEL-based hypervisor, thick host	Red Hat Enterprise Linux hosts subscribed to the appropriate channels can be used as hypervisor hosts. It provides you the full access to the operating system.



IMPORTANT

Red Hat recommends that you install at least two hypervisor hosts in the Red Hat Enterprise Virtualization environment, otherwise you will be unable to access features such as migration and high availability.

CHAPTER 7. RED HAT ENTERPRISE VIRTUALIZATION HYPERVISOR

7.1. INSTALLING THE RED HAT ENTERPRISE VIRTUALIZATION HYPERVISOR

The Red Hat Enterprise Virtualization Hypervisor is a minimal operating system based on Red Hat Enterprise Linux that is designed to provide a simple method for setting up a physical machine to act as a hypervisor in a Red Hat Enterprise Virtualization environment. The minimal operating system contains only the packages required for the machine to act as a hypervisor, and features a simple text user interface for configuring the machine and adding it to an environment.



IMPORTANT

In new Red Hat Enterprise Virtualization 3.6 environments, Red Hat recommends installing RHVH 3.6 because it provides an upgrade path to the most recent version of Red Hat Virtualization through the Manager. Installations that use RHEV-H 7 require a full reinstall of the hypervisors to upgrade to the most recent version of Red Hat Virtualization. See [Section 8.1, “Installing Red Hat Virtualization Host”](#) for more information.

For more information about upgrading with RHEV-H, see [Upgrading to Red Hat Enterprise Virtualization 3.6](#) in the *Upgrade Guide*. RHEV-H installations should be converted to RHVH 3.6 as part of the upgrade.

Before you proceed, make sure the hosts meet the hardware requirements listed in [Section 2.2, “Hypervisor Requirements”](#).

Installing Red Hat Enterprise Virtualization Hypervisor on a physical machine involves three key steps:

- Obtain the Red Hat Enterprise Virtualization Hypervisor ISO file (**RHEV-H Image**) either by installing the package or downloading it from the [Customer Portal](#).
- Write the Red Hat Enterprise Virtualization Hypervisor ISO File to a USB Storage Device, CD, or DVD.
- Install the Red Hat Enterprise Virtualization Hypervisor Minimal Operating System.

Procedure 7.1. Installing the Red Hat Enterprise Virtualization Hypervisor Disk Image

1. Obtain the latest Red Hat Enterprise Virtualization Hypervisor image by installing the package. By default, the Red Hat Enterprise Virtualization Hypervisor disk image is located in the `/usr/share/rhev-hypervisor/` directory. Alternatively, download the disk image (**RHEV-H Image**) from the [Customer Portal](#).
 - a. Enable the required repositories:
 - For Red Hat Enterprise Linux 6:

```
# subscription-manager repos --enable=rhel-6-server-rhev-h-rpms
```
 - For Red Hat Enterprise Linux 7:
 -

```
# subscription-manager repos --enable=rhel-7-server-rhev-rpms
```

b. Install the RHEV-H package:

- For Red Hat Enterprise Linux 6:

```
# yum install rhev-hypervisor6
```

- For Red Hat Enterprise Linux 7:

```
# yum install rhev-hypervisor7
```

2. Write the disk image to a storage device.

- Install the `livecd-tools` package and write the disk image to a USB storage device.

```
# yum install livecd-tools
```

```
# livecd-iso-to-disk --format --reset-mbr /usr/share/rhev-hypervisor/rhev-hypervisor.iso /dev/[sdb]
```

- Install the `wodim` package, insert a blank CD-ROM or DVD, and write the disk image to disc.

```
# yum install wodim
```

```
wodim dev=[device] [image]
```



NOTE

To find out the name of your writer device, run the following command:

```
# less /proc/sys/dev/cdrom/info
```

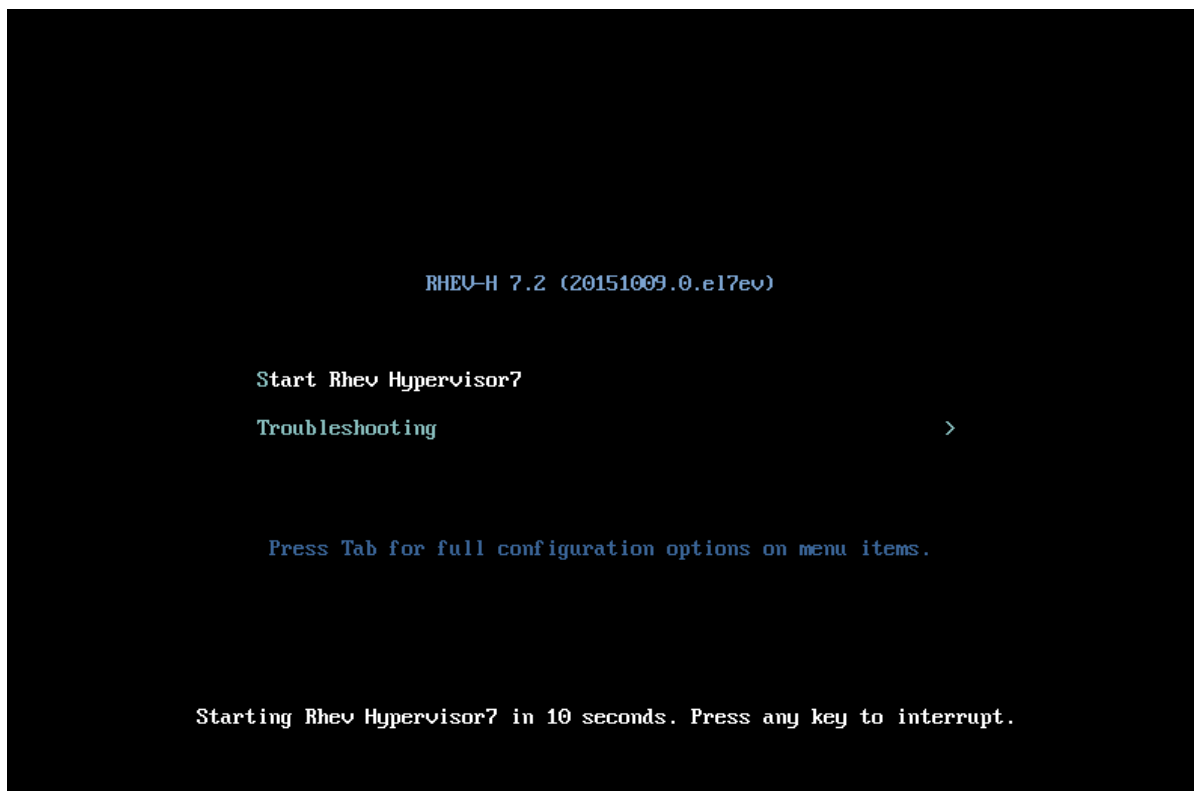
Example 7.1. Use of the `wodim` Utility

This example uses the first CD-RW (`/dev/sr0`) device available and the default Hypervisor image location.

```
# wodim dev=/dev/sr0 /usr/share/rhev-hypervisor/rhev-hypervisor.iso
```

3. Start the machine on which to install the Hypervisor minimal operating system using the prepared installation media.

4. From the boot menu, select **Start RHEV Hypervisor**, and press **Enter**.



IMPORTANT

If reinstalling Red Hat Enterprise Virtualization Hypervisor over an existing instance on a multipathed iSCSI machine, remove the `rd_NO_MULTIPATH` kernel argument by pressing the **Tab** button after selecting the option to reinstall the Hypervisor. This will help avoid potential installation errors.

5. Select a keyboard layout, and press **Enter**.
6. Select the device on which to install the boot loader for the Red Hat Enterprise Virtualization Hypervisor.
7. Select the device on which to install the Red Hat Enterprise Virtualization Hypervisor.
8. Select the **Fill disk with Data partition** check box. Clearing this text box displays a field showing the remaining space on the drive and allows you to specify the amount of space to be allocated to data storage.
9. From the **Confirm disk selection** screen, press **Enter** to confirm the boot device and storage device selection, or select **Back** and press **Enter** to revise your selection.
10. Set a password for the **admin** user, confirm the password, and press **Enter** to commence installation.



NOTE

From the boot menu, you can also press the **Tab** key to edit the kernel parameters. Kernel parameters must be separated by a space, and you can boot the system using the specified kernel parameters by pressing the **Enter** key. Press the **Esc** key to clear any changes to the kernel parameters and return to the boot menu.

Once installation is complete, the machine reboots. Log in as the `admin` user and configure the networking options. You can then add the Hypervisor to a standard Red Hat Enterprise Virtualization environment or use the **Hosted Engine** screen to configure a self-hosted engine environment. See [Appendix G, *Configuring a Hypervisor Host for PCI Passthrough*](#) for more information on how to enable the hypervisor hardware and software for device passthrough.



WARNING

Red Hat strongly recommends not creating untrusted users on Red Hat Enterprise Virtualization Hypervisor, as this can lead to exploitation of local security vulnerabilities.

7.2. MODIFYING THE RED HAT ENTERPRISE VIRTUALIZATION HYPERVISOR ISO

7.2.1. Introduction to Modifying the Red Hat Enterprise Virtualization Hypervisor ISO

While the Red Hat Enterprise Virtualization Hypervisor is designed as a closed, minimal operating system, you can use the `edit-node` tool to make specific changes to the Red Hat Enterprise Virtualization Hypervisor ISO file to address specific requirements. The tool extracts the file system from a `livecd`-based ISO file and modifies aspects of the image, such as user passwords, SSH keys, and the packages included.



IMPORTANT

Any modifications must be repeated each time prior to upgrading a Hypervisor to a new version of the Red Hat Enterprise Virtualization Hypervisor ISO file.



WARNING

In the event of an issue with a Red Hat Enterprise Virtualization Hypervisor that has been modified using the `edit-node` tool, you may be required to reproduce the issue in an unmodified version of the Red Hat Enterprise Virtualization Hypervisor as part of the troubleshooting process.

7.2.2. Installing the `edit-node` Tool

The `edit-node` tool is included in the `ovirt-node-tools` package provided by the Red Hat Enterprise Virtualization Hypervisor repository.

Procedure 7.2. Installing the `edit-node` Tool

1. Log in to the system on which to modify the Red Hat Enterprise Virtualization Hypervisor ISO file.
2. Enable the required repository:

- o For Red Hat Enterprise Linux 6:

```
# subscription-manager repos --enable=rhel-6-server-rhev-rpms
```

- o For Red Hat Enterprise Linux 7:

```
# subscription-manager repos --enable=rhel-7-server-rhev-rpms
```

3. Install the `ovirt-node-tools` package:

```
# yum install ovirt-node-tools
```

You have installed the `edit-node` tool required for modifying the Red Hat Enterprise Virtualization Hypervisor ISO file. Proceed to the next section to see how to use the tool.

7.2.3. Syntax of the `edit-node` Tool

The basic options for the `edit-node` tool are as follows:

Options for the `edit-node` Tool

`--name=image_name`

Specifies the name of the modified image.

`--output=directory`

Specifies the directory to which the edited ISO is saved.

`--kickstart=kickstart_file`

Specifies the path or URL to and name of a kickstart configuration file.

`--script=script`

Specifies the path to and name of a script to run in the image.

`--shell`

Opens an interactive shell with which to edit the image.

`--passwd=user, encrypted_password`

Defines a password for the specified *user*. This option accepts MD5-encrypted password values. The `--password` parameter can be specified multiple times to modify multiple users. If no user is specified, the default user is `admin`.

`--sshkey=user, public_key_file`

Specifies the public key for the specified user. This option can be specified multiple times to specify keys for multiple users. If no user is specified, the default user is `admin`.

--uidmod=*user, uid*

Specifies the user ID for the specified user. This option can be specified multiple times to specify IDs for multiple users.

--gidmod=*group, gid*

Specifies the group ID for the specified group. This option can be specified multiple times to specify IDs for multiple groups.

--tmpdir=*temporary_directory*

Specifies the temporary directory on the local file system to use. By default, this value is set to `/var/tmp`

--releasefile=*release_file*

Specifies the path to and name of a release file to use for branding.

--builder=*builder*

Specifies the builder of a remix.

--install-plugin=*plugin*

Specifies a list of plug-ins to install in the image. You can specify multiple plug-ins by separating the plug-in names using a comma.

--install=*package*

Specifies a list of packages to install in the image. You can specify multiple packages by separating the package names using a comma.

--install-kmod=*package_name*

Installs the specified driver update package from a yum repository or specified `.rpm` file. Specified `.rpm` files are valid only if in whitelisted locations (kmod-specific areas).

--repo=*repository*

Specifies the yum repository to be used in conjunction with the `--install-*` options. The value specified can be a local directory, a yum repository file (`.repo`), or a driver disk `.iso` file.

--nogpgcheck

Skips GPG key verification during the `yum install` stage. This option allows you to install unsigned packages.

Manifest Options for the `edit-node` Tool

--list-plugins

Prints a list of plug-ins added to the image.

--print-version

Prints current version information from `/etc/system-release`.

--print-manifests

Prints a list of manifest files in the ISO file.

--print-manifest=*manifest*

Prints the specified manifest file.

--get-manifests=*manifest*

Creates a `.tar` file of manifest files in the ISO file.

--print-file-manifest

Prints the contents of `rootfs` on the ISO file.

--print-rpm-manifest

Prints a list of installed packages in `rootfs` on the ISO file.

Debugging Options for the `edit-node` Tool**--debug**

Prints debugging information when the `edit-node` command is run.

--verbose

Prints verbose information regarding the progress of the `edit-node` command.

--logfile=*logfile*

Specifies the path to and name of a file in which to print debugging information.

7.2.4. Adding and Updating Packages

You can use the `edit-node` tool to add new packages to or update existing packages in the Red Hat Enterprise Virtualization Hypervisor ISO file. To add or update a single package, you must either set up a local directory to act as a repository for the required package and its dependencies or point the `edit-node` tool to the location of a repository definition file that defines one or more repositories that provide the package and its dependencies. To add or update multiple packages, you must point the `edit-node` tool to the location of a repository definition file that defines one or more repositories that provide the packages and their dependencies.

**NOTE**

If you include a definition for a local repository in a repository definition file, the directory that acts as the source for that repository must be exposed via a web server or an FTP server. For example, it must be possible to access the repository via a link such as `http://localhost/myrepo/` or `ftp://localhost/myrepo/`.



