Abstract

A comprehensive guide to installing Red Hat Enterprise Virtualization.
Table of Contents

PART I. INTRODUCTION TO RED HAT ENTERPRISE VIRTUALIZATION ........................................ 4

CHAPTER 1. INTRODUCTION TO RED HAT ENTERPRISE VIRTUALIZATION ................................. 5

CHAPTER 2. SYSTEM REQUIREMENTS ......................................................................................... 6
2.1. RED HAT ENTERPRISE VIRTUALIZATION MANAGER REQUIREMENTS .......................... 6
2.2. HYPERVERSOR REQUIREMENTS ......................................................................................... 8
2.3. FIREWALLS ....................................................................................................................... 11

PART II. INSTALLING THE RED HAT ENTERPRISE VIRTUALIZATION MANAGER .................... 18

CHAPTER 3. RED HAT ENTERPRISE VIRTUALIZATION MANAGER ........................................... 19
3.1. SUBSCRIBING TO THE REQUIRED ENTITLEMENTS ..................................................... 19
3.2. INSTALLING THE RED HAT ENTERPRISE VIRTUALIZATION MANAGER PACKAGES ....... 20
3.3. CONFIGURING THE RED HAT ENTERPRISE VIRTUALIZATION MANAGER .................. 20
3.4. CONNECTING TO THE ADMINISTRATION PORTAL ...................................................... 24

CHAPTER 4. RED HAT ENTERPRISE VIRTUALIZATION MANAGER RELATED TASKS ............... 25
4.1. REMOVING THE RED HAT ENTERPRISE VIRTUALIZATION MANAGER ....................... 25
4.2. CONFIGURING A LOCAL REPOSITORY FOR OFFLINE RED HAT ENTERPRISE VIRTUALIZATION MANAGER INSTALLATION .................................................. 26

CHAPTER 5. DATA WAREHOUSE AND REPORTS ..................................................................... 29
5.1. OVERVIEW OF CONFIGURING DATA WAREHOUSE AND REPORTS .............................. 29
5.2. DATA WAREHOUSE AND REPORTS CONFIGURATION NOTES ..................................... 29
5.3. DATA WAREHOUSE AND REPORTS INSTALLATION OPTIONS .................................... 29
5.4. MIGRATING DATA WAREHOUSE AND REPORTS TO SEPARATE MACHINES ................. 51

PART III. INSTALLING HYPERVISOR HOSTS ........................................................................... 61

CHAPTER 6. INTRODUCTION TO HYPERVISOR HOSTS ............................................................. 62

CHAPTER 7. RED HAT ENTERPRISE VIRTUALIZATION HYPERVISOR ..................................... 64
7.1. INSTALLING THE RED HAT ENTERPRISE VIRTUALIZATION HYPERVISOR ................ 64
7.2. MODIFYING THE RED HAT ENTERPRISE VIRTUALIZATION HYPERVISOR ISO ............ 67
7.3. ADDITIONAL WAYS TO PREPARE THE INSTALLATION MEDIA .................................. 73
7.4. AUTOMATED INSTALLATION OF THE HYPERVISOR (ADVANCED) ......................... 77
7.5. CONFIGURING THE RED HAT ENTERPRISE VIRTUALIZATION HYPERVISOR .............. 89
7.6. APPROVING A REGISTERED HYPERVISOR ..................................................................... 100

CHAPTER 8. RED HAT VIRTUALIZATION HOSTS ..................................................................... 101
8.1. INSTALLING RED HAT VIRTUALIZATION HOST ......................................................... 101
8.2. ADVANCED INSTALLATION ............................................................................................ 103

CHAPTER 9. RED HAT ENTERPRISE LINUX HOSTS ................................................................ 107
9.1. RED HAT ENTERPRISE LINUX HOSTS .......................................................................... 107
9.2. HOST COMPATIBILITY MATRIX ...................................................................................... 107
9.3. SUBSCRIBING TO THE REQUIRED ENTITLEMENTS ................................................... 109
9.4. MANUALLY ADDING A HYPERVISOR FROM THE ADMINISTRATION PORTAL .............. 110

PART IV. ATTACHING STORAGE ............................................................................................. 112

