Getting Started with Red Hat Enterprise Virtualization
Edition 1

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**Abstract**

This document is a step-by-step guide for first-time users to install and configure a basic Red Hat Enterprise Virtualization environment and create virtual machines.
# Table of Contents

**Preface** ................................................................. 4
  1. About this Guide .................................................. 4
    1.1. Audience .................................................... 4
    1.2. Overview .................................................... 4
  2. Document Conventions ........................................... 5
    2.1. Typographic Conventions .................................. 5
    2.2. Pull-quote Conventions .................................... 7
    2.3. Notes and Warnings ......................................... 7
  3. Getting Help and Giving Feedback ............................. 8
    3.1. Do You Need Help? ......................................... 8
    3.2. We Need Feedback! ......................................... 8

**Chapter 1. Introduction** ............................................ 9
  1.1. Prerequisites ................................................ 9

**Chapter 2. Install Red Hat Enterprise Virtualization** .......... 12
  2.1. Installing Red Hat Enterprise Virtualization Manager .... 12
  2.2. Install Hosts ................................................. 16
    2.2.1. Install Red Hat Enterprise Virtualization Hypervisor - Overview ........ 16
    2.2.2. Registering the host on RHN and Acquiring ISO Hypervisor Images .... 16
    2.2.3. Preparing Optical Hypervisor Installation Media ....................... 18
    2.2.4. Installing Red Hat Enterprise Virtualization Hosts from Optical Installation Media .... 20
    2.2.5. Configuring Red Hat Enterprise Virtualization installation settings ... 19
  2.3. Connect to Red Hat Enterprise Virtualization Manager .... 23
  2.4. Connecting to Red Hat Enterprise Virtualization Web Administration Portal .... 24
  2.5. Web Administration Portal Graphical User Interface ....... 24

**Chapter 3. Configure Red Hat Enterprise Virtualization** ....... 26
  3.1. Configure Data Centers .................................... 26
  3.2. Configure Cluster ........................................... 27
  3.3. Configure Networking ...................................... 28
  3.4. Configure Hosts ............................................. 30
    3.4.1. Approve Red Hat Enterprise Virtualization Hypervisor Host ............ 30
    3.4.2. Attach Red Hat Enterprise Linux Host .................................. 32
  3.5. Configure Storage ........................................... 33
    3.5.1. Create an NFS Data Domain .................................. 35
    3.5.2. Create an iSCSI Data Domain .................................. 37
    3.5.3. Create an FCP Data Domain ................................ 38
    3.5.4. Attach and Populate ISO domain ................................ 40

**Chapter 4. Manage Virtual Machines** ............................. 42
  4.1. Create Virtual Machines .................................... 42
    4.1.1. Create a Red Hat Enterprise Linux Virtual Machine .................... 42
    4.1.2. Create a Windows Virtual Machine .................................. 47
  4.2. Using Templates ............................................. 48
    4.2.1. Create a Red Hat Enterprise Linux Template ....................... 49
    4.2.2. Clone a Red Hat Enterprise Linux Virtual Machine .................... 51
    4.2.3. Create a Windows Template .................................... 52
    4.2.4. Create a Windows Virtual Machine from a Template .................. 53
  4.3. Using Virtual Machines ..................................... 54
    4.3.1. Assign User Permissions ..................................... 54
    4.3.2. Log in to the User Portal ..................................... 55
Preface

The Red Hat Enterprise Virtualization platform is a virtualization management solution providing fully integrated management for virtual machines. Based on the leading open source virtualization platform, it provides superior technical capabilities and scalability for virtual environments.

1. About this Guide

This guide enables you to install and configure Red Hat Enterprise Virtualization and create your first virtual machine.

1.1. Audience

This document is designed as a guide for system administrators to set up Red Hat Enterprise Virtualization for the first time. It covers the deployment of Red Hat Enterprise Virtualization across multiple hosts using three different storage types. After completing this guide, you will have a basic working Red Hat Enterprise Virtualization environment which can be scaled and further configured for deployment across large enterprises.

It is recommended that the users of this document have advanced Linux or Windows systems administration experience, including familiarity with virtual machine data center operations.