IMPORTANT

The `edit-node` tool cannot download packages from repositories that use SSL. Instead, you must manually download each package and its dependencies and create a local repository that contains those packages.

7.2.4.1. Creating a Local Repository

To add packages to the Red Hat Enterprise Virtualization Hypervisor ISO file, you must set up a directory to act as a repository for installing those packages using the `createrepo` tool provided by the base Red Hat Enterprise Linux Workstation and Red Hat Enterprise Linux Server repositories.

Procedure 7.3. Creating a Local Repository

1. Install the `createrepo` package and dependencies on the system on which to modify the Red Hat Enterprise Virtualization Hypervisor ISO file:

```
# yum install createrepo
```

2. Create a directory to serve as the repository.

```
# mkdir exampleLocalrepo
```

3. Copy all required packages and their dependencies into the newly created directory.

4. Set up the metadata files for that directory to act as a repository:

```
# createrepo exampleLocalrepo
```

You have created a local repository for installing the required packages and their dependencies in the Red Hat Enterprise Virtualization Hypervisor ISO file. Proceed to the next section to add packages to the Red Hat Enterprise Virtualization Hypervisor ISO file.

7.2.4.2. Example: Adding Packages to the Red Hat Enterprise Virtualization Hypervisor ISO File

Use the `edit-node` tool to add packages to the Red Hat Enterprise Virtualization Hypervisor ISO file. This action creates a copy of the ISO file in the directory from which the `edit-node` tool was run that includes the name of the newly added packages in its name.

The following example adds a single package to the Red Hat Enterprise Virtualization Hypervisor ISO file, using a directory configured to act as a local repository as the source from which to install the package:

Example 7.2. Adding a Single Package to the Red Hat Enterprise Virtualization Hypervisor ISO File

```
# edit-node --nogpgcheck --install package1 --repo exampleLocalrepo /usr/share/rhev-hypervisor/rhev-latest-7.iso
```

You can add multiple packages by enclosing a comma-separated list of package names in double quotation marks. The following example adds two packages to the Red Hat Enterprise Virtualization

Hypervisor ISO file, using a directory configured to act as a local repository as the source from which to install the packages:

Example 7.3. Adding Multiple Packages to the Red Hat Enterprise Virtualization Hypervisor ISO File

```
# edit-node --nogpgcheck --install "package1,package2" --repo
exampleLocalrepo /usr/share/rhev-hypervisor/rhev-latest-7.iso
```

7.2.4.3. Example: Updating Packages in the Red Hat Enterprise Virtualization Hypervisor ISO File

You can use the `edit-node` tool to update existing packages in the Red Hat Enterprise Virtualization Hypervisor ISO file. This action creates a copy of the ISO file in the directory from which the `edit-node` tool was run that includes the names of the updated packages in its name.

The following example updates the `vdsm` package in the Red Hat Enterprise Virtualization Hypervisor ISO file, using a repository file containing the details of the Red Hat Enterprise Virtualization Hypervisor repository:

Example 7.4. Updating a Single Package in the Red Hat Enterprise Virtualization Hypervisor ISO File

```
# edit-node --nogpgcheck --install vdsm --repo
/etc/yum.repos.d/rhev.repo /usr/share/rhev-hypervisor/rhev-latest-
7.iso
```

You can update multiple packages by enclosing a comma-separated list of package names in double quotation marks. The following example updates the `vdsm` and `libvirt` packages in the Red Hat Enterprise Virtualization Hypervisor ISO file, using a repository file containing the details of the Red Hat Enterprise Virtualization Hypervisor repository:

Example 7.5. Updating Multiple Packages in the Red Hat Enterprise Virtualization Hypervisor ISO File

```
# edit-node --nogpgcheck --install "vdsm,libvirt" --repo
/etc/yum.repos.d/rhev.repo /usr/share/rhev-hypervisor/rhev-latest-
7.iso
```

7.2.5. Modifying the Default ID of Users and Groups

7.2.5.1. Example: Modifying the Default ID of a User

You can use the `edit-node` tool to modify the default ID of a user in the Red Hat Enterprise Virtualization Hypervisor ISO file.

The following example changes the default ID of the user `user1` to `60`:

Example 7.6. Modifying the Default ID of a Single User

```
# edit-node --uidmod=user1,60
```

You can modify the default ID of multiple users by specifying the `--uidmod` option multiple times in the same command. The following example changes the default ID of the user `user1` to `60` and the default ID of the user `user2` to `70`.

Example 7.7. Modifying the Default ID of Multiple Users

```
# edit-node --uidmod=user1,60 --uidmod=user2,70
```

7.2.5.2. Example: Modifying the Default ID of a Group

You can use the `edit-node` tool to modify the default ID of a group in the Red Hat Enterprise Virtualization Hypervisor ISO file.

The following example changes the default ID of the group `group1` to `60`:

Example 7.8. Modifying the Default ID of a Single Group

```
# edit-node --gidmod=group1,60
```

You can modify the default ID of multiple groups by specifying the `--gidmod` option multiple times in the same command. The following example changes the default ID of the group `group1` to `60` and the default ID of the group `group2` to `70`.

Example 7.9. Modifying the Default ID of Multiple Groups

```
# edit-node --gidmod=group1,60 --gidmod=group2,70
```

7.3. ADDITIONAL WAYS TO PREPARE THE INSTALLATION MEDIA

7.3.1. Preparing USB Installation Media Using `dd`

The `dd` utility can also be used to write a Red Hat Enterprise Virtualization Hypervisor disk image to a USB storage device. The `dd` utility is available from the `coreutils` package, and versions of the `dd` utility are available on a wide variety of Linux and Unix operating systems. Windows users can obtain the `dd` utility by installing Red Hat Cygwin, a free Linux-like environment for Windows.

The basic syntax for the `dd` utility is as follows:

```
# dd if=[image] of=[device]
```

The `[device]` parameter is the path to the USB storage device on which the disk image will be written. The `[image]` parameter is the path and file name of the disk image to write to the USB storage device. By default, the Red Hat Enterprise Virtualization Hypervisor disk image is located at

`/usr/share/rhev-hypervisor/rhev-hypervisor.iso` on the machine on which the `rhev-hypervisor7` package is installed. The `dd` command does not make assumptions as to the format of the device because it performs a low-level copy of the raw data in the selected image.

7.3.2. Preparing USB Installation Media Using `dd` on Linux Systems

You can use the `dd` utility to write a Red Hat Enterprise Virtualization Hypervisor disk image to a USB storage device.

Procedure 7.4. Preparing USB Installation Media using `dd` on Linux Systems

1. Run the following command to ensure you have the latest version of the Red Hat Enterprise Virtualization Hypervisor disk image:

- o For Red Hat Enterprise Linux 6:

```
# yum update rhev-hypervisor6
```

- o For Red Hat Enterprise Linux 7:

```
# yum update rhev-hypervisor7
```

2. Use the `dd` utility to write the disk image to a USB storage device.

Example 7.10. Use of `dd`

This example uses a USB storage device named `/dev/sdc`.

```
# dd if=/usr/share/rhev-hypervisor/rhev-hypervisor.iso of=/dev/sdc
243712+0 records in
243712+0 records out
124780544 bytes (125 MB) copied, 56.3009 s, 2.2 MB/s
```



WARNING

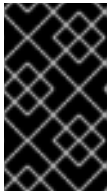
The `dd` utility will overwrite all data on the device specified by the `of` parameter. Ensure you have specified the correct device and that the device contains no valuable data before using the `dd` utility.

7.3.3. Preparing USB Installation Media Using `dd` on Windows Systems

You can use the `dd` utility to write a Red Hat Enterprise Virtualization Hypervisor disk image to a USB storage device. To use this utility in Windows, you must download and install Red Hat Cygwin.

Procedure 7.5. Preparing USB Installation Media using `dd` on Windows Systems

1. Open <http://www.redhat.com/services/custom/cygwin/> in a web browser and click **32-bit Cygwin** to download the 32-bit version of Red Hat Cygwin, or **64-bit Cygwin** to download the 64-bit version of Red Hat Cygwin.
2. Run the downloaded executable as a user with administrator privileges to open the Red Hat Cygwin installation program.
3. Follow the prompts to install Red Hat Cygwin. The Coreutils package in the Base package group provides the `dd` utility. This package is automatically selected for installation.
4. Copy the `rhev-hypervisor.iso` file downloaded from the Content Delivery Network to `C:\rhev-hypervisor.iso`.
5. Run the Red Hat Cygwin application from the desktop as a user with administrative privileges.



IMPORTANT

On the Windows 7 and Windows Server 2008, you must right-click the Red Hat Cygwin icon and select the **Run as Administrator** option to ensure the application runs with the correct permissions.

6. In the terminal, run the following command to view the drives and partitions currently visible to the system:

```
$ cat /proc/partitions
```

Example 7.11. View of Disk Partitions Attached to System

```
Administrator@test /
$ cat /proc/partitions
major minor #blocks name
 8      0 15728640 sda
 8      1   102400 sda1
 8      2 15624192 sda2
```

7. Attach the USB storage device to which the Red Hat Enterprise Virtualization Hypervisor disk image will be written to the system. Run the `cat /proc/partitions` command again and compare the output to that of the previous output. A new entry will appear that designates the USB storage device.

Example 7.12. View of Disk Partitions Attached to System

```
Administrator@test /
$ cat /proc/partitions
major minor #blocks name
 8      0 15728640 sda
 8      1   102400 sda1
 8      2 15624192 sda2
 8     16    524288 sdb
```

8. Use the `dd` utility to write the `rhev-hypervisor.iso` file to the USB storage device. The

following example uses a USB storage device named `/dev/sdb`. Replace `sdb` with the correct device name for the USB storage device to be used.

Example 7.13. Use of `dd` Utility Under Red Hat Cygwin

```
Administrator@test /
$ dd if=/cygdrive/c/rhev-hypervisor.iso of=/dev/sdb& pid=$!
```



WARNING

The `dd` utility will overwrite all data on the device specified by the `of` parameter. Ensure you have specified the correct device and that the device contains no valuable data before using the `dd` utility.



NOTE

Writing disk images to USB storage devices with the version of the `dd` utility included with Red Hat Cygwin can take significantly longer than the equivalent on other platforms. You can run the following command to view the progress of the operation:

```
$ kill -USR1 $pid
```

7.3.4. Preparing Optical Hypervisor Installation Media

You can write a Red Hat Enterprise Virtualization Hypervisor disk image to a CD-ROM or DVD with the `wodim` utility. The `wodim` utility is provided by the `wodim` package.

Procedure 7.6. Preparing Optical Hypervisor Installation Media

1. Install the `wodim` package and dependencies:

```
# yum install wodim
```

2. Insert a blank CD-ROM or DVD into your CD or DVD writer.
3. Write the disk image to the disc:

```
wodim dev=[device] [image]
```



NOTE

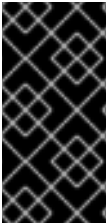
To find out the name of your writer device, run the following command:

```
# less /proc/sys/dev/cdrom/info
```


Example 7.14. Use of the wodim Utility

This example uses the first CD-RW (`/dev/sr0`) device available and an example unified installer disk image location.

```
# wodim dev=/dev/sr0 /usr/share/rhev-hypervisor/rhev-
hypervisor.iso
```

**IMPORTANT**

The Hypervisor uses a program (`isomd5sum`) to verify the integrity of the installation media every time the Hypervisor is booted. If media errors are reported in the boot sequence you have a bad CD-ROM. Follow the procedure above to create a new CD-ROM or DVD.

You have written a Red Hat Enterprise Virtualization Hypervisor disk image to a CD-ROM or DVD.

7.4. AUTOMATED INSTALLATION OF THE HYPERVISOR (ADVANCED)

This section covers the kernel command line parameters for Red Hat Enterprise Virtualization Hypervisors. These parameters can be used to automate installation. The parameters are described in detail and an example parameter string for an automated installation is provided.

This installation method is an alternative to the interactive installation. Using the method covered in this chapter with a PXE server can, with some configuration, deploy multiple Hypervisors without manually accessing the systems.

It is important to understand how the parameters work and what effects they have before attempting automated deployments. These parameters can delete data from existing systems if the system is configured to automatically boot with PXE.

7.4.1. How the Kernel Arguments Work

Below is a description of the Red Hat Enterprise Virtualization Hypervisor start up sequence. This may be useful for debugging issues with automated installation.

1. The `ovirt-early` service sets storage, network and management parameters in the `/etc/default/ovirt` file. These parameters are determined from the kernel arguments passed to the Hypervisor during the boot sequence.
2. The `/etc/init.d/ovirt-firstboot` script determines the type of installation to perform based on the parameters set on the kernel command line or the TUI installation.

7.4.2. Required Parameters

At a minimum, the following parameters are required for an installation:

1. One of the following parameters, depending on the type of installation or reinstallation that you wish to perform:
 1. *install*, to begin an installation (even if it detects an existing installation).

2. *reinstall*, to remove a current installation and begin a completely clean reinstall.
3. *upgrade*, to upgrade an existing installation.
2. The *storage_init* parameter, to initialize a local storage device.
3. The *BOOTIF* parameter, to specify the network interface which the Hypervisor uses to connect to the Manager. When using PXE boot, *BOOTIF* may be automatically supplied by `pxelinux`.

These parameters are discussed in further detail in the sections that follow.

If you want to use Red Hat Enterprise Virtualization Hypervisor with Red Hat Enterprise Virtualization Manager, you must also provide at least one of the following parameters:

adminpw

Allows you to log in with administrative privileges to configure Red Hat Enterprise Virtualization Hypervisor.

management_server

Specifies the Red Hat Enterprise Virtualization Manager to be used.

rhevm_admin_password

Specifies the password to be used during the process of adding a host in Red Hat Enterprise Virtualization Manager.

7.4.3. Storage Parameters

The following parameters configure local storage devices for installing a Hypervisor.

storage_init

The *storage_init* parameter is required for an automated installation; it initializes a local storage device.

Hypervisors use one storage device for local installation. There are several methods for defining which disk to initialize and install on.