CHAPTER 10. STORAGE ............................................................................................................ 113
10.1. INTRODUCTION TO STORAGE ...................................................................................... 113
10.2. ADDING FCP STORAGE ................................................................................................ 113
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

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

**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

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

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

### 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

<table>
<thead>
<tr>
<th>Support Tier</th>
<th>Operating System</th>
<th>SPICE Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td>Red Hat Enterprise Linux 6</td>
<td>Fully supported on Red Hat Enterprise Linux 6.8 and above</td>
</tr>
<tr>
<td>Tier 1</td>
<td>Red Hat Enterprise Linux 7</td>
<td>Fully supported on Red Hat Enterprise Linux 7.2 and above</td>
</tr>
<tr>
<td>Support Tier</td>
<td>Operating System</td>
<td>SPICE Support</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Tier 2</td>
<td>Microsoft Windows 7</td>
<td>Fully supported on Microsoft Windows 7</td>
</tr>
<tr>
<td></td>
<td>Microsoft Windows 8</td>
<td>Supported when spice-vdagent is running on these guest operating systems</td>
</tr>
<tr>
<td></td>
<td>Microsoft Windows 10</td>
<td>Supported when spice-vdagent is running on these guest operating systems</td>
</tr>
</tbody>
</table>

### 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**

<table>
<thead>
<tr>
<th>AMD</th>
<th>Intel</th>
<th>IBM</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMD Opteron G1</td>
<td>Intel Conroe</td>
<td>IBM POWER8</td>
</tr>
<tr>
<td>AMD Opteron G2</td>
<td>Intel Penryn</td>
<td></td>
</tr>
<tr>
<td>AMD Opteron G3</td>
<td>Intel Nehalem</td>
<td></td>
</tr>
<tr>
<td>AMD Opteron G4</td>
<td>Intel Westmere</td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 GB of RAM</td>
<td>2 TB of RAM</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>Version</th>
<th>Root and RootBackup Partitions</th>
<th>Configuration Partition</th>
<th>Logging Partition</th>
<th>Data Partition</th>
<th>Swap Partition</th>
<th>Minimum Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat Enterprise Virtualization Hypervisor 6</td>
<td>512 MB</td>
<td>8 MB</td>
<td>2048 MB</td>
<td>512 MB</td>
<td>8 MB</td>
<td>3.5 GB</td>
</tr>
<tr>
<td>Red Hat Enterprise Virtualization Hypervisor 7</td>
<td>8600 MB</td>
<td>8 MB</td>
<td>2048 MB</td>
<td>10240 MB</td>
<td>8 MB</td>
<td>20.4 GB</td>
</tr>
<tr>
<td>Red Hat Virtualization Host</td>
<td>6 GB</td>
<td>NA</td>
<td>8 GB</td>
<td>15 GB</td>
<td>1 GB</td>
<td>32 GB</td>
</tr>
</tbody>
</table>

**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](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

<table>
<thead>
<tr>
<th>Port(s)</th>
<th>Protocol</th>
<th>Source</th>
<th>Destination</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>ICMP</td>
<td>Red Hat Enterprise Virtualization Hypervisor(s)</td>
<td>Red Hat Enterprise Virtualization Manager</td>
<td>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.</td>
</tr>
<tr>
<td>22</td>
<td>TCP</td>
<td>System(s) used for maintenance of the Manager including backend configuration, and software upgrades.</td>
<td>Red Hat Enterprise Virtualization Manager</td>
<td>Secure Shell (SSH) access. Optional.</td>
</tr>
<tr>
<td>2222</td>
<td>TCP</td>
<td>Clients accessing virtual machine serial consoles.</td>
<td>Red Hat Enterprise Virtualization Manager</td>
<td>Secure Shell (SSH) access to enable connection to virtual machine serial consoles.</td>
</tr>
</tbody>
</table>
| 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. |
<table>
<thead>
<tr>
<th>Port(s)</th>
<th>Protocol</th>
<th>Source</th>
<th>Destination</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>6100</td>
<td>TCP</td>
<td>Administration Portal clients</td>
<td>Red Hat Enterprise Virtualization Manager</td>
<td>Provides websocket proxy access for web-based console clients (noVNC and spice-html5) 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>User Portal clients</td>
<td>Red Hat Enterprise Virtualization Manager</td>
<td></td>
</tr>
<tr>
<td>7410</td>
<td>UDP</td>
<td>Red Hat Enterprise Virtualization Hypervisor(s)</td>
<td>Red Hat Enterprise Virtualization Manager</td>
<td>Must be open for the Manager to receive Kdump notifications.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Red Hat Enterprise Linux host(s)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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_TCP_PORT="port"`
- UDP port specified with `LOCKD_UDPPORT="port"`