1.2. Overview

The Quick Start Guide takes you through the following tasks:

» Installing the Red Hat Enterprise Virtualization Manager and Hypervisor
» Configuring hosts, clusters, storage and networking
» Creating and accessing virtual machines
2. Document Conventions

This manual uses several conventions to highlight certain words and phrases and draw attention to specific pieces of information.

In PDF and paper editions, this manual uses typefaces drawn from the Liberation Fonts set. The Liberation Fonts set is also used in HTML editions if the set is installed on your system. If not, alternative but equivalent typefaces are displayed. Note: Red Hat Enterprise Linux 5 and later include the Liberation Fonts set by default.

2.1. Typographic Conventions

Four typographic conventions are used to call attention to specific words and phrases. These conventions, and the circumstances they apply to, are as follows.

Mono-spaced Bold
Used to highlight system input, including shell commands, file names and paths. Also used to highlight keys and key combinations. For example:

To see the contents of the file *my_next_bestselling_novel* in your current working directory, enter the `cat my_next_bestselling_novel` command at the shell prompt and press **Enter** to execute the command.

The above includes a file name, a shell command and a key, all presented in mono-spaced bold and all distinguishable thanks to context.

Key combinations can be distinguished from an individual key by the plus sign that connects each part of a key combination. For example:

Press **Enter** to execute the command.

Press **Ctrl+Alt+F2** to switch to a virtual terminal.

The first example highlights a particular key to press. The second example highlights a key combination: a set of three keys pressed simultaneously.

If source code is discussed, class names, methods, functions, variable names and returned values mentioned within a paragraph will be presented as above, in **mono-spaced bold**. For example:

File-related classes include **filesystem** for file systems, **file** for files, and **dir** for directories. Each class has its own associated set of permissions.

**Proportional Bold**

This denotes words or phrases encountered on a system, including application names; dialog box text; labeled buttons; check-box and radio button labels; menu titles and sub-menu titles. For example:

Choose **System → Preferences → Mouse** from the main menu bar to launch Mouse Preferences. In the **Buttons** tab, select the **Left-handed mouse** check box and click **Close** to switch the primary mouse button from the left to the right (making the mouse suitable for use in the left hand).

To insert a special character into a **gedit** file, choose **Applications → Accessories → Character Map** from the main menu bar. Next, choose **Search → Find...** from the Character Map menu bar, type the name of the character in the **Search** field and click **Next**. The character you sought will be highlighted in the Character Table. Double-click this highlighted character to place it in the **Text to copy** field and then click the **Copy** button. Now switch back to your document and choose **Edit → Paste** from the gedit menu bar.

The above text includes application names; system-wide menu names and items; application-specific menu names; and buttons and text found within a GUI interface, all presented in proportional bold and all distinguishable by context.

**Mono-spaced Bold Italic** or **Proportional Bold Italic**

Whether mono-spaced bold or proportional bold, the addition of italics indicates replaceable or variable text. Italics denotes text you do not input literally or displayed text that changes depending on circumstance. For example:

To connect to a remote machine using ssh, type `ssh username@domain.name` at a shell prompt. If the remote machine is **example.com** and your username on that machine is
john, type `ssh john@example.com`.

The `mount -o remount file-system` command remounts the named file system. For example, to remount the `/home` file system, the command is `mount -o remount /home`.

To see the version of a currently installed package, use the `rpm -q package` command. It will return a result as follows: `package-version-release`.

Note the words in bold italics above — username, domain.name, file-system, package, version and release. Each word is a placeholder, either for text you enter when issuing a command or for text displayed by the system.

Aside from standard usage for presenting the title of a work, italics denotes the first use of a new and important term. For example:

Publican is a *DocBook* publishing system.

### 2.2. Pull-quote Conventions

Terminal output and source code listings are set off visually from the surrounding text.