- For USB storage devices, use the *usb* parameter to select the disk type. For example:

```
storage_init=usb
```

- For SCSI hard drives, use the *scsi* parameter to select the disk type. For example:

```
storage_init=scsi
```

- For hard drives on the ATA bus, including SATA hard drives that may also appear on the SCSI bus, use the *ata* parameter to select the disk type. For example:

```
storage_init=ata
```

- Alternatively, the storage device can be specified by using the Linux device name as the *storage_init* parameter. Using device names in the format `/dev/disk/by-id` is not

supported. *storage_init* must use the format */dev/mapper/disk* or */dev/disk*. In this example the */dev/sda* device is specified:

```
storage_init=/dev/sda
```

When specifying a *storage_init* value of *usb*, *scsi*, or *ata* you can also append a serial number to explicitly set which device to use. Determine the serial numbers for all disks attached to the system by running the command in the example below:

Example 7.15. Finding udev Serial Numbers

```
$ for d in /dev/sd?; do echo $d `udevadm info -q env -n $d | egrep
  'ID_BUS=|ID_SERIAL='`; done
  /dev/sda ID_SERIAL=ST9500325AS_6VE867X1
```

When providing both a storage type and the serial number, ensure that the two values are separated by a colon (:). For example:

```
storage_init=ata:3600508b100104a3953545233304c0003
```



IMPORTANT

If reinstalling Red Hat Enterprise Virtualization Hypervisor over an existing instance on a multipathed iSCSI machine, specify the storage type and serial number to avoid installation errors.



NOTE

Consistency of devices names following a system restart is not guaranteed. Device names are liable to change.

storage_vol

The *storage_vol* parameter is used to partition the storage device set by the *storage_init* parameter. After *storage_vol=*, you can specify the size in megabytes of the following partitions: Boot, Swap, Root, Config, Logging, and Data.

The Boot partition is always 50 MB and cannot be reconfigured. The Root partition for Red Hat Enterprise Virtualization Hypervisor 7 is always 8600 MB and cannot be reconfigured. The remaining partitions are described in more detail below:

Partitions defined by the *storage_vol* parameter

Swap

The swap partition is used for swapping pages of memory that are not frequently accessed to the hard drive. This frees pages of memory in RAM that are in turn used for pages which are accessed more frequently, increasing performance. The default size of the swap partition is calculated based on the amount of RAM installed in the system and over-commit ratio (default is 0.5). Hypervisors must have a swap partition and the swap partition cannot be disabled by setting its size to 0. The minimum size for the swap partition is 8 MB.

To determine the size of the swap partition, see <https://access.redhat.com/knowledge/solutions/15244>.

Use the formula from the Red Hat Knowledgebase solution above and add storage for the over-commit ratio (RAM multiplied by the over-commit ratio).

```
Recommended swap + (RAM * over-commit) = swap partition size
```

Leaving the value empty allows the system to set the recommended value for the swap partition.

Config

The config partition stores configuration files for the Hypervisor. The default and minimum size for the configuration partition is 8 MB.

Logging

The logging partition stores all logs for the Hypervisor. The logging partition requires a minimum of 2048 MB storage. However, it is recommended to allocate more storage to the logging partition if resources permit.

Data

The data partition must be large enough to hold core files for KVM. Core files depend on the RAM size for the guests. The data partition must also be large enough to store kernel dump files, also known as kdump. A kdump file is usually the same size as the host's system RAM. The data partition also stores the Hypervisor ISO file for Hypervisor upgrades.

The data partition requires a minimum of 512 MB storage. The recommended size is at least 1.5 times as large as the RAM on the host system plus an additional 512 MB. It can be configured to take up all remaining space by giving it a size value of `-1`, or disabled by giving it a size value of `0`.

Partitions can be specified in any order. The syntax for specifying each partition is *size, type*. Each partition specified is separated by a colon (:). To specify a 256MB Swap partition, and a 4096MB Logging partition, the whole parameter is `storage_vol=256,Swap:4096,Logging`.

NOTE

The old method of specifying partition sizes is still valid. In the old method, the partition sizes must be given in a particular order, as shown here:

```
storage_vol=BOOT:SWAP:ROOT:CONFIG:LOGGING:DATA
```

However, since the Boot and Root partitions cannot be reconfigured, sizes for these partitions can be omitted, like so:

```
storage_vol=:SWAP::CONFIG:LOGGING:DATA
```

If you fail to specify a size, the partition will be created at its default size. To specify a 256MB Swap partition, and a 4096MB Logging partition, the correct syntax is:

```
storage_vol=:256:::4096:
```

The following is the standard format of the *storage_vol* parameter:

```
storage_vol=256,EFI:256,Root:4096,Swap
```

iscsi_name

The *iscsi_name* parameter is used to set the iSCSI Initiator Name. The iSCSI Initiator name is expected to take the form of an iSCSI Qualified Name (IQN). This format is defined by RFC 3720, which is available at <http://tools.ietf.org/html/rfc3720>.

The IQN is made up of the following elements, separated by the `.` character:

- The literal string `iqn`
- The date that the naming authority took control of the domain in `yyyy-mm` format
- The reversed domain name - `demo.redhat.com` becomes `com.redhat.demo`
- Optionally, a storage target name as specified by the naming authority - preceded by a colon

Example 7.16. *iscsi_name*

The following illustrates the IQN for an iSCSI initiator attached to the `demo.redhat.com` domain where the domain was established in July 2011.

```
iscsi_name=iqn.2011-07.com.redhat.demo
```

7.4.4. Networking Parameters

Several networking options are available. The following parameters must be appended for the Hypervisor to automatically install:

- Setting the IP address or DHCP.
- Setting the hostname if the hostname is not resolved with DHCP.
- The interface the Red Hat Enterprise Virtualization Manager network is attached to.

The following list contains descriptions and usage examples for both optional and mandatory parameters.

Networking Parameters

BOOTIF

The ***BOOTIF*** parameter is required for an automated installation.

The ***BOOTIF*** parameter specifies the network interface which the Hypervisor uses to connect to the Red Hat Enterprise Virtualization Manager.



IMPORTANT

When using PXE to boot Hypervisors for installation using the **IPAPPEND 2** directive causes **BOOTIF=<MAC>** to be automatically appended to the kernel arguments. If the **IPAPPEND 2** directive is used it is not necessary to use the **BOOTIF** parameter.

The **BOOTIF** parameter takes arguments in one of three forms:

link

Indicates to use the first interface (as enumerated by the kernel) with an active link. This is useful for systems with multiple network interface controllers but only one plugged in.

eth#

Indicates to use the NIC as determined by the kernel driver initialization order (where # is the number of the NIC). To determine the number boot the Hypervisor and select **Shell** from the Hypervisor Configuration Menu. Use `ifconfig | grep eth*` to list the network interfaces attached to the system. There is no guarantee that on the next reboot the network interface controller will have the same **eth#** mapping.

```
BOOTIF=eth0
```

<MAC>

Indicates to use the MAC address explicitly defined inside the brackets.

ip

The **ip** parameter sets the IP address for the network interface controller defined by the **BOOTIF** parameter. The **ip** parameter accepts either an IP address (in the form 0.0.0.0) or **dhcp**.

```
ip=192.168.1.1
```

```
ip=dhcp
```

ipv6

The **ipv6** parameter is an alias for the **ip** parameter. It accepts either **dhcp** or **auto**.

netmask

The **netmask** parameter sets the subnet mask for the IP address defined with the **ip** parameter.

```
netmask=255.255.255.0
```

gateway

The **gateway** parameter sets the Internet gateway.

```
gateway=192.168.1.246
```

dns

The *dns* parameter sets the address of up to two DNS servers. Each DNS server address must be separated by a comma.

```
dns=192.168.1.243,192.168.1.244
```

hostname

The *hostname* parameter sets the hostname. The hostname must be a fully-qualified and resolvable domain name.

```
hostname=rhev1.example.com
```

ntp

The *ntp* parameter sets the address of one or more Network Time Protocol servers. Each NTP server address must be separated by a comma.

```
ntp=192.168.2.253,192.168.2.254
```

vlan

The *vlan* parameter sets the VLAN identifier for the network connected to the Red Hat Enterprise Virtualization Manager. This parameter should be set where VLANs are in use.

```
vlan=vlan-id:
```

For example:

```
vlan=36:
```

bond

The *bond* parameter configures a bond. Each interface name must be separated by a comma.

```
BOOTIF=bond01 bond=bond01:nic1,nic2
```

7.4.5. Red Hat Network (RHN) Parameters

These parameters are used to automatically register the hypervisor host with the Red Hat Network (RHN). At a minimum, either the *rhn_activationkey* or both the *rhn_username* and *rhn_password* parameters must be provided. Where registration is to occur against a satellite server, the *rhn_url* parameter must be provided.

rhn_type

Sets the RHN entitlement method for this machine. *sam* sets the entitlement method to Certificate-based RHN, which integrates the Customer Portal, content delivery network, and subscription service (subscription management). *classic* sets the entitlement method to RHN Classic, which uses the traditional channel entitlement model (channel access) to provides a global view of content access but does not provide insight into system-level subscription uses. The default value is *sam*.

rhn_username

The *rh_n_username* parameter sets the username used to connect to RHN.

```
rhn_username=testuser
```

rh_n_password

The *rh_n_password* parameter sets the password used to connect to RHN.

```
rhn_password=testpassword
```

rh_n_activationkey

The *rh_n_activationkey* parameter sets the activation key used to connect to RHN. Activation keys are used to register systems, entitle them to an RHN service level, and subscribe them to specific channels and system groups, all in one action. If both *rh_n_activationkey* and *rh_n_username* are provided, the *rh_n_activationkey* value will be used.

```
rhn_activationkey=7202f3b7d218cf59b764f9f6e9fa281b
```

rh_n_org

This parameter is used only with SAM. Registers the system to SAM in the same way as `--org org_name --activationkey key_value` when combined with the *rh_n_activationkey* parameter on the kernel command line.

```
rhn_org=org_name
```

rh_n_url

The *rh_n_url* parameter sets the URL of the satellite server used to register the host.

```
rhn_url=https://satellite.example.com
```

rh_n_ca_cert

The *rh_n_ca_cert* parameter sets the URL of the CA certificate used to connect to the satellite server. If it is not provided, the default value is *rh_n_url/pub/RHN-ORG-TRUSTED-SSL-CERT*.

```
rhn_ca_cert=https://satellite.example.com/pub/RHN-ORG-TRUSTED-SSL-CERT
```

rh_n_profile

The *rh_n_profile* parameter sets the name of the profile to be registered with RHN for this host. The default value is the system hostname.

```
rhn_profile=testhost
```

7.4.6. Authentication Parameters

adminpw

The *adminpw* parameter is used to set the password for the `admin` user. The value provided must already be hashed. All hashing schemes supported by the shadow password mechanism are

supported. The recommended way to hash a password for use with this parameter is to run the following command:

```
# openssl passwd -1
```

The `openssl` command will prompt for the password to use. A hashed representation of the password will be returned which can be used as the *adminpw* value.

rootpw

The *rootpw* parameter is used to set a temporary `root` password. A password change is forced the first time `root` logs on to the system. The value provided must already be hashed. All hashing schemes supported by the shadow password mechanism are supported. The recommended way to hash a password for use with this parameter is to run the following command:

```
# openssl passwd -1
```

The `openssl` command will prompt for the password to use. A hashed representation of the password will be returned which can be used as the *rootpw* value.



IMPORTANT

The `root` password is not set by default and is not supported unless enabled at the request of Red Hat support.

rhevm_admin_password

The *rhevm_admin_password* parameter sets a `root` password and enables SSH password authentication. The value provided must already be hashed. All hashing schemes supported by the shadow password mechanism are supported. The recommended way to hash a password for use with this parameter is to run the following command:

```
# openssl passwd -1
```

The `openssl` command will prompt for the password to use. A hashed representation of the password will be returned which can be used as the *rhevm_admin_password* value.



IMPORTANT

Setting this parameter has the side-effect of enabling SSH password authentication, which is unsupported unless enabled at the request of Red Hat support. We recommend disabling SSH password authentication after initial configuration is complete.

ssh_pwauth

The *ssh_pwauth* parameter is used to select whether or not password authentication is enabled for SSH connections. Possible values are `0` (disabled) and `1` (enabled). The default value is `0`.

```
ssh_pwauth=1
```

**IMPORTANT**

SSH password authentication is disabled by default and is not supported unless enabled at the request of Red Hat support.

7.4.7. Other Parameters

firstboot

The *firstboot* parameter indicates that the system should be treated as if there is no existing installation.

The *reinstall* parameter is a direct alias of the *firstboot* parameter, and can be used interchangeably with *firstboot*.

**WARNING**

Using the *firstboot* parameter erases existing data if a disk on the system has a Volume Group named **HostVG**. Combining the *firstboot* parameter with the *storage_init* parameter also erases data on any disks specified with *storage_init*.

install

The *install* parameter indicates that the system should be treated as if there is no existing installation. The *install* parameter is intended to be used when booting from CD-ROM, DVD, USB, or PXE media.

cim_enabled

Enables the use of Common Information Model (CIM) management infrastructure.

cim_passwd

Configures a password for your Common Information Model (CIM) management infrastructure.

disable_aes_ni

Disables the AES-NI encryption instruction set. Possible values are *y* or *n*.

kdump_nfs

This parameter configures an NFS server for kdump. The syntax for this parameter is `kdump_nfs=hostname:nfs_share_path`, for example, `kdump_nfs=nfshost.redhat.com:/path/to/nfs/share`.

local_boot

The *local_boot* parameter is an alias for the *upgrade* parameter.

local_boot_trigger

Sets a target URL to check and disables PXE when installation completes successfully, so that the system boots from disk on subsequent boots.

netconsole

The *netconsole* parameter sets the address of a server to which kernel messages should be logged. The *netconsole* parameter takes an IP address or fully qualified domain name and, optionally, a port (the default port is 6666).

```
netconsole=rhev.example.com:6666
```

nfsv4_domain

The *nfsv4_domain* parameter specifies a domain to use for NFSv4.

nocheck

The *nocheck* parameter will skip the MD5 check of the installation ISO, which might be time consuming if the media is remote or slow.

management_server

The *management_server* parameter sets the address of the Red Hat Enterprise Virtualization Manager. The *management_server* parameter takes an IP address or fully qualified domain name and, optionally, a port (the default port is 443).

```
management_server=rhev.example.com:443
```

mem_overcommit

The *mem_overcommit* parameter specifies the multiplier to use for adding extra swap to support memory over-commit. The default over-commit value is 0.5.

```
mem_overcommit=0.7
```

qemu_pxe

The *qemu_pxe* parameter is used to select which network boot loader is used in virtual machines. Possible values are *gpxe* and *etherboot*.

```
qemu_pxe=gpxe
```

reinstall

The *reinstall* parameter indicates that the system should be treated as if there is no existing installation.