The `MOUNTD_PORT`, `STATD_PORT`, `LOCKD_TCP_PORT`, 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

<table>
<thead>
<tr>
<th>Port(s)</th>
<th>Protocol</th>
<th>Source</th>
<th>Destination</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>TCP</td>
<td>Red Hat Enterprise Virtualization Manager</td>
<td>Red Hat Enterprise Virtualization Hypervisor(s)</td>
<td>Secure Shell (SSH) access. Optional.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Red Hat Virtualization Host(s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Red Hat Virtualization Host(s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Red Hat Enterprise Linux host(s)</td>
<td></td>
</tr>
<tr>
<td>2223</td>
<td>TCP</td>
<td>Red Hat Enterprise Virtualization Manager</td>
<td>Red Hat Enterprise Virtualization Hypervisor(s)</td>
<td>Secure Shell (SSH) access to enable connection to virtual machine serial consoles.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Red Hat Virtualization Host(s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Red Hat Virtualization Host(s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Red Hat Enterprise Linux host(s)</td>
<td></td>
</tr>
<tr>
<td>161</td>
<td>UDP</td>
<td>Red Hat Enterprise Virtualization Hypervisor(s)</td>
<td>Red Hat Enterprise Virtualization Manager</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Red Hat Virtualization Host(s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Red Hat Enterprise Linux host(s)</td>
<td></td>
</tr>
<tr>
<td>Port(s)</td>
<td>Protocol</td>
<td>Source</td>
<td>Destination</td>
<td>Purpose</td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
<td>---------------------------------------------</td>
<td>---------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>5900 - 6923</td>
<td>TCP</td>
<td>Administration Portal clients, User Portal clients</td>
<td>Red Hat Enterprise Virtualization Hypervisor(s), Red Hat Virtualization Host(s), Red Hat Enterprise Linux host(s)</td>
<td>Remote guest console access via VNC and SPICE. These ports must be open to facilitate client access to virtual machines.</td>
</tr>
<tr>
<td>5989</td>
<td>TCP, UDP</td>
<td>Common Information Model Object Manager (CIMOM)</td>
<td>Red Hat Enterprise Virtualization Hypervisor(s), Red Hat Virtualization Host(s), Red Hat Enterprise Linux host(s)</td>
<td>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.</td>
</tr>
<tr>
<td>16514</td>
<td>TCP</td>
<td>Red Hat Enterprise Virtualization Hypervisor(s), Red Hat Virtualization Host(s), Red Hat Enterprise Linux host(s)</td>
<td>Red Hat Enterprise Virtualization Hypervisor(s), Red Hat Virtualization Host(s), Red Hat Enterprise Linux host(s)</td>
<td>Virtual machine migration using <strong>libvirt</strong>.</td>
</tr>
<tr>
<td>49152 - 49216</td>
<td>TCP</td>
<td>Red Hat Enterprise Virtualization Hypervisor(s), Red Hat Virtualization Host(s), Red Hat Enterprise Linux host(s)</td>
<td>Red Hat Enterprise Virtualization Hypervisor(s), Red Hat Virtualization Host(s), Red Hat Enterprise Linux host(s)</td>
<td>Virtual machine migration and fencing using VDSM. These ports must be open facilitate both automated and manually initiated migration of virtual machines.</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Port(s)</th>
<th>Protocol</th>
<th>Source</th>
<th>Destination</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>54321</td>
<td>TCP</td>
<td>Red Hat Enterprise Virtualization Manager</td>
<td>Red Hat Enterprise Virtualization Hypervisor(s)</td>
<td>VDSM communications with the Manager and other virtualization hosts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Red Hat Enterprise Virtualization Hypervisor(s)</td>
<td>Red Hat Virtualization Host(s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Red Hat Virtualization Host(s)</td>
<td>Red Hat Enterprise Linux host(s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Red Hat Enterprise Linux host(s)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Port(s)</th>
<th>Protocol</th>
<th>Source</th>
<th>Destination</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Red Hat Enterprise Virtualization Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>389, 636</td>
<td>TCP</td>
<td>Red Hat Enterprise Virtualization Manager</td>
<td>Directory server</td>
<td>Lightweight Directory Access Protocol (LDAP) and LDAP over SSL.</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Port(s)</th>
<th>Protocol</th>
<th>Source</th>
<th>Destination</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>5432</td>
<td>TCP, UDP</td>
<td>Red Hat Enterprise Virtualization Manager</td>
<td>PostgreSQL database server</td>
<td>Default port for PostgreSQL database connections.</td>
</tr>
</tbody>
</table>
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 rhevm 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 rhevm package and dependencies.