Output sent to a terminal is set in **mono-spaced roman** and presented thus:

```
books    Desktop   documentation  drafts  mss    photos   stuff  svn
books_tests Desktop1 downloads      images  notes  scripts  svgs
```

Source-code listings are also set in **mono-spaced roman** but add syntax highlighting as follows:

```c
static int kvm_vm_ioctl_deassign_device(struct kvm *kvm,
                                        struct kvm_assigned_pci_dev *assigned_dev)
{
    int r = 0;
    struct kvm_assigned_dev_kernel *match;

    mutex_lock(&kvm->lock);
    match = kvm_find_assigned_dev(&kvm->arch.assigned_dev_head,
                                  assigned_dev->assigned_dev_id);
    if (!match) {
        printk(KERN_INFO "%s: device hasn't been assigned before, "
               "so cannot be deassigned\n", __func__);
        r = -EINVAL;
        goto out;
    }
    kvm_deassign_device(kvm, match);
    kvm_free_assigned_device(kvm, match);
out:
    mutex_unlock(&kvm->lock);
    return r;
}
```

### 2.3. Notes and Warnings

Finally, we use three visual styles to draw attention to information that might otherwise be overlooked.
3. Getting Help and Giving Feedback

3.1. Do You Need Help?
If you experience difficulty with a procedure described in this documentation, visit the Red Hat Customer Portal at http://access.redhat.com. Through the customer portal, you can:

» search or browse through a knowledgebase of technical support articles about Red Hat products.
» submit a support case to Red Hat Global Support Services (GSS).
» access other product documentation.

Red Hat also hosts a large number of electronic mailing lists for discussion of Red Hat software and technology. You can find a list of publicly available mailing lists at https://www.redhat.com/mailman/listinfo. Click on the name of any mailing list to subscribe to that list or to access the list archives.

3.2. We Need Feedback!
If you find a typographical error in this manual, or if you have thought of a way to make this manual better, we would love to hear from you! Please submit a report in Bugzilla: http://bugzilla.redhat.com/ against the product Red Hat Enterprise Virtualization Manager.

When submitting a bug report, be sure to mention the manual's identifier: Guides-Quick Start

If you have a suggestion for improving the documentation, try to be as specific as possible when describing it. If you have found an error, please include the section number and some of the surrounding text so we can find it easily.
Chapter 1. Introduction

The Red Hat Enterprise Virtualization platform comprises various components which work seamlessly together, enabling the system administrator to install, configure and manage a virtualized environment. After reading this guide, you will be able to set up Red Hat Enterprise Virtualization as represented in the following diagram:

Figure 1.1. Overview of Red Hat Enterprise Virtualization components

1.1. Prerequisites

The following requirements are typical for small- to medium-sized installations. Note that the exact requirements of the setup depend on the specific installation, sizing and load. Please use the following requirements as guidelines:

Red Hat Enterprise Virtualization Manager

- Minimum - Dual core server with 4 GB RAM, with 25 GB free disk space and 1 Gbps network interface.
- Recommended - Dual Sockets/Quad core server with 16 GB RAM, 50 GB free disk space on multiple disk spindles and 1 Gbps network interface.

The breakdown of the server requirements are as below:

- For the Red Hat Enterprise Linux 6 operating system: minimum 1 GB RAM and 5 GB local disk space.
- For the Manager: minimum 3 GB RAM, 3 GB local disk space and 1 Gbps network controller bandwidth.
- If you wish to create an ISO domain on the Manager server, you need minimum 15 GB disk space.
A valid Red Hat Network subscription to the following channels:
- The **Red Hat Enterprise Virtualization Manager (v.3.1 x86_64)** channel, also referred to as `rhel-x86_64-server-6-rhevm-3.1`, which provides Red Hat Enterprise Virtualization Manager.
- The **JBoss Application Platform (v 6) for 6Server x86_64** channel, also referred to as `jbappplatform-6-x86_64-server-6-rpm`, which provides the supported release of the application platform on which the manager runs.
- The **RHEL Server Supplementary (v. 6 64-bit x86_64)** channel, also referred to as `rhel-x86_64-server-supplementary-6`, which provides the supported version of the Java Runtime Environment (JRE).

A client for connecting to Red Hat Enterprise Virtualization Manager.
- Mozilla Firefox 10 or higher on Red Hat Enterprise Linux
- Internet Explorer 9 or higher on Microsoft Windows

**For each Host (Red Hat Enterprise Virtualization Hypervisor or Red Hat Enterprise Linux)**

- Minimum - Dual core server, 2 GB RAM and 10 GB Storage, 1 Gbps network interface.
- Recommended - Dual socket server, 16 GB RAM and 50 GB storage, two 1 Gbps network interfaces.