The *firstboot* parameter is a direct alias of the *reinstall* parameter, and can be used interchangeably with *reinstall*.

**WARNING**

Using the *reinstall* parameter erases existing data if a disk on the system has a Volume Group named **HostVG**. Combining the *reinstall* parameter with the *storage_init* parameter also erases data on any disks specified with *storage_init*.

snmp_password

Enables and configures a password for the Simple Network Management Protocol.

syslog

Configures an rsyslog server at the address specified. You can also specify a port. The syntax is `syslog=hostname[:port]`.

upgrade

The *upgrade* parameter will upgrade the existing hypervisor image to the version provided by the boot media. The hypervisor will be automatically upgraded and rebooted once complete. If a hypervisor image is not yet installed, the image will be installed to the device selected with the *storage_init* parameter. When performing an upgrade, the previous boot entry is saved as **BACKUP** in `grub.conf`. If the reboot following the upgrade procedure fails, the **BACKUP** boot entry will be automatically selected as the new default.

uninstall

The *uninstall* parameter removes an existing Red Hat Enterprise Virtualization installation. The host volume group will be removed and the system rebooted.

7.4.8. An Automated Hypervisor Installation Example

This example uses the kernel command line parameters for an automated Hypervisor installation.

**IMPORTANT**

This example may not work accurately on all systems. The parameter descriptions above should be reviewed and the example modified as appropriate for the systems on which deployment is to occur.

The following is a typical example for installing a Hypervisor with the kernel command line parameters.

In this example, the Manager is located at the hostname: `rhevm.example.com`, and the netconsole server is located on the same machine.

```
:linux storage_init=/dev/sda storage_vol=:::: local_boot BOOTIF=eth0
management_server=rhevm.example.com netconsole=rhevm.example.com
```

**NOTE**

The kernel parameters can be automatically appended to guests booting over a network with PXE. Automatically installing from PXE is not covered by this guide.

7.5. CONFIGURING THE RED HAT ENTERPRISE VIRTUALIZATION HYPERVISOR

7.5.1. Configuring Networking on the Hypervisor

The **Network** screen is used to configure the host name of the Hypervisor and the DNS servers, NTP servers, and network interfaces that the Hypervisor will use.

<Ping>: Allows you to ping a given IP address by specifying the address to ping and the number of times to ping that address.

<Create Bond>: Allows you to create bonds between network interfaces.

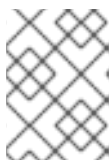
Procedure 7.7. Configuring the Host Name, DNS, and NTP

1. In the text user interface, select the **Network** screen, press the right arrow key and enter a new host name in the **Hostname** field.
2. Select the **DNS Server 1** field and enter the IP address of the primary DNS server. Optionally set a secondary DNS server.
3. Select the **NTP Server 1** field and enter the IP address or host name of the primary NTP server. Optionally set a secondary NTP server.
4. Select **<Save>** and press **Enter** to save the changes. You must save before you proceed to edit the network interfaces.

All network interface cards attached to the Hypervisor are initially in an unconfigured state. You must configure at least one network interface to connect it to a Red Hat Enterprise Virtualization environment.

Procedure 7.8. Configuring Network Interfaces

1. Select a network interface from the list beneath **Available System NICs** and press **Enter** to configure that network interface.

**NOTE**

To identify the physical network interface card associated with the selected network interface, select **<Flash Lights to Identify>** and press **Enter**.

2. Choose to configure IPv4 or IPv6.
 - o Configure a dynamic or static IP address for IPv4:
 - Select **DHCP** under **IPv4 Settings** and press the space bar to configure a dynamic IP address.

- Select **Static** under **IPv4 Settings**, press the space bar, and input the **IP Address**, **Netmask**, and **Gateway** that the Hypervisor will use to configure a static IP address.

Example 7.17. Static IPv4 Networking Configuration

```
IPv4 Settings
( ) Disabled      ( ) DHCP      (*) Static
IP Address: 192.168.122.100_ Netmask: 255.255.255.0___
Gateway      192.168.1.1_____
```

- Configure a stateless, dynamic, or static IP for IPv6:
 - Select **Auto** under **IPv6 Settings** and press the space bar to configure stateless auto configuration.
 - Select **DHCP** under **IPv6 Settings** and press the space bar to configure a dynamic IP address.
 - Select **Static** under **IPv6 Settings**, press the space bar, and input the **IP Address**, **Prefix Length**, and **Gateway** that the Hypervisor will use to configure a static IP address.

Example 7.18. Static IPv6 Networking Configuration

```
IPv6 Settings
( ) Disabled      ( ) Auto      ( ) DHCP      (*) Static
IP Address: 2001:db8:1::ab9:C0A8:103_ Prefix Length:
64_____
Gateway      2001:db8:1::ab9:1_____
```

3. Enter a VLAN identifier in the **VLAN ID** field to configure a VLAN for the device.
4. Select the <Save> button and press **Enter** to save the network configuration.

7.5.2. Configuring Remote Storage

Use the **Remote Storage** screen to specify a remote iSCSI initiator or NFS share to use as storage.

Procedure 7.9. Configuring Remote Storage

1. Enter an initiator name in the **iSCSI Initiator Name** field or the path to the NFS share in the **NFSv4 Domain (example.redhat.com)** field.

Example 7.19. iSCSI Initiator Name

```
iSCSI Initiator Name:
iqn.1994-05.com.redhat:5189835eeb40_____
```

Example 7.20. NFS Path

```
NFSv4 Domain (example.redhat.com):
example.redhat.com_____
```

2. Select **<Save>** and press **Enter**.

7.5.3. Connecting the Hypervisor to the Red Hat Enterprise Virtualization Manager

You can attach the Hypervisor to the Red Hat Enterprise Virtualization Manager immediately if the address of the Manager is available. If the Manager has not yet been installed, you must instead set a password. This allows the Hypervisor to be added from the Administration Portal once the Manager has been installed. Both modes of configuration are supported from the **RHEV-M** screen in the Hypervisor user interface. However, adding the Hypervisor from the Administration Portal is the recommended option.

**IMPORTANT**

Setting a password on the **RHEV-M** configuration screen sets the **root** password on the Hypervisor and enables SSH password authentication. Once the Hypervisor has successfully been added to the Manager, disabling SSH password authentication is recommended.

**IMPORTANT**

If you are configuring the Hypervisor to use a bond or bridge device, add it manually from the Red Hat Enterprise Virtualization Manager instead of registering it with the Manager during setup to avoid unexpected errors.

Procedure 7.10. Configuring a Hypervisor Management Server

- ○ Configure the Hypervisor Management Server using the address of the Manager.
 - a. Enter the IP address or fully qualified domain name of the Manager in the **Management Server** field.
 - b. Enter the management server port in the **Management Server Port** field. The default value is **443**. If a different port was selected during Red Hat Enterprise Virtualization Manager installation, specify it here, replacing the default value.
 - c. Leave the **Password** and **Confirm Password** fields blank. These fields are not required if the address of the management server is known.
 - d. Select **<Save & Register>** and press **Enter**.

After a few minutes, the Hypervisor is displayed under the **Hosts** tab in the Administration Portal. You must approve it to use the Hypervisor in your Red Hat Enterprise Virtualization environment. See [Section 7.6, “Approving a Registered Hypervisor”](#) for more information.

- Configure the Hypervisor Management Server using a password.
 - a. Enter a password in the **Password** field. Although the Hypervisor will accept a weak

password, it is recommended that you use a strong password. Strong passwords contain a mix of uppercase, lowercase, numeric and punctuation characters. They are six or more characters long and do not contain dictionary words.

- b. Re-enter the password in the **Confirm Password** field.
- c. Leave the **Management Server** and **Management Server Port** fields blank. As long as a password is set, allowing the Hypervisor to be added to the Manager later, these fields are not required.
- d. Select **<Save & Register>** and press **Enter**.

After the password is set, manually add the Hypervisor from the Administration Portal. See [Section 9.4, “Manually Adding a Hypervisor from the Administration Portal”](#) for more information.

7.5.4. Registering the Hypervisor

Registration is only required if virtual machines running on the Hypervisor need to consume Red Hat Enterprise Linux virtualization entitlements. You can choose to register the Hypervisor to Red Hat Subscription Manager, a Satellite server, or Subscription Asset Manager from the **RHSM Registration** screen. The Hypervisor can also connect to these services via a proxy server.

You do not need to register the Hypervisor to receive updates to the Hypervisor image itself; new versions of the Hypervisor image are made available through the Red Hat Enterprise Virtualization Manager.

Procedure 7.11. Registering the Hypervisor

1. Enter your Customer Portal user name in the **Login** field.
2. Enter your Customer Portal password in the **Password** field.
3. Enter a profile name to be used for the system in the **Profile Name (optional)** field. This is the name under which the system will appear when viewed in the Customer Portal.
4. Select the method by which to register the Hypervisor:
 - o **Red Hat Subscription Manager**
 - a. Select the **RHSM** option and press the space bar.
 - b. You do not need to enter values in the **URL** and **CA URL** fields.
 - c. Optionally enter an organization name in the **Organization** field.

Example 7.21. Red Hat Subscription Manager Configuration

```
(X) RHSM      ( ) Satellite      ( ) SAM
URL:
```

```
CA URL:
```

```
Organization: Organization_Name
```


- o **Red Hat Satellite 5**

- a. Select the **Satellite** option and press the space bar.
- b. Enter the URL of the Satellite server in the **URL** field.
- c. Enter the URL of the certificate authority for the Satellite server in the **CA URL** field.
- d. Optionally enter an organization name in the **Organization** field.
- e. Optionally enter a life cycle environment name in the **Environment** field.

Example 7.22. Satellite 5 Configuration

```
( ) RHSM      (X) Satellite      ( ) SAM
URL:
https://sat.example.com_____
CA URL:      http://sat.example.com/pub/RHN-ORG-TRUSTED-SSL-
CERT
Organization:
Organization_Name_____
Environment:
Library_____
```

- o **Red Hat Satellite 6.0 or 6.1**

- a. On the Satellite server, extract the certificate:

```
# cd /tmp
# rpm2cpio /var/www/html/pub/katello-ca-consumer-
latest.noarch.rpm | cpio -idmv
# cat etc/rhsm/ca/candlepin-local.pem etc/rhsm/ca/katello-
server-ca.pem >> /var/www/html/pub/katello-server-ca.crt
# restorecon -Rv /var/www/html/pub/katello-server-ca.crt
# chmod 644 /var/www/html/pub/katello-server-ca.crt
```

- b. On the Hypervisor, select the **Satellite** option and press the space bar.
- c. Enter the URL of the Satellite server in the **URL** field.
- d. Enter the URL of the certificate authority for the Satellite server in the **CA URL** field.
- e. Enter an organization name in the **Organization** field.
- f. Enter a life cycle environment name in the **Environment** field.

Example 7.23. Satellite 6 Configuration

```
( ) RHSM      (X) Satellite      ( ) SAM
URL:
https://sat.example.com_____
CA URL:      http://sat.example.com/pub/katello-server-
ca.crt____
Organization:
```

```

Organization_Name_____
Environment:
Library_____

```

- o **Red Hat Satellite 6.2**

- a. Select the **Satellite** option and press the space bar.
- b. Enter the URL of the Satellite server in the **URL** field.
- c. Enter the URL of the certificate authority for the Satellite server in the **CA URL** field.
- d. Enter an organization name in the **Organization** field.
- e. Enter a life cycle environment name in the **Environment** field.

Example 7.24. Satellite 6 Configuration

```

( ) RHSM      (X) Satellite      ( ) SAM
URL:
https://sat.example.com_____
CA URL:      http://sat.example.com/pub/katello-server-
ca.crt____
Organization:
Organization_Name_____
Environment:
Library_____

```

- o **Subscription Asset Manager**

- a. Select the **SAM** option and press the space bar.
- b. Enter the URL of the Subscription Asset Manager server in the **URL** field.
- c. Enter the URL of the certificate authority for the Subscription Asset Manager server in the **CA URL** field.
- d. Optionally enter an organization name in the **Organization** field.

Example 7.25. Subscription Asset Manager Configuration

```

( ) RHSM      ( ) Satellite      (X) SAM
URL:
https://sam.example.com_____
CA URL:      http://sam.example.com/sam/candlepin-
local.pem____
Organization:
Your_Organization_____

```

5. If you are using a proxy server, you must also specify the details of that server:

- a. Select **<HTTP Proxy Configuration>** and press **Enter**.
 - b. Enter the IP address or fully qualified domain name of the proxy server in the **Server** field.
 - c. Enter the port by which to attempt a connection to the proxy server in the **Port** field.
 - d. Enter the user name by which to attempt a connection to the proxy server in the **Username** field.
 - e. Enter the password by which to authenticate the user name specified above in the **Password** field.
 - f. Select **<Save>** and press **Enter** to save the configuration and return to the **RHSM Registration** screen.
6. Select **<Save>** and press **Enter**.

7.5.5. Changing the Admin User Password and Other Security-Related Tasks

You can configure security-related options for the Hypervisor such as SSH password authentication, AES-NI encryption, and the password of the `admin` user.

Procedure 7.12. Configuring Security-Related Tasks

1. To enable SSH authentication, select the **Enable SSH password authentication** option and press the space bar. SSH authentication can also be enabled in the **RHEV-M** screen. Leave the option disabled if the function is not required.
2. AES-NI encryption is enabled by default.
 - o If you need to disable it, select the **Disable AES-NI** option and press the space bar.
 - o If AES-NI encryption is enabled, you can optionally set the number of bytes by which to pad blocks in AES-NI encryption
3. Enter a new password for the `admin` user in the **Password** field and **Confirm Password** to change the password used to log into the Hypervisor console.
4. Select **<Save>** and press **Enter**.

7.5.6. Changing the Keyboard Layout on the Hypervisor

The **Keyboard** screen allows you to configure the keyboard layout used inside the Hypervisor console.