   # yum install rhevm

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 rhevm 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]:
     - 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:

   ```sh
   # engine-cleanup
   ```

2. You are prompted whether to remove all Red Hat Enterprise Virtualization Manager components:
   - Type **Yes** and press Enter to remove all components:

     ```sh
     Do you want to remove all components? (Yes, No) [Yes]:
     ```
   - Type **No** and press Enter to select the components to remove. You can select whether to retain or remove each component individually:

     ```sh
     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.

   ```sh
   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:

   ```sh
   # yum remove rhevm* vdsm-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-rhevm-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:
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:

```bash
# yum install vsftpd
```

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

```bash
# 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:

```bash
# 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:

```bash
# 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:

```bash
# yum install createrepo
```

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

```bash
# 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:

```bash
#!/bin/sh
REPOFILE="/etc/yum.repos.d/rhev.repo"
for DIR in `find /var/ftp/pub/rhevrepo -maxdepth 1 -mindepth 1 -type d`; do
```
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.

```bash
    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;
```
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:
   - 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

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 rhevm-dwh package and the rhevm-reports package on the system where the Red Hat Enterprise Virtualization Manager is installed:

   # yum install rhevm-dwh rhevm-reports

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:

   ```bash
   # subscription-manager register
   ```

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

   ```bash
   # 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-rhevm-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 rhevm-dwh-setup and rhevm-reports-setup packages:

   # yum install rhevm-dwh-setup rhevm-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.
   - 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:

   ```bash
   # subscription-manager register
   ```

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

   ```bash
   # 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-rhevm-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 rhevm-dwh-setup package:

   # yum install rhevm-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:

<table>
<thead>
<tr>
<th>Engine database host</th>
<th>engine-db-fqdn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine database port</td>
<td>5432</td>
</tr>
<tr>
<td>Engine database secured connection</td>
<td>No</td>
</tr>
<tr>
<td>Engine database name</td>
<td>engine</td>
</tr>
<tr>
<td>Engine database user</td>
<td>engine</td>
</tr>
<tr>
<td>Engine database password</td>
<td>password</td>
</tr>
</tbody>
</table>

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-rhevm-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 rhevm-reports-setup package:

   # yum install rhevm-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.

5.3.4. 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:
   - 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 entitlement pools.
   - 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:
   - 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

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 `rhevm-dwh` package:

   ```
   # yum install rhevm-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-rhevm-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 rhevm-reports-setup package:

   # yum install rhevm-reports-setup

8. Run the engine-setup command to begin configuration of Reports on the machine:
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:
   - 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 entitlement 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:
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
5. If you are using the self-hosted engine, you must move it to maintenance mode:
   ```bash
   # 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-rhevm-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 rhevm-dwh-setup package:

   ```
   # yum install rhevm-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 rhevm-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]: 
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 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.

6. 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

7. 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.

8. 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.

9. 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:
   
   ```bash
   # 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:
   
   - 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 entitlement 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.
   - 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 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=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-rhevm-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 rhevm-dwh-setup package:

   ```
   # yum install rhevm-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/pgsq1/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:

   ```bash
   # 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:

   ```bash
   # engine-setup
   ```

2. Press Enter to configure Data Warehouse:

   ```bash
   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:

   ```bash
   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:

   ```bash
   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:

   ```bash
   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:

   ```bash
   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 rhevm-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:
   - 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 entitlement 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


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:

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

5. Enable the required channels:

```bash
# subscription-manager repos --enable=rhel-6-server-rpms
# subscription-manager repos --enable=rhel-6-server-supplementary-rpms
# subscription-manager repos --enable=rhel-6-server-rhevm-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:

```bash
# yum update
```

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

```bash
# yum install rhevm-reports-setup
```

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

```bash
# 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:

   ```bash
   # 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:

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

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

   ```bash
   # 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:

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

2. Remove the Reports package:

   ```bash
   # 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 HYPERVERSOR 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

<table>
<thead>
<tr>
<th>Host Type</th>
<th>Other Names</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat Enterprise Virtualization Hypervisor</td>
<td>RHEV-H, thin host</td>
<td>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. This download is available on the Customer Portal and is named RHEV-H Image.</td>
</tr>
<tr>
<td>Red Hat Virtualization Host</td>
<td>RHVH, thin host, Next Generation RHVH</td>
<td>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. This download is available on the Customer Portal and is named Next Generation RHVH Image.</td>
</tr>
<tr>
<td>Host Type</td>
<td>Other Names</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux Host</td>
<td>RHEL-based hypervisor, thick host</td>
<td>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.</td>
</tr>
</tbody>
</table>

**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 HYPERVERSOR

7.1. INSTALLING THE RED HAT ENTERPRISE VIRTUALIZATION HYPERVERSOR

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:

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

      - For Red Hat Enterprise Linux 7:

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 \texttt{rd\_NO\_MULTIPATH} kernel argument by pressing the \texttt{Tab} button after selecting the option to reinstall the Hypervisor. This will help avoid potential installation errors.

5. Select a keyboard layout, and press \texttt{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 \texttt{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 \texttt{Confirm disk selection} screen, press \texttt{Enter} to confirm the boot device and storage device selection, or select \texttt{Back} and press \texttt{Enter} to revise your selection.

10. Set a password for the \texttt{admin} user, confirm the password, and press \texttt{Enter} to commence installation.

NOTE

From the boot menu, you can also press the \texttt{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 \texttt{Enter} key. Press the \texttt{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 HYPERVERSOR 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:
   - For Red Hat Enterprise Linux 6:
     ```bash
     # subscription-manager repos --enable=rhel-6-server-rhevh-rpms
     ```
   - For Red Hat Enterprise Linux 7:
     ```bash
     # subscription-manager repos --enable=rhel-7-server-rhevh-rpms
     ```

3. Install the `ovirt-node-tools` package:
   ```bash
   # 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/.
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:

     ```bash
     # yum install createrepo
     ```

 2. Create a directory to serve as the repository.

     ```bash
     # 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:

     ```bash
     # 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/rhevhl-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/rhevh-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/rhevh.repo /usr/share/rhev-hypervisor/rhevh-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/rhevh.repo /usr/share/rhev-hypervisor/rhevh-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
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

```bash
# 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

```bash
# 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

```bash
# 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:

```bash
# 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-hypervisor 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:
   - For Red Hat Enterprise Linux 6:
     ```
     # yum update rhev-hypervisor6
     ```
   - 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.

```bash
# 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:

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

   **Example 7.11. View of Disk Partitions Attached to System**

   ```bash
   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**

   ```bash
   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.

```bash
# 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:

```bash
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**

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

```bash
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).

\[
\text{Recommended swap } + (\text{RAM} \times \text{over-commit}) = \text{swap partition size}
\]

Leaving the value empty allows the system to sets 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 kdzumps. 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:

```
```

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](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 `yyyymm` 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.

```plaintext
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.

```plaintext
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.

```plaintext
netmask=255.255.255.0
```

**gateway**

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

```plaintext
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 `rhn_username` parameter sets the username used to connect to RHN.

```markdown
rhn_username=testuser
```

**rhn_password**

The `rhn_password` parameter sets the password used to connect to RHN.

```markdown
rhn_password=testpassword
```

**rhn_activationkey**

The `rhn_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 `rhn_activationkey` and `rhn_username` are provided, the `rhn_activationkey` value will be used.

```markdown
rhn_activationkey=7202f3b7d218cf59b764f9fa281b
```

**rhn_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 `rhn_activationkey` parameter on the kernel command line.

```markdown
rhn_org=org_name
```

**rhn_url**

The `rhn_url` parameter sets the URL of the satellite server used to register the host.