Procedure 7.13. Configuring the Hypervisor Keyboard Layout

1. Select a keyboard layout from the list provided.

Keyboard Layout Selection

Choose the Keyboard Layout you would like to apply to this system.

Current Active Keyboard Layout: U.S. English

Available Keyboard Layouts

Swiss German (latin1)

```

Turkish
U.S. English
U.S. International
Ukranian
...
<Save>
    
```

2. Select **<Save>** and press **Enter** to save the selection.

7.5.7. Enabling the SNMP Agent on the Hypervisor

The **SNMP** screen allows you to enable and configure a password for simple network management protocol.

```

Enable SNMP      [ ]

SNMP Password
Password:        _____
Confirm Password: _____

<Save>          <Reset>
    
```

Procedure 7.14. Enabling the SNMP Agent on the Hypervisor

1. Select the **Enable SNMP** option and press the space bar to enable **SNMP**.
2. Enter a password in the **Password** and **Confirm Password** fields.
3. Select **<Save>** and press **Enter**.

You have enabled **SNMP** and configured a password that the Hypervisor will use in **SNMP** communication.

7.5.8. Enabling CIM Monitoring Connections on the Hypervisor

The **CIM** screen allows you to configure a common information model for attaching the Hypervisor to a pre-existing CIM management infrastructure and monitor virtual machines that are running on the Hypervisor.

Procedure 7.15. Enabling CIM Monitoring Connections on the Hypervisor

1. Select the **Enable CIM** option and press the space bar to enable **CIM**.

```

Enable CIM      [ ]
    
```

2. Enter a password in the **Password** field and **Confirm Password** field.
3. Select **<Save>** and press **Enter**.

You have configured the Hypervisor to accept CIM connections authenticated using a password. Use this password when adding the Hypervisor to your common information model object manager.

7.5.9. Configuring Logging

The **Logging** screen allows you to configure logging-related options such as a daemon for automatically exporting log files generated by the Hypervisor to a remote server.

Press **F8** to see the available log files. To view the content of a log file, press the right arrow key, select a log file and press **Enter**.

- `/var/log/ovirt.log`
- `/var/log/ovirt-node.log`
- `/var/log/audit/audit.log`
- `/var/log/messages`
- `dmesg`

Procedure 7.16. Configuring Logging using the Logging Screen

1. In the **Logrotate Max Log Size** field, enter the maximum size in kilobytes that log files can reach before they are rotated by **logrotate**. The default value is **1024**.
2. Select an **Interval** to configure **logrotate** to run **Daily**, **Weekly**, or **Monthly**. The default value is **Daily**.
3. Optionally configure **rsyslog** to transmit log files to a remote **syslog** daemon:
 - a. Enter the remote **rsyslog** server address in the **Server Address** field.
 - b. Enter the remote **rsyslog** server port in the **Server Port** field. The default port is **514**.
4. Optionally configure **netconsole** to transmit kernel messages to a remote destination:
 - a. Enter the **Server Address**.
 - b. Enter the **Server Port**. The default port is **6666**.
5. Select **<Save>** and press **Enter**.

7.5.10. Configuring Kernel Dumps

The **Kdump** screen allows you to specify a location in which kernel dumps will be stored in the event of a system failure.

Table 7.1. The Kdump Screen

Kdump Options	Description
Disable	Disables kernel dumping.
Local	Stores kernel dumps on the local system.

Kdump Options	Description
SSH	Exports kernel dumps via SSH to the specified remote location.
NFS	Exports kernel dumps to the specified NFS share.

Procedure 7.17. Configuring Kernel Dumps

- Select an option for storing kernel dumps:
 - o **Disable**
To disable kernel dumps, select **Disable**, and press the space bar.
 - o **Local**
Select the **Local** option and press the space bar to store kernel dumps on the local system. This is the default option.
 - o **SSH**
 - a. Select the **SSH** option and press the space bar to export kernel dumps via SSH.
 - b. Enter the location in which kernel dumps will be stored in the **SSH Location (root@example.com)** field.
 - c. Enter an **SSH Key URL (optional)**.
 - o **NFS**
 - a. Select the **NFS** option and press the space bar to export kernel dumps to an NFS share.
 - b. Enter the location in which kernel dumps will be stored in the **NFS Location (example.com:/var/crash)** field.
- Select **<Save>** and press **Enter**.

7.5.11. The Diagnostics Screen

The **Diagnostics** screen allows you to select one of the diagnostic tools from the following list:

- **multipath -ll**: Shows the current multipath topology from all available information.
- **fdisk -l**: Lists the partition tables.
- **parted -s -l**: Lists partition layout on all block devices.
- **lsblk**: Lists information on all block devices.

7.5.12. The Performance Screen

The **Performance** screen allows you to select and apply a **tuned** profile to your system from the following list. The **virtual-host** profile is used by default. For Red Hat Enterprise Linux 7 profiles, see [Tuned-adm](#) in the *Red Hat Enterprise Linux 7 Power Management Guide* for more information.

Table 7.2. Tuned Profiles available in Red Hat Enterprise Virtualization

Tuned Profile	Description
None	The system is disabled from using any tuned profile.
virtual-host	Based on the enterprise-storage profile, virtual-host decreases the swappiness of virtual memory and enables more aggressive writeback of dirty pages.
virtual-guest	A profile optimized for virtual machines.
throughput-performance	A server profile for typical throughput performance tuning.
spindown-disk	A strong power-saving profile directed at machines with classic hard disks.
server-powersave	A power-saving profile directed at server systems.
latency-performance	A server profile for typical latency performance tuning.
laptop-battery-powersave	A high-impact power-saving profile directed at laptops running on battery.
laptop-ac-powersave	A medium-impact power-saving profile directed at laptops running on AC.
enterprise-storage	A server profile to improve throughput performance for enterprise-sized server configurations.
desktop-powersave	A power-saving profile directed at desktop systems.
default	The default power-saving profile. This is the most basic power-saving profile. It only enables the disk and CPU plug-ins.

7.5.13. The Plugins Screen

The **Plugins** screen provides an overview of the installed plug-ins and allows you to view package differences if you have used the **edit-node** tool to update or add new packages. The **Plugins** screen also provides the following buttons:

- **<RPM Diff>**: Allows you to view RPM differences.
- **<SRPM Diff>**: Allows you to view SRPM differences.

- **<File Diff>**: Allows you to view file differences.

7.5.14. The Hosted Engine Screen

To configure self-hosted engine on the Hypervisor, configure the **Network** screen before proceeding to configure the **Hosted Engine** screen. Do not configure the **RHEV-M** screen if you intend to configure the Hypervisor for self-hosted engine.

For more information on configuring networking, see [Section 7.5.1, “Configuring Networking on the Hypervisor”](#).

For more information on configuring self-hosted engine, see [Configuring Self-Hosted Engine on Red Hat Enterprise Virtualization Hypervisor](#) in the *Self-Hosted Engine Guide*

7.6. APPROVING A REGISTERED HYPERVISOR

Approve a Hypervisor that has been registered using the details of the Manager.

Procedure 7.18. Approving a Registered Hypervisor

1. From the Administration Portal, click the **Hosts** tab, and then click the host to be approved. The host is currently listed with the status of **Pending Approval**.
2. Click **Approve** to open the **Edit and Approve Hosts** window. You can use the window to specify a name for the Hypervisor, fetch its SSH fingerprint before approving it, and configure power management. For information on power management configuration, see [Host Power Management Settings Explained](#) in the *Administration Guide*.
3. Click **OK**. If you have not configured power management, you are prompted to confirm whether to proceed without doing so; click **OK**.

CHAPTER 8. RED HAT VIRTUALIZATION HOSTS

8.1. INSTALLING RED HAT VIRTUALIZATION HOST

Red Hat Virtualization Host (RHVH) is a minimal operating system based on Red Hat Enterprise Linux that is designed to provide a simple method for setting up a physical machine to act as a hypervisor in a Red Hat Enterprise Virtualization environment. The minimal operating system contains only the packages required for the machine to act as a hypervisor.



IMPORTANT

In new Red Hat Enterprise Virtualization 3.6 environments, Red Hat recommends installing RHVH 3.6 because it provides an upgrade path to the most recent version of Red Hat Virtualization through the Manager. Installations that use RHEV-H 7 require a full reinstall of the hypervisors to upgrade to the most recent version of Red Hat Virtualization.

Before you proceed, verify that the machine on which you are installing RHVH meets the hardware requirements listed in [Section 2.2, “Hypervisor Requirements”](#).

Installing RHVH on a physical machine involves three key steps:

1. Download **Next Generation RHV-H Image** from the Customer Portal.
2. Write the RHVH ISO image to a USB, CD, or DVD.
3. Install the RHVH minimal operating system.

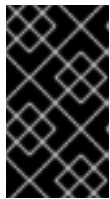
Procedure 8.1. Installing Red Hat Virtualization Host

1. Download the RHVH ISO image from the Customer Portal:
 - a. Log in to the Customer Portal at <https://access.redhat.com>.
 - b. Click **Downloads** in the menu bar.
 - c. Click **Red Hat Virtualization**, scroll up, and click **Download Latest** to access the product download page.
 - d. Select **3.6** from the **Version** drop-down list.
 - e. Download **Next Generation RHV-H Image**.
 - f. Create a bootable media device. See [Making Media](#) in the *Red Hat Enterprise Linux Installation Guide* for more information.
2. Start the machine on which to install RHVH using the prepared installation media.
3. From the boot menu, select the **Install** option, and press **Enter**.

**NOTE**

You can also press the **Tab** key to edit the kernel parameters. Kernel parameters must be separated by a space, and you can boot the system using the specified kernel parameters by pressing the **Enter** key. Press the **Esc** key to clear any changes to the kernel parameters and return to the boot menu.

4. Select a language, and click **Continue**.
5. Select a time zone from the **Date & Time** screen and click **Done**.
6. Select a keyboard layout from the **Keyboard** screen and click **Done**.
7. Select the device on which to install RHVH from the **Installation Destination** screen. Optionally, enable encryption. Click **Done**.

**IMPORTANT**

Red Hat strongly recommends using the **Automatically configure partitioning** option. However, if you do select **I will configure partitioning**, see [Section 8.2.1, “Custom Partitioning”](#) for details.

**NOTE**

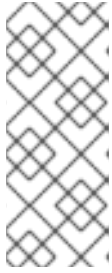
For information on preserving local storage domains when reinstalling RHVH, see <https://access.redhat.com/solutions/2804081>.

8. Select a network from the **Network & Host Name** screen and click **Configure . . .** to configure the connection details. Enter a host name in the **Host name** field, and click **Done**.
9. Optionally configure **Language Support**, **Security Policy**, and **Kdump**. See [Installing Using Anaconda](#) in the *Red Hat Enterprise Linux 7 Installation Guide* for more information on each of the sections in the **Installation Summary** screen.
10. Click **Begin Installation**.
11. Set a root password and, optionally, create an additional user while RHVH installs.

**WARNING**

Red Hat strongly recommends not creating untrusted users on RHVH, as this can lead to exploitation of local security vulnerabilities.

12. Click **Finish configuration** to enable RHVH to configure the system.
13. Click **Reboot** to complete the installation.

**NOTE**

When RHVH restarts, `imgbase-motd.service` performs a health check on the host and displays the result when you log in on the command line. The message `imgbase status: OK` or `imgbase status: DEGRADED` indicates the health status. Run `imgbase check` to get more information. The service is enabled by default.

14. Once the installation is complete, subscribe to the required entitlements. See [Section 9.3, “Subscribing to the Required Entitlements”](#), and enable only the **Red Hat Virtualization Host 7** repository to allow later updates to the Red Hat Virtualization Host:

```
# subscription-manager repos --enable=rhel-7-server-rhvh-4-rpms
```

You can now add the host to your Red Hat Enterprise Virtualization environment.

8.2. ADVANCED INSTALLATION

8.2.1. Custom Partitioning

Custom partitioning on Red Hat Virtualization Host (RHVH) is not recommended. Red Hat strongly recommends using the **Automatically configure partitioning** option in the **Installation Destination** window.

If your installation requires custom partitioning, select the **I will configure partitioning** option during the installation, and note that the following restrictions apply:

- You must select the **LVM Thin Provisioning** option in the **Manual Partitioning** window.
- The following directories are required and must be on thin provisioned logical volumes:
 - `root (/)`
 - `/home`
 - `/tmp`
 - `/var`
 - `/var/log`
 - `/var/log/audit`

For information about the required storage sizes for each partition, refer to the table below.

- The `/boot` directory should be defined as a standard partition.
- The `/var` directory must be on a separate volume or disk.
- Only XFS or Ext4 file systems are supported.

Table 8.1. Red Hat Virtualization Host Minimum Partition Sizes

/	/home	/tmp	/boot	/var	/var/log	/var/log /audit	swap	Minimum Total
6 GB	1 GB	1 GB	1 GB	15 GB	8 GB	2 GB	1 GB	32 GB

8.2.2. Automating Red Hat Virtualization Host Deployment

You can install Red Hat Virtualization Host (RHVH) without a physical media device by booting from the network using PXE. You can automate the installation process by using a Kickstart file containing the answers to the installation questions. The Kickstart file can also be accessed over the network, removing the need for physical media.

Instructions for both tasks can be found in the [Red Hat Enterprise Linux 7 Installation Guide](#), as RHVH is installed in much the same way as Red Hat Enterprise Linux. The main differences required for RHVH are included in the following procedure.

Procedure 8.2. Automating Deployment using PXE and Kickstart

1. Download the RHVH ISO image from the Customer Portal:
 - a. Log in to the Customer Portal at <https://access.redhat.com>.
 - b. Click **Downloads** in the menu bar.
 - c. Click **Red Hat Virtualization**, scroll up, and click **Download Latest** to access the product download page.
 - d. Choose the appropriate hypervisor image and click **Download Now**.
2. Make the RHVH ISO image available over the network using the instructions in [Installation Source on a Network](#).
3. Configure the PXE server using the instructions in [Preparing for a Network Installation](#).

The following requirements apply in order to boot RHVH from the PXE server:

- o Ensure that you copy the RHVH boot images to the `tftp/` root directory.

```
# cp URL/to/RHVH-ISO/images/pxeboot/{vmlinuz,initrd.img}
/var/lib/tftpboot/pxelinux/
```

- o The boot loader configuration file must include a RHVH label that specifies the RHVH boot images.

```
KERNEL URL/to/vmlinuz
APPEND initrd=URL/to/initrd.img inst.stage2=URL/to/RHVH-ISO
```

4. Create a Kickstart file and make it available over the network using the instructions in [Kickstart Installations](#).

The following constraints apply to RHVH Kickstart files:

- o The `%packages` section is not required for RHVH. Instead, use the `liveimg` option and specify the `squashfs.img` file from the RHVH ISO image.

```
liveimg --url=URL/to/squashfs.img
```

- o The `autopart` command is highly recommended. Thin provisioning must be used.

```
autopart --type=thinp
```

If your installation requires manual partitioning instead, see [Section 8.2.1, “Custom Partitioning”](#) for a list of limitations that apply to partitions.

The following example demonstrates how to configure manual partitioning.

```
clearpart --all
part /boot --fstype xfs --size=1000 --ondisk=sda
part pv.01 --size=42000 --grow
volgroup HostVG pv.01
logvol swap --vgname=HostVG --name=swap --fstype=swap --
recommended
logvol none --vgname=HostVG --name=HostPool --thinpool --
size=40000 --grow
logvol / --vgname=HostVG --name=root --thin --fstype=ext4 --
poolname=HostPool --fsoptions="defaults,discard" --size=6000 --
grow
logvol /var --vgname=HostVG --name=var --thin --fstype=ext4 --
poolname=HostPool
--fsoptions="defaults,discard" --size=15000
logvol /var/log --vgname=HostVG --name=var_log --thin --
fstype=ext4 --poolname=HostPool --fsoptions="defaults,discard" --
size=8000
logvol /var/log/audit --vgname=HostVG --name=var_audit --thin --
fstype=ext4 --poolname=HostPool --fsoptions="defaults,discard" --
size=2000
logvol /home --vgname=HostVG --name=home --thin --fstype=ext4 --
poolname=HostPool --fsoptions="defaults,discard" --size=1000
logvol /tmp --vgname=HostVG --name=tmp --thin --fstype=ext4 --
poolname=HostPool --fsoptions="defaults,discard" --size=1000
```

- o A `%post` section that calls the `nodedctl init` command is required.

```
%post
nodedctl init
%end
```

To fully automate the installation process, you can add this Kickstart file to the boot loader configuration file on the PXE server. Specify the Kickstart location by adding `inst.ks=` to the **APPEND** line:

```
APPEND initrd=URL/to/initrd.img inst.stage2=URL/to/RHVH-ISO
inst.ks=URL/to/RHVH-ks.cfg
```

Example 8.1. Red Hat Virtualization Host Kickstart File

The following is an example of a Kickstart file used to deploy Red Hat Virtualization Host. You can include additional commands and options as required.

```
liveimg --url=http://1.2.3.4/path/to/squashfs.img
clearpart --all
autopart --type=thinp
rootpw --plaintext ovirt
timezone --utc America/Phoenix
zerombr
text

reboot

%post --erroronfail
nodectl init
%end
```

5. Install RHVH using the instructions in [Booting the Installation on AMD64 and Intel 64 Systems from the Network Using PXE](#).

CHAPTER 9. RED HAT ENTERPRISE LINUX HOSTS

9.1. RED HAT ENTERPRISE LINUX HOSTS

A Red Hat Enterprise Linux host, also known as a RHEL-based hypervisor is based on a standard basic installation of Red Hat Enterprise Linux on a physical server, with **Red Hat Enterprise Linux Server** and the **Red Hat Enterprise Virtualization** entitlements enabled. For detailed installation instructions, see [Red Hat Enterprise Linux 7 Installation Guide](#) .

See [Appendix G, Configuring a Hypervisor Host for PCI Passthrough](#) for more information on how to enable the hypervisor hardware and software for device passthrough.



IMPORTANT

By default, SELinux is in enforcing mode upon installation. To verify, run `getenforce`. While it is highly recommended to have SELinux in enforcing mode, it is not required for Red Hat Enterprise Virtualization to host virtual machines. Disabling SELinux eliminates a core security feature of Red Hat Enterprise Linux. Problems also occur when migrating virtual machines between hypervisors that have different SELinux modes. For more information, see [Red Hat Enterprise Linux 7 Virtualization Security Guide](#) .

If you need to live migrate virtual machines from a hypervisor that has SELinux disabled to a hypervisor that has SELinux enabled, see the workaround in <https://access.redhat.com/solutions/1982023>.



IMPORTANT

Virtualization must be enabled in your host's BIOS settings. For information on changing your host's BIOS settings, refer to your host's hardware documentation.



IMPORTANT

Third-party watchdogs should not be installed on Red Hat Enterprise Linux hosts, as they can interfere with the watchdog daemon provided by VDSM.

9.2. HOST COMPATIBILITY MATRIX

The following table outlines the supported hypervisor host versions in each compatibility version of Red Hat Enterprise Virtualization. For the 3.6 compatibility version, only Red Hat Enterprise Linux 7 hosts are supported.



NOTE

The latest version of VDSM is backwards compatible with all previous versions of Red Hat Enterprise Virtualization.

Table 9.1.

Supported RHEL or RHEV-H Version	3.0	3.1	3.2	3.3	3.4	3.5	3.6
6.2	✓						
6.3	✓	✓					
6.4	✓	✓	✓				
6.5	✓	✓	✓	✓	✓		
6.6						✓	
6.7						✓	
6.8						✓	
7.0						✓	✓
7.1						✓	✓
7.2						✓	✓
7.3							✓

When you create a new data center, you can set the compatibility version. Select the compatibility version that suits all the hosts in the data center. Once set, version regression is not allowed. For a fresh Red Hat Enterprise Virtualization installation, the latest compatibility version is set in the Default Data Center and Default Cluster; to use an older compatibility version, you must create additional data centers and clusters.

9.3. SUBSCRIBING TO THE REQUIRED ENTITLEMENTS

To be used as a hypervisor host, make sure the Red Hat Enterprise Linux host meets the hardware requirements listed in Chapter 2. The host must also be registered and subscribed to a number of entitlements using Subscription Manager. Follow this procedure to register with the Content Delivery Network and attach the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** entitlements to the host.

Procedure 9.1. Subscribing to Required Entitlements using Subscription Manager

1. Register your system with the Content Delivery Network, entering your Customer Portal **Username** and **Password** when prompted:

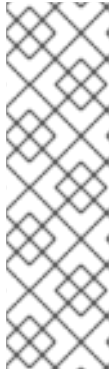
```
# subscription-manager register
```

2. Find the **Red Hat Enterprise Linux Server** and **Red Hat Enterprise Virtualization** subscription pools and note down the pool IDs.

```
# subscription-manager list --available
```

3. Use the pool IDs located in the previous step to attach the entitlements to the system:

```
# subscription-manager attach --pool=poolid
```

**NOTE**

To find out what subscriptions are currently attached, run:

```
# subscription-manager list --consumed
```

To list all enabled repositories, run:

```
# yum repolist
```

4. Ensure all hosts remain on Red Hat Enterprise Linux 7.3:

```
subscription-manager release --set=7.3
```

5. Disable all existing repositories:

```
# subscription-manager repos --disable=*
```

6. Enable the required repositories.

**IMPORTANT**

Red Hat Enterprise Virtualization 3.x has reached End Of Life (EOL). Users with Extended Lifecycle Support (ELS) must use the repositories in <https://access.redhat.com/solutions/3194482> to keep the environment up and running.

If you are installing Red Hat Enterprise Linux 7 hosts, little endian on IBM POWER8 hardware, enable the following repositories instead:

```
# subscription-manager repos --enable=rhel-7-server-rhev-mgmt-agent-for-power-le-rpms  
# subscription-manager repos --enable=rhel-7-for-power-le-rpms
```

**IMPORTANT**

Red Hat Enterprise Linux 7 hosts, little endian on IBM POWER8 is not part of the Extended Lifecycle Support (ELS) offering.

7. Ensure that all packages currently installed are up to date:

```
# yum update
```

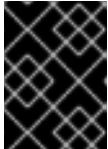
Once you have subscribed the host to the required entitlements, proceed to the next section to attach your host to your Red Hat Enterprise Virtualization environment.

9.4. MANUALLY ADDING A HYPERVISOR FROM THE ADMINISTRATION PORTAL

Adding a host to your Red Hat Enterprise Virtualization environment can take some time, as the following steps are completed by the platform: virtualization checks, installation of packages, creation of bridge, and a reboot of the host. Use the details pane to monitor the process as the host and the Manager establish a connection.

Procedure 9.2. Adding a Host to the Red Hat Enterprise Virtualization Manager

1. From the Administration Portal, click the **Hosts** resource tab.
2. Click **New** to open the **New Host** window.
3. Use the drop-down menu to select the **Data Center** and **Host Cluster** for the new host.



IMPORTANT

Red Hat recommends to keep Red Hat Enterprise Linux 6 and Red Hat Enterprise Linux 7 hosts in different clusters.

4. Enter the **Name** and the **Address** of the new host. The standard SSH port, port 22, is auto-filled in the **SSH Port** field.
5. Select an authentication method to use for the Manager to access the host.
 - o Enter the root user's password to use password authentication.
 - o Alternatively, copy the key displayed in the **SSH PublicKey** field to `/root/.ssh/authorized_keys` on the host to use public key authentication.
6. Click the **Advanced Parameters** button to expand the advanced host settings.
 - a. Optionally disable automatic firewall configuration.
 - b. Optionally add a host SSH fingerprint to increase security. You can add it manually, or fetch it automatically.
7. You can configure power management, where the host has a supported power management card. For information on power management configuration, see [Host Power Management Settings Explained](#) in the *Administration Guide*.
8. Click **OK**.

The new host displays in the list of hosts with a status of **Installing**, and you can view the progress of the installation in the details pane. After a brief delay the host status changes to **Up**.

PART IV. ATTACHING STORAGE

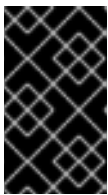
CHAPTER 10. STORAGE

10.1. INTRODUCTION TO STORAGE

A storage domain is a collection of images that have a common storage interface. A storage domain contains complete images of templates and virtual machines (including snapshots), ISO files, and metadata about themselves. A storage domain can be made of either block devices (SAN - iSCSI or FCP) or a file system (NAS - NFS, GlusterFS, or other POSIX compliant file systems).

There are three types of storage domain:

- **Data Domain:** A data domain holds the virtual hard disks and OVF files of all the virtual machines and templates in a data center, and cannot be shared across data centers. Data domains of multiple types (iSCSI, NFS, FC, POSIX, and Gluster) can be added to the same data center, provided they are all shared, rather than local, domains.



IMPORTANT

You must have one hypervisor host with the status of **Up** and have attached a data domain to a data center before you can attach an ISO domain and an export domain.

- **ISO Domain:** ISO domains store ISO files (or logical CDs) used to install and boot operating systems and applications for the virtual machines, and can be shared across different data centers. An ISO domain removes the data center's need for physical media. ISO domains can only be NFS-based. Only one ISO domain can be added to a data center.
- **Export Domain:** Export domains are temporary storage repositories that are used to copy and move images between data centers and Red Hat Enterprise Virtualization environments. Export domains can be used to backup virtual machines. An export domain can be moved between data centers, however, it can only be active in one data center at a time. Export domains can only be NFS-based. Only one export domain can be added to a data center.

See the next section to attach existing FCP storage as a data domain. More storage options are available in the [Administration Guide](#)

10.2. ADDING FCP STORAGE

Red Hat Enterprise Virtualization platform supports SAN storage by creating a storage domain from a volume group made of pre-existing LUNs. Neither volume groups nor LUNs can be attached to more than one storage domain at a time.

Red Hat Enterprise Virtualization system administrators need a working knowledge of Storage Area Networks (SAN) concepts. SAN usually uses Fibre Channel Protocol (FCP) for traffic between hosts and shared external storage. For this reason, SAN may occasionally be referred to as FCP storage.

For information regarding the setup and configuration of FCP or multipathing on Red Hat Enterprise Linux, see the [Storage Administration Guide](#) and [DM Multipath Guide](#).

The following procedure shows you how to attach existing FCP storage to your Red Hat Enterprise Virtualization environment as a data domain. For more information on other supported storage types, see [Storage](#) in the *Administration Guide*.

Procedure 10.1. Adding FCP Storage

1. Click the **Storage** resource tab to list all storage domains.
2. Click **New Domain** to open the **New Domain** window.
3. Enter the **Name** of the storage domain.

New Domain ?

Data Center: Default (V3) | Name:

Domain Function: Data | Description:

Storage Type: Fibre Channel | Comment:

Use Host: Host1

<input type="checkbox"/> LUN ID	Dev. Size	Additional Size	#path	Vendor ID	Product ID	Serial

Advanced Parameters

OK Cancel

Figure 10.1. Adding FCP Storage

4. Use the **Data Center** drop-down menu to select an FCP data center.
If you do not yet have an appropriate FCP data center, select **(none)**.
5. Use the drop-down menus to select the **Domain Function** and the **Storage Type**. The storage domain types that are not compatible with the chosen data center are not available.
6. Select an active host in the **Use Host** field. If this is not the first data domain in a data center, you must select the data center's SPM host.



IMPORTANT

All communication to the storage domain is through the selected host and not directly from the Red Hat Enterprise Virtualization Manager. At least one active host must exist in the system and be attached to the chosen data center. All hosts must have access to the storage device before the storage domain can be configured.

7. The **New Domain** window automatically displays known targets with unused LUNs when **Data / Fibre Channel** is selected as the storage type. Select the **LUN ID** check box to select all of the available LUNs.
8. Optionally, you can configure the advanced parameters.
 - a. Click **Advanced Parameters**.
 - b. Enter a percentage value into the **Warning Low Space Indicator** field. If the free space available on the storage domain is below this percentage, warning messages are displayed to the user and logged.
 - c. Enter a GB value into the **Critical Space Action Blocker** field. If the free space available on the storage domain is below this value, error messages are displayed to the user and logged, and any new action that consumes space, even temporarily, will be blocked.
 - d. Select the **Wipe After Delete** check box to enable the wipe after delete option. This option can be edited after the domain is created, but doing so will not change the wipe after delete property of disks that already exist.
9. Click **OK** to create the storage domain and close the window.

The new FCP data domain displays on the **Storage** tab. It will remain with a **Locked** status while it is being prepared for use. When ready, it is automatically attached to the data center.