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

**rhn_ca_cert**

The `rhn_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 `rhn_url/pub/RHN-ORG-TRUSTED-SSL-CERT`.

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

**rhn_profile**

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

```markdown
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`.

```
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.
```

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```
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 HYPERVERSOR

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.

   - 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 Configuration](image)

  - 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 Configuration](image)

  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** field.

  **Example 7.19. iSCSI Initiator Name**

  ![iSCSI Initiator Name](image)
Example 7.20. NFS Path

NFSv4 Domain (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:
   - **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
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____________________________________________

Red Hat Satellite 6.0 or 6.1

a. On the Satellite server, extract the certificate:

```bash
# 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____________________________________________
- **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

- **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.


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)
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**.

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

<table>
<thead>
<tr>
<th>Kdump Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disable</td>
<td>Disables kernel dumping.</td>
</tr>
<tr>
<td>Local</td>
<td>Stores kernel dumps on the local system.</td>
</tr>
<tr>
<td>Kdump Options</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------</td>
</tr>
<tr>
<td>SSH</td>
<td>Exports kernel dumps via SSH to the specified remote location.</td>
</tr>
<tr>
<td>NFS</td>
<td>Exports kernel dumps to the specified NFS share.</td>
</tr>
</tbody>
</table>

Procedure 7.17. Configuring Kernel Dumps

1. Select an option for storing kernel dumps:
   - **Disable**
     To disable kernel dumps, select *Disable*, and press the space bar.
   - **Local**
     Select the *Local* option and press the space bar to store kernel dumps on the local system. This is the default option.
   - **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).
   - **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.

2. 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

<table>
<thead>
<tr>
<th>Tuned Profile</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>The system is disabled from using any tuned profile.</td>
</tr>
<tr>
<td>virtual-host</td>
<td>Based on the enterprise-storage profile, virtual-host decreases the swappiness of virtual memory and enables more aggressive writeback of dirty pages.</td>
</tr>
<tr>
<td>virtual-guest</td>
<td>A profile optimized for virtual machines.</td>
</tr>
<tr>
<td>throughput-performance</td>
<td>A server profile for typical throughput performance tuning.</td>
</tr>
<tr>
<td>spindown-disk</td>
<td>A strong power-saving profile directed at machines with classic hard disks.</td>
</tr>
<tr>
<td>server-powersave</td>
<td>A power-saving profile directed at server systems.</td>
</tr>
<tr>
<td>latency-performance</td>
<td>A server profile for typical latency performance tuning.</td>
</tr>
<tr>
<td>laptop-battery-powersave</td>
<td>A high-impact power-saving profile directed at laptops running on battery.</td>
</tr>
<tr>
<td>laptop-ac-powersave</td>
<td>A medium-impact power-saving profile directed at laptops running on AC.</td>
</tr>
<tr>
<td>enterprise-storage</td>
<td>A server profile to improve throughput performance for enterprise-sized server configurations.</td>
</tr>
<tr>
<td>desktop-powersave</td>
<td>A power-saving profile directed at desktop systems.</td>
</tr>
<tr>
<td>default</td>
<td>The default power-saving profile. This is the most basic power-saving profile. It only enables the disk and CPU plug-ins.</td>
</tr>
</tbody>
</table>

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.
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.
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:

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:
   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.

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.


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:

```bash
# 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
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:
   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:
   a. 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/
   ```

   b. 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:
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
```

The `autopart` command is highly recommended. Thin provisioning must be used.

```
apart --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 --vtypename=HostVG --name=swap --fstype=swap --recommended
logvol none --vtypename=HostVG --name=HostPool --thinpool --size=40000 --grow
logvol / --vtypename=HostVG --name=root --thin --fstype=ext4 --poolname=HostPool --fsoptions="defaults,discard" --size=6000 --grow
logvol /var --vtypename=HostVG --name=var --thin --fstype=ext4 --poolname=HostPool --fsoptions="defaults,discard" --size=15000
logvol /var/log --vtypename=HostVG --name=var_log --thin --fstype=ext4 --poolname=HostPool --fsoptions="defaults,discard" --size=8000
logvol /var/log/audit --vtypename=HostVG --name=var_audit --thin --fstype=ext4 --poolname=HostPool --fsoptions="defaults,discard" --size=2000
logvol /home --vtypename=HostVG --name=home --thin --fstype=ext4 --poolname=HostPool --fsoptions="defaults,discard" --size=1000
logvol /tmp --vtypename=HostVG --name=tmp --thin --fstype=ext4 --poolname=HostPool --fsoptions="defaults,discard" --size=1000
```

A `%post` section that calls the `nodectl init` command is required.