APPENDIX A. CHANGING THE PERMISSIONS FOR THE LOCAL ISO DOMAIN

If the Manager was configured during setup to provide a local ISO domain, that domain can be attached to one or more data centers, and used to provide virtual machine image files. By default, the access control list (ACL) for the local ISO domain provides read and write access for only the Manager machine. Virtualization hosts require read and write access to the ISO domain in order to attach the domain to a data center. Use this procedure if network or host details were not available at the time of setup, or if you need to update the ACL at any time.

While it is possible to allow read and write access to the entire network, it is recommended that you limit access to only those hosts and subnets that require it.

Procedure A.1. Changing the Permissions for the Local ISO Domain

1. Log in to the Manager machine.
2. Edit the `/etc/exports` file, and add the hosts, or the subnets to which they belong, to the access control list:

```
/var/lib/exports/iso 10.1.2.0/255.255.255.0(rw)
host01.example.com(rw) host02.example.com(rw)
```

The example above allows read and write access to a single /24 network and two specific hosts. `/var/lib/exports/iso` is the default file path for the ISO domain. See the `exports(5)` man page for further formatting options.

3. Apply the changes:

```
# exportfs -ra
```

Note that if you manually edit the `/etc/exports` file after running `engine-setup`, running `engine-cleanup` later will not undo the changes.

APPENDIX B. ATTACHING THE LOCAL ISO DOMAIN TO A DATA CENTER

The local ISO domain, created during the Manager installation, appears in the Administration Portal as **Unattached**. To use it, attach it to a data center. The ISO domain must be of the same **Storage Type** as the data center. Each host in the data center must have read and write access to the ISO domain. In particular, ensure that the Storage Pool Manager has access.

Only one ISO domain can be attached to a data center.

Procedure B.1. Attaching the Local ISO Domain to a Data Center

1. In the Administration Portal, click the **Data Centers** resource tab and select the appropriate data center.
2. Select the **Storage** tab in the details pane to list the storage domains already attached to the data center.
3. Click **Attach ISO** to open the **Attach ISO Library** window.
4. Click the radio button for the local ISO domain.
5. Click **OK**.

The ISO domain is now attached to the data center and is automatically activated.

APPENDIX C. ENABLING GLUSTER PROCESSES ON RED HAT GLUSTER STORAGE NODES

1. In the Navigation Pane, select the **Clusters** tab.
2. Select **New**.
3. Select the "Enable Gluster Service" radio button. Provide the address, SSH fingerprint, and password as necessary. The address and password fields can be filled in only when the **Import existing Gluster configuration** check box is selected.

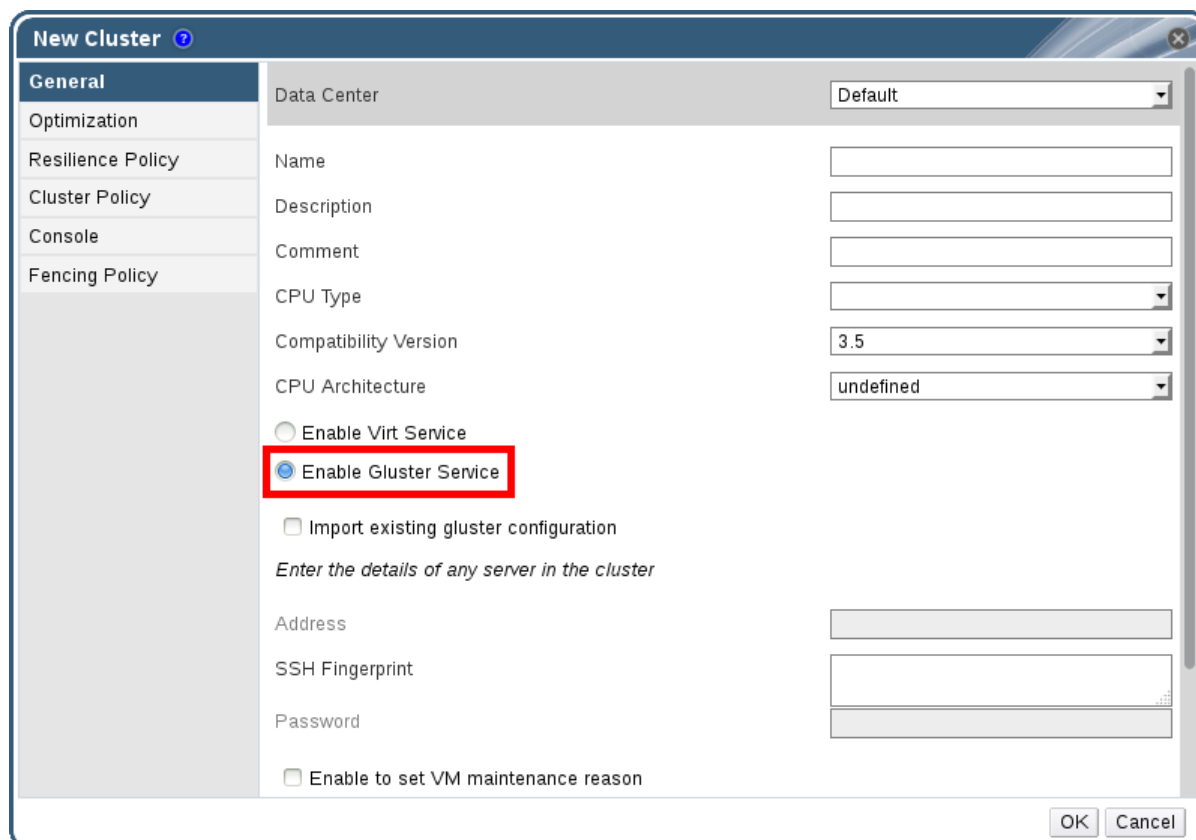


Figure C.1. Selecting the "Enable Gluster Service" Radio Button

4. Click **OK**.

It is now possible to add Red Hat Gluster Storage nodes to the Gluster cluster, and to mount Gluster volumes as storage domains. `iptables` rules no longer block storage domains from being added to the cluster.

APPENDIX D. PREPARING A REMOTE POSTGRESQL DATABASE FOR USE WITH THE RED HAT ENTERPRISE VIRTUALIZATION MANAGER

Optionally configure a PostgreSQL database on a remote Red Hat Enterprise Linux 6.6 or later versions of Red Hat Enterprise Linux 6 machine to use as the Manager database. By default, the Red Hat Enterprise Virtualization Manager's configuration script, `engine-setup`, creates and configures the Manager database locally on the Manager machine. For automatic database configuration, see [Section 3.3, “Configuring the Red Hat Enterprise Virtualization Manager”](#). To set up the Manager database with custom values on the Manager machine, see [Appendix E, *Preparing a Local Manually-Configured PostgreSQL Database for Use with the Red Hat Enterprise Virtualization Manager*](#).

Use this procedure to configure the database on a machine that is separate from the machine where the Manager is installed. Set up this database before you configure the Manager; you must supply the database credentials during `engine-setup`.



NOTE

The `engine-setup` and `engine-backup --mode=restore` commands only support system error messages in the `en_US.UTF8` locale, even if the system locale is different.

The locale settings in the `postgresql.conf` file must be set to `en_US.UTF8`.



IMPORTANT

The database name must contain only numbers, underscores, and lowercase letters.

Procedure D.1. Preparing a Remote PostgreSQL Database for use with the Red Hat Enterprise Virtualization Manager

1. Install the PostgreSQL server package:

```
# yum install postgresql-server
```

2. Initialize the PostgreSQL database, start the `postgresql` service, and ensure that this service starts on boot:

```
# su -l postgres -c "/usr/bin/initdb --locale=en_US.UTF8 --
auth='ident' --pgdata=/var/lib/pgsql/data/"
# service postgresql start
# chkconfig postgresql on
```

3. Connect to the `psql` command line interface as the `postgres` user:

```
# su - postgres
$ psql
```

4. Create a user for the Manager to use when it writes to and reads from the database. The default user name on the Manager is `engine`:

```
postgres=# create role user_name with login encrypted password
'password';
```

5. Create a database in which to store data about the Red Hat Enterprise Virtualization environment. The default database name on the Manager is **engine**:

```
postgres=# create database database_name owner user_name template
template0 encoding 'UTF8' lc_collate 'en_US.UTF-8' lc_ctype
'en_US.UTF-8';
```

6. Connect to the new database and add the **plpgsql** language:

```
postgres=# \c database_name
database_name=# CREATE LANGUAGE plpgsql;
```

7. Ensure the database can be accessed remotely by enabling md5 client authentication. Edit the `/var/lib/pgsql/data/pg_hba.conf` file, and add the following line immediately underneath the line starting with **local** at the bottom of the file, replacing `X.X.X.X` with the IP address of the Manager:

```
host      database_name      user_name      X.X.X.X/32      md5
```

8. Allow TCP/IP connections to the database. Edit the `/var/lib/pgsql/data/postgresql.conf` file and add the following line:

```
listen_addresses='*'
```

This example configures the **postgresql** service to listen for connections on all interfaces. You can specify an interface by giving its IP address.

9. Open the default port used for PostgreSQL database connections, and save the updated firewall rules:

```
# iptables -I INPUT 5 -p tcp --dport 5432 -j ACCEPT
# service iptables save
```

10. Restart the **postgresql** service:

```
# service postgresql restart
```

Optionally, set up SSL to secure database connections using the instructions at <http://www.postgresql.org/docs/8.4/static/ssl-tcp.html#SSL-FILE-USAGE>.

APPENDIX E. PREPARING A LOCAL MANUALLY-CONFIGURED POSTGRESQL DATABASE FOR USE WITH THE RED HAT ENTERPRISE VIRTUALIZATION MANAGER

Optionally configure a local PostgreSQL database on the Manager machine to use as the Manager database. By default, the Red Hat Enterprise Virtualization Manager's configuration script, `engine-setup`, creates and configures the Manager database locally on the Manager machine. For automatic database configuration, see [Section 3.3, “Configuring the Red Hat Enterprise Virtualization Manager”](#). To configure the Manager database on a machine that is separate from the machine where the Manager is installed, see [Appendix D, *Preparing a Remote PostgreSQL Database for Use with the Red Hat Enterprise Virtualization Manager*](#).

Use this procedure to set up the Manager database with custom values. Set up this database before you configure the Manager; you must supply the database credentials during `engine-setup`. To set up the database, you must first install the `rhev` package on the Manager machine; the `postgresql-server` package is installed as a dependency.



NOTE

The `engine-setup` and `engine-backup --mode=restore` commands only support system error messages in the `en_US.UTF8` locale, even if the system locale is different.

The locale settings in the `postgresql.conf` file must be set to `en_US.UTF8`.



IMPORTANT

The database name must contain only numbers, underscores, and lowercase letters.

Procedure E.1. Preparing a Local Manually-Configured PostgreSQL Database for use with the Red Hat Enterprise Virtualization Manager

1. Initialize the PostgreSQL database, start the `postgresql` service, and ensure that this service starts on boot:

```
# su -l postgres -c "/usr/bin/initdb --locale=en_US.UTF8 --
auth='ident' --pgdata=/var/lib/pgsql/data/"
# service postgresql start
# chkconfig postgresql on
```

2. Connect to the `psql` command line interface as the `postgres` user:

```
# su - postgres
$ psql
```

3. Create a user for the Manager to use when it writes to and reads from the database. The default user name on the Manager is `engine`:

```
postgres=# create role user_name with login encrypted password
'password';
```

4. Create a database in which to store data about the Red Hat Enterprise Virtualization environment. The default database name on the Manager is **engine**:

```
postgres=# create database database_name owner user_name template
template0 encoding 'UTF8' lc_collate 'en_US.UTF-8' lc_ctype
'en_US.UTF-8';
```

5. Connect to the new database and add the **plpgsql** language:

```
postgres=# \c database_name
database_name=# CREATE LANGUAGE plpgsql;
```

6. Ensure the database can be accessed remotely by enabling md5 client authentication. Edit the `/var/lib/pgsql/data/pg_hba.conf` file, and add the following line immediately underneath the line starting with **local** at the bottom of the file:

```
host    [database name]    [user name]    0.0.0.0/0    md5
host    [database name]    [user name]    ::0/0        md5
```

7. Restart the **postgresql** service:

```
# service postgresql restart
```

Optionally, set up SSL to secure database connections using the instructions at <http://www.postgresql.org/docs/8.4/static/ssl-tcp.html#SSL-FILE-USAGE>.

APPENDIX F. INSTALLING A WEBSOCKET PROXY ON A SEPARATE MACHINE

The websocket proxy allows users to connect to virtual machines via noVNC and SPICE HTML5 consoles. The noVNC client uses websockets to pass VNC data. However, the VNC server in QEMU does not provide websocket support, therefore a websocket proxy must be placed between the client and the VNC server. The proxy can run on any machine that has access to the network, including the the Manager machine.

For security and performance reasons, users may want to configure the websocket proxy on a separate machine.



NOTE

SPICE HTML5 support is a Technology Preview feature. Technology Preview features are not fully supported under Red Hat Subscription Service Level Agreements (SLAs), may not be functionally complete, and are not intended for production use. However, these features provide early access to upcoming product innovations, enabling customers to test functionality and provide feedback during the development process.

This section describes how to install and configure the websocket proxy on a separate machine that does not run the Manager. See [Section 3.3, “Configuring the Red Hat Enterprise Virtualization Manager”](#) for instructions on how to configure the websocket proxy on the Manager.

Procedure F.1. Installing and Configuring a Websocket Proxy on a Separate Machine

1. Install the websocket proxy:

```
# yum install rhvm-websocket-proxy
```

2. Run the `engine-setup` command to configure the websocket proxy.

```
# engine-setup
```



NOTE

If the `rhvm` package has also been installed, choose **No** when asked to configure the engine on this host.