```
%post
nodectl 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.

```bash
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.
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.
<table>
<thead>
<tr>
<th>Supported RHEL or RHEV-H Version</th>
<th>3.0</th>
<th>3.1</th>
<th>3.2</th>
<th>3.3</th>
<th>3.4</th>
<th>3.5</th>
<th>3.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.5</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>6.6</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>6.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>6.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>7.0</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.1</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.2</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

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](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.
   - Enter the root user’s password to use password authentication.
   - 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.

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.

![New Cluster](image)

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:

   ```sh
   # yum install postgresql-server
   ```

2. Initialize the PostgreSQL database, start the `postgresql` service, and ensure that this service starts on boot:

   ```sh
   # 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:

   ```sh
   # 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_cctype '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 `rhevm` 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:

```sql
postgres=# create database database_name owner user_name template template0 encoding 'UTF8' lc_collate 'en_US.UTF-8' lc_cctype 'en_US.UTF-8';
```

5. Connect to the new database and add the plpgsql language:

```sql
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:

```plaintext
host  [database name]   [user name]  0.0.0.0/0  md5
host  [database name]   [user name]  ::0/0      md5
```

7. Restart the `postgresql` service:

```bash
# service postgresql restart
```

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 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 rhevm-websocket-proxy

2. Run the `engine-setup` command to configure the websocket proxy.

   # engine-setup

   **NOTE**

   If the rhevm 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 then 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:
     
     1. 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
        ...
        ```

     2. 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
           ```
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 `allowUnsafeInterrupts` option if the virtual machines are trusted. The `allowUnsafeInterrupts` 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 allowUnsafeInterrupts=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

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.6-33</td>
<td>Mon 15 Jan 2018</td>
<td>BZ#1413816 - Updated the Satellite instructions for registering hypervisors.</td>
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<td>3.6-32</td>
<td>Fri 20 Oct 2017</td>
<td>BZ#1496998 - Added EOL notice to subscription sections.</td>
</tr>
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<td>3.6-31</td>
<td>Wed 23 Aug 2017</td>
<td>BZ#1471548 - Added Next Generation RHVH to the hypervisor hosts table.</td>
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<td>3.6-30</td>
<td>Wed 26 Jul 2017</td>
<td>BZ#1445161 - Added the Customer Portal ISO image names for RHEV-H and RHVH.</td>
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<td>3.6-29</td>
<td>Wed 21 Jun 2017</td>
<td>BZ#1445161 - Added installation steps for the 3.6 version of RHVH.</td>
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<td>3.6-28</td>
<td>Wed 22 Mar 2017</td>
<td>BZ#1378688 - Added DNS requirements.</td>
</tr>
<tr>
<td>3.6-27</td>
<td>Fri 17 Feb 2017</td>
<td>BZ#1398507 - Added RHEL 7.3 support.</td>
</tr>
<tr>
<td>3.6-24</td>
<td>Thu 19 Jan 2017</td>
<td>BZ#1373313 - Removed an incorrect step when adding a host.</td>
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<td></td>
<td>BZ#1387089 - Add repository information for installing POWER8 hosts.</td>
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<td>3.6-21</td>
<td>Fri 2 Dec 2016</td>
<td>BZ#1387560 - Added Red Hat Enterprise Linux 6.8 to the Host Compatibility Matrix.</td>
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<td>3.6-20</td>
<td>Thu 27 Oct 2016</td>
<td>BZ#1389135 - Added a warning about the security risks of untrusted users on RHEV-H.</td>
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<tr>
<td>3.6-19</td>
<td>Fri 07 Oct 2016</td>
<td>BZ#1331634 - Updated browser and client requirements.</td>
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<tr>
<td>3.6-18</td>
<td>Mon 22 Aug 2016</td>
<td>BZ#1322343 - Added more information on direct device assignment.</td>
</tr>
<tr>
<td>3.6-17</td>
<td>Wed 27 Jul 2016</td>
<td>BZ#1353824 - Updated the Manager OS requirements to 6.6 or later versions of Red Hat Enterprise Linux 6.</td>
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<td></td>
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<td>BZ#1359544 - Updated the links to the Storage Administration Guide and DM Multipath Guide.</td>
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<tr>
<td>Revision 3.6-16</td>
<td>Wed 29 Jun 2016</td>
<td>Red Hat Enterprise Virtualization Documentation Team</td>
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<tr>
<td>BZ#1276197 - Added a link to the RHEL7 tuned profiles.</td>
<td>BZ#1335315 - Added a note on the importance of synchronizing system clocks.</td>
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<td>Revision 3.6-15</td>
<td>Wed 25 May 2016</td>
<td>Red Hat Enterprise Virtualization Documentation Team</td>
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<tr>
<td>BZ#1241041 - Added an admonition about how to prevent RHEV-H reinstallation errors on a multipathed iSCSI machine.</td>
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<td>Revision 3.6-14</td>
<td>Mon 18 Apr 2016</td>
<td>Red Hat Enterprise Virtualization Documentation Team</td>
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<tr>
<td>BZ#1259625 - Added an admonition about third-party watchdogs.</td>
<td>BZ#1302066 - Added a note and updated the command to initialize a remote PostgreSQL database.</td>
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<td>Revision 3.6-13</td>
<td>Mon 14 Mar 2016</td>
<td>Red Hat Enterprise Virtualization Documentation Team</td>
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<td>BZ#1121840 - Added instructions for installing the websocket proxy on a separate machine.</td>
<td>BZ#1309766 - Clarified a confusing section title.</td>
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<td>Revision 3.6-12</td>
<td>Wed 09 Mar 2016</td>
<td>Red Hat Enterprise Virtualization Documentation Team</td>
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<td>Updated the subscriptions topic for Red Hat Enterprise Linux hosts so that it is clear that Red Hat Enterprise Linux 7 should be used.</td>
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<td>Revision 3.6-11</td>
<td>Mon 22 Feb 2016</td>
<td>Red Hat Enterprise Virtualization Documentation Team</td>
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<tr>
<td>Initial revision for Red Hat Enterprise Virtualization 3.6 general availability.</td>
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<td></td>
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<td>Revision 3.6-10</td>
<td>Fri 19 Feb 2016</td>
<td>Red Hat Enterprise Virtualization Documentation Team</td>
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<td>BZ#1299326 - Updated the output of engine-setup.</td>
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<td></td>
</tr>
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<td>Revision 3.6-9</td>
<td>Wed 10 Feb 2016</td>
<td>Red Hat Enterprise Virtualization Documentation Team</td>
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<tr>
<td>BZ#1304829 - Updated NTP setup information for automated configuration of the Red Hat Enterprise Virtualization Hypervisor.</td>
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<td>Revision 3.6-8</td>
<td>Mon 8 Feb 2016</td>
<td>Red Hat Enterprise Virtualization Documentation Team</td>
</tr>
<tr>
<td>BZ#1097006 - Added a note on VDSM's backward compatibility with older versions of Red Hat Enterprise Virtualization.</td>
<td>BZ#1300145 - Added an important warning that SELinux should stay enforcing as problems with migrating hosts can occur if it is disabled.</td>
<td></td>
</tr>
<tr>
<td>Revision 3.6-7</td>
<td>Wed 23 Dec 2015</td>
<td>Red Hat Enterprise Virtualization Documentation Team</td>
</tr>
<tr>
<td>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.</td>
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<td>Revision 3.6-6</td>
<td>Wed 16 Dec 2015</td>
<td>Red Hat Enterprise Virtualization Documentation Team</td>
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<td>BZ#1276122 - Corrected syntax for automatic VLAN assignment for Red Hat Enterprise Virtualization Hypervisor.</td>
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<tr>
<td>Revision 3.6-5</td>
<td>Wed 2 Dec 2015</td>
<td>Red Hat Enterprise Virtualization Documentation Team</td>
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</tbody>
</table>
APPENDIX H. REVISION HISTORY

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.