3. Press **Enter** to allow `engine-setup` to configure a websocket proxy server on the machine.

```
Configure WebSocket Proxy on this machine? (Yes, No) [Yes]:
```

4. Press **Enter** to accept the automatically detected hostname, or enter an alternative hostname and press **Enter**. Note that the automatically detected hostname may be incorrect if you are using virtual hosts:

```
Host fully qualified DNS name of this server [host.example.com]:
```

5. Press **Enter** to allow **engine-setup** to configure the firewall and open the ports required for external communication. If you do not allow **engine-setup** to modify your firewall configuration, then you must manually open the required ports.

```
Setup can automatically configure the firewall on this system.  
Note: automatic configuration of the firewall may overwrite current  
settings.
```

```
Do you want Setup to configure the firewall? (Yes, No) [Yes]:
```

6. Enter the fully qualified DNS name of the Manager machine and press **Enter**.

```
Host fully qualified DNS name of the engine server []:  
engine_host.example.com
```

7. Press **Enter** to allow **engine-setup** to perform actions on the Manager machine, or press **2** to manually perform the actions.

```
Setup will need to do some actions on the remote engine server.  
Either automatically, using ssh as root to access it, or you will be  
prompted to manually perform each such action.
```

```
Please choose one of the following:
```

```
1 - Access remote engine server using ssh as root
```

```
2 - Perform each action manually, use files to copy content around  
(1, 2) [1]:
```

- a. Press **Enter** to accept the default SSH port number, or enter the port number of the Manager machine.

```
ssh port on remote engine server [22]:
```

- b. Enter the root password to log in to the Manager machine and press **Enter**.

```
root password on remote engine server engine_host.example.com:
```

8. Select whether to review iptables rules if they differ from the current settings.

```
Generated iptables rules are different from current ones.  
Do you want to review them? (Yes, No) [No]:
```

9. Press **Enter** to confirm the configuration settings.

```
--== CONFIGURATION PREVIEW ==--
```

```
Firewall manager           : iptables  
Update Firewall            : True  
Host FQDN                  : host.example.com  
Configure WebSocket Proxy  : True  
Engine Host FQDN           : engine_host.example.com
```

```
Please confirm installation settings (OK, Cancel) [OK]:
```


Instructions are provided to configure the Manager machine to use the configured websocket proxy.

```
Manual actions are required on the engine host
in order to enroll certs for this host and configure the engine
about it.
```

```
Please execute this command on the engine host:
  engine-config -s WebSocketProxy=host.example.com:6100
and than restart the engine service to make it effective
```

10. Log in to the Manager machine and execute the provided instructions.

```
# engine-config -s WebSocketProxy=host.example.com:6100
# service ovirt-engine restart
```

APPENDIX G. CONFIGURING A HYPERVISOR HOST FOR PCI PASSTHROUGH

Enabling PCI passthrough allows a virtual machine to use a host device as if the device were directly attached to the virtual machine. To enable the PCI passthrough function, you need to enable virtualization extensions and the IOMMU function. The following procedure requires you to reboot the hypervisor host. If the host is attached to the Manager already, ensure you place the host into maintenance mode before running the following procedure.

Prerequisites:

- Ensure that the host hardware meets the requirements for PCI device passthrough and assignment. See [Section 2.2.4, “PCI Device Requirements”](#) for more information.
- Ensure that either Red Hat Enterprise Linux 7 or RHEV-H 7 is installed.

Procedure G.1. Configuring a Hypervisor Host for PCI Passthrough

1. Enable the virtualization extension (for example, VT-d or AMD-Vi) in the BIOS. See [Enabling Intel VT-x and AMD-V virtualization hardware extensions in BIOS](#) in the *Red Hat Enterprise Linux Virtualization and Administration Guide* for more information.
2. Enable IOMMU by editing the grub configuration file.



NOTE

If you are using IBM POWER8 hardware, skip this step as IOMMU is enabled by default.

- For Intel:
 - For Red Hat Enterprise Linux hosts, boot the machine, and append `intel_iommu=on` to the end of the `GRUB_CMDLINE_LINUX` line in the `grub` configuration file.

```
# vi /etc/default/grub
...
GRUB_CMDLINE_LINUX="nofb splash=quiet console=tty0 ...
intel_iommu=on
...
```

- For RHEV-H, boot the machine, and press **F2** to enter rescue mode.
 1. Remount the boot image with read and write permissions:


```
# mount -o rw,remount LABEL=Root /dev/.initramfs/live
```
 2. Edit `/dev/.initramfs/live/grub/grub.conf` and append `intel_iommu=on` to the end of the `kernel /vmlinuz` line.
 3. Remount the boot image with read-only permission:

```
# mount -o ro,remount LABEL=Root /dev/.initramfs/live
```

- o For AMD:

- For Red Hat Enterprise Linux hosts, boot the machine, and append `amd_iommu=on` to the end of the `GRUB_CMDLINE_LINUX` line in the `grub` configuration file.

```
# vi /etc/default/grub
...
GRUB_CMDLINE_LINUX="nofb splash=quiet console=tty0 ...
amd_iommu=on
...
```

- For RHEV-H, boot the machine, and press **F2** to enter rescue mode.

1. Remount the boot image with read and write permissions:

```
# mount -o rw,remount LABEL=Root /dev/.initramfs/live
```

2. Edit `/dev/.initramfs/live/grub/grub.conf` and append `amd_iommu=on` to the end of the `kernel /vmlinuz` line.

3. Remount the boot image with read-only permission:

```
# mount -o ro,remount LABEL=Root /dev/.initramfs/live
```

NOTE

If `intel_iommu=on` or `amd_iommu=on` works, you can try replacing them with `intel_iommu=pt` or `amd_iommu=pt`. The `pt` option only enables IOMMU for devices used in passthrough and will provide better host performance. However, the option may not be supported on all hardware. Revert to previous option if the `pt` option doesn't work for your host.

If the passthrough fails because the hardware does not support interrupt remapping, you can consider enabling the `allow_unsafe_interrupts` option if the virtual machines are trusted. The `allow_unsafe_interrupts` is not enabled by default because enabling it potentially exposes the host to MSI attacks from virtual machines. To enable the option:

```
# vi /etc/modprobe.d
options vfio_iommu_type1 allow_unsafe_interrupts=1
```

For RHEV-H, also run `persist /etc/modprobe.d` so the file change persists over system reboots.

3. Refresh the `grub.cfg` file and reboot the host for these changes to take effect:

```
# grub2-mkconfig -o /boot/grub2/grub.cfg
```

```
# reboot
```

4. Run `cat /proc/cmdline` to verify the changes. Your system is now capable of PCI device passthrough and assignment.

For GPU passthrough, you need to run additional configuration steps on both the host and the guest system. See [Preparing Host and Guest Systems for GPU Passthrough](#) in the *Administration Guide* for more information.

For enabling SR-IOV and assigning dedicated virtual NICs to virtual machines, see <https://access.redhat.com/articles/2335291> for more information.

APPENDIX H. REVISION HISTORY

Revision 3.6-33	Mon 15 Jan 2018	Red Hat Enterprise Virtualization Documentation Team
BZ#1413816 - Updated the Satellite instructions for registering hypervisors.		
Revision 3.6-32	Fri 20 Oct 2017	Red Hat Enterprise Virtualization Documentation Team
BZ#1496998 - Added EOL notice to subscription sections.		
Revision 3.6-31	Wed 23 Aug 2017	Red Hat Enterprise Virtualization Documentation Team
BZ#1471548 - Added Next Generation RHVH to the hypervisor hosts table.		
Revision 3.6-30	Wed 26 Jul 2017	Red Hat Enterprise Virtualization Documentation Team
BZ#1445161 - Added the Customer Portal ISO image names for RHEV-H and RHVH.		
Revision 3.6-29	Wed 21 Jun 2017	Red Hat Enterprise Virtualization Documentation Team
BZ#1445161 - Added installation steps for the 3.6 version of RHVH.		
Revision 3.6-28	Wed 22 Mar 2017	Red Hat Enterprise Virtualization Documentation Team
BZ#1378688 - Added DNS requirements.		
Revision 3.6-27	Fri 17 Feb 2017	Red Hat Enterprise Virtualization Documentation Team
BZ#1398507 - Added RHEL 7.3 support.		
Revision 3.6-24	Thu 19 Jan 2017	Red Hat Enterprise Virtualization Documentation Team
BZ#1373313 - Removed an incorrect step when adding a host.		
BZ#1387089 - Add repository information for installing POWER8 hosts.		
Revision 3.6-21	Fri 2 Dec 2016	Red Hat Enterprise Virtualization Documentation Team
BZ#1387560 - Added Red Hat Enterprise Linux 6.8 to the Host Compatibility Matrix.		
Revision 3.6-20	Thu 27 Oct 2016	Red Hat Enterprise Virtualization Documentation Team
BZ#1389135 - Added a warning about the security risks of untrusted users on RHEV-H.		
Revision 3.6-19	Fri 07 Oct 2016	Red Hat Enterprise Virtualization Documentation Team
BZ#1331634 - Updated browser and client requirements.		
Revision 3.6-18	Mon 22 Aug 2016	Red Hat Enterprise Virtualization Documentation Team
BZ#1322343 - Added more information on direct device assignment.		
Revision 3.6-17	Wed 27 Jul 2016	Red Hat Enterprise Virtualization Documentation Team
BZ#1353824 - Updated the Manager OS requirements to 6.6 or later versions of Red Hat Enterprise Linux 6.		
BZ#1359544 - Updated the links to the Storage Administration Guide and DM Multipath Guide.		

Revision 3.6-16	Wed 29 Jun 2016	Red Hat Enterprise Virtualization Documentation Team
BZ#1276197 - Added a link to the RHEL7 tuned profiles. BZ#1335315 - Added a note on the importance of synchronizing system clocks.		
Revision 3.6-15	Wed 25 May 2016	Red Hat Enterprise Virtualization Documentation Team
BZ#1241041 - Added an admonition about how to prevent RHEV-H reinstallation errors on a multipathed iSCSI machine.		
Revision 3.6-14	Mon 18 Apr 2016	Red Hat Enterprise Virtualization Documentation Team
BZ#1259625 - Added an admonition about third-party watchdogs. BZ#1302066 - Added a note and updated the command to initialize a remote PostgreSQL database.		
Revision 3.6-13	Mon 14 Mar 2016	Red Hat Enterprise Virtualization Documentation Team
BZ#1121840 - Added instructions for installing the websocket proxy on a separate machine. BZ#1309766 - Clarified a confusing section title.		
Revision 3.6-12	Wed 09 Mar 2016	Red Hat Enterprise Virtualization Documentation Team
Updated the subscriptions topic for Red Hat Enterprise Linux hosts so that it is clear that Red Hat Enterprise Linux 7 should be used.		
Revision 3.6-11	Mon 22 Feb 2016	Red Hat Enterprise Virtualization Documentation Team
Initial revision for Red Hat Enterprise Virtualization 3.6 general availability.		
Revision 3.6-10	Fri 19 Feb 2016	Red Hat Enterprise Virtualization Documentation Team
BZ#1299326 - Updated the output of engine-setup.		
Revision 3.6-9	Wed 10 Feb 2016	Red Hat Enterprise Virtualization Documentation Team
BZ#1304829 - Updated NTP setup information for automated configuration of the Red Hat Enterprise Virtualization Hypervisor.		
Revision 3.6-8	Mon 8 Feb 2016	Red Hat Enterprise Virtualization Documentation Team
BZ#1097006 - Added a note on VDSM's backward compatibility with older versions of Red Hat Enterprise Virtualization. BZ#1300145 - Added an important warning that SELinux should stay enforcing as problems with migrating hosts can occur if it is disabled.		
Revision 3.6-7	Wed 23 Dec 2015	Red Hat Enterprise Virtualization Documentation Team
BZ#1273331 - Added a note to tell users to configure the date and time on the Manager to synchronize with the system clock used by the directory server.		
Revision 3.6-6	Wed 16 Dec 2015	Red Hat Enterprise Virtualization Documentation Team
BZ#1276122 - Corrected syntax for automatic VLAN assignment for Red Hat Enterprise Virtualization Hypervisor.		
Revision 3.6-5	Wed 2 Dec 2015	Red Hat Enterprise Virtualization Documentation Team

[BZ#1280154](#) - Replaced Red Hat Enterprise Virtualization Hypervisor 6 examples with Red Hat Enterprise Virtualization Hypervisor 7.

[BZ#1188222](#) - Updated the browser support matrix.

Revision 3.6-4 **Wed 18 Nov 2015** **Red Hat Enterprise Virtualization Documentation Team**

Final revision for Red Hat Enterprise Virtualization 3.6 beta.

Revision 3.6-3 **Wed 18 Nov 2015** **Red Hat Enterprise Virtualization Documentation Team**

[BZ#1283090](#) - Updated a link to the Self-Hosted Engine Guide.

Revision 3.6-2 **Wed 18 Nov 2015** **Red Hat Enterprise Virtualization Documentation Team**

[BZ#1280148](#) - Updated Data Partition minimum storage requirements for RHEV-H 7, and 60GB if using the engine appliance.

[BZ#1247509](#) - Updated the content for configuring networking on a Hypervisor.

[BZ#1224935](#) - Updated the procedure for configuring an offline repository.

[BZ#1249163](#) - Added the word optional to the SNMP and CIM port descriptions.

[BZ#1273715](#) - Removed documentation for an unsupported feature.

[BZ#1270140](#) - Removed duplicate networking content.

[BZ#1281396](#) - Updated the Satellite CA URL example for registering a hypervisor.

[BZ#1281392](#) - Updated the Subscription Asset Manager CA URL example for registering a Hypervisor.

[BZ#1281402](#) - Removed the RHEV-M Fingerprint screen step from the Connecting the Hypervisor to the Red Hat Enterprise Virtualization Manager section.

[BZ#1281400](#) - Removed the word 'Optionally' from the Registering the Hypervisor section for the Satellite option.

[BZ#1281642](#) - Added a step to disable all repositories after attaching to a pool id.

[BZ#1281399](#) - Updated vlan=vlan-id to vlan=vlan-id:nic-name.

[BZ#1281367](#) - Updated the bond setup example in Network Parameters.

[BZ#1281387](#) - Added 'Auto' to the IPv6 option of the Configuring Networking on the Hypervisor section.

[BZ#1255222](#) - Added firewall ports for serial console access.

[BZ#1280152](#) - Updated the Red Hat Enterprise Virtualization Hypervisor installation screenshot.

[BZ#1280156](#) - Updated the storage requirements for Red Hat Enterprise Virtualization Hypervisors.

Revision 3.6-1 **Fri 10 Jul 2015** **Red Hat Enterprise Virtualization Documentation Team**

Initial creation for the Red Hat Enterprise Virtualization 3.6 release.