The breakdown of the server requirements are as below:
- For each host: AMD-V or Intel VT enabled, AMD64 or Intel 64 extensions, 3 GB free storage and 1 Gbps network interface.

Valid Red Hat Network subscriptions for each host. You can use either Red Hat Enterprise Virtualization Hypervisor or Red Hat Enterprise Linux hosts, or both.
- For each Red Hat Enterprise Virtualization Hypervisor host: The **Red Hat Enterprise Virtualization Hypervisor (v.6 x86-64)** channel, also referred to as `rhel-x86_64-server-6-rhev`.
- For each Red Hat Enterprise Virtualization Linux host: The **Red Hat Enterprise Virtualization Management Agent (v 6 x86_64)** channel, also referred to as `rhel-x86_64-rhev-mgmt-agent-6`.

**Storage and Networking**

- At least one of the supported storage types (NFS, iSCSI and FCP).
  - For NFS storage, a valid IP address and export path is required.
  - For iSCSI storage, a valid IP address and target information is required.
- Static IP addresses for the Red Hat Enterprise Virtualization Manager server and for each host server.
- DNS service which can resolve (forward and reverse) all the IP addresses.
- An existing DHCP server which can allocate network addresses for the virtual machines.

**Virtual Machines**

- Installation images for creating virtual machines, depending on which operating system you wish to use.
  - Red Hat Enterprise Linux 3, 4, 5 or 6.
- Valid licenses or subscription entitlements for each operating system.

**Red Hat Enterprise Virtualization User Portal**

- A Red Hat Enterprise Linux client running Mozilla Firefox 3.6 and higher.
Chapter 2. Install Red Hat Enterprise Virtualization

The Red Hat Enterprise Virtualization platform consists of at least one Manager and one or more hosts.

- **Red Hat Enterprise Virtualization Manager** provides a graphical user interface to manage the physical and logical resources of the Red Hat Enterprise Virtualization infrastructure. The Manager is installed on a Red Hat Enterprise Linux 6 server, and accessed from a client running Firefox.

- **Red Hat Enterprise Virtualization Hypervisor** runs virtual machines. A physical server running Red Hat Enterprise Linux can also be configured as a host for virtual machines on the Red Hat Enterprise Virtualization platform.

### 2.1. Installing Red Hat Enterprise Virtualization Manager

The Red Hat Enterprise Virtualization Manager is the control center of the Red Hat Enterprise Virtualization environment. It allows you to define hosts, configure data centers, add storage, define networks, create virtual machines, manage user permissions, and use templates from one central location.

The Red Hat Enterprise Virtualization Manager must be installed on a server running Red Hat Enterprise Linux 6, with minimum 4 GB RAM, 25 GB free disk space and 1 Gbps network interface.

#### Procedure 2.1. To install Red Hat Enterprise Virtualization Manager

1. Install Red Hat Enterprise Linux 6 on a server. When prompted for the software packages to install, select the default **Basic Server** option. See the *Red Hat Enterprise Linux Installation Guide* for more details.

   **Important**

   During installation, remember to set the fully qualified domain name (FQDN) and IP for the server.

2. If your server has not been registered with the Red Hat Network, run:

   ```bash
   # rhn_register
   ```

   To complete registration successfully you need to supply your Red Hat Network username and password. Follow the onscreen prompts to complete registration of the system.

   After you have registered your server, update all the packages on it. Run:

   ```bash
   # yum -y update
   ```

   Reboot your server for the updates to be applied.

3. Subscribe the server to the required channels using the Red Hat Network web interface.
   b. Click **Systems** at the top of the page.
   c. Select the system to which you are adding channels from the list presented on the screen,
by clicking the name of the system.

d. Click **Alter Channel Subscriptions** in the **Subscribed Channels** section of the screen.

e. Select the following channels from the list presented on the screen.

   » Under **Channels for Red Hat Enterprise Linux 6 for x86_64**: **Red Hat Enterprise Virtualization Manager (v.3.1 x86_64)**

   » Under **Additional Services Channels for Red Hat Enterprise Linux 6 for x86_64**: **JBoss Application Platform (v 6) for 6Server x86_64**

   » Under **Release Channels for Red Hat Enterprise Linux 6 for x86_64**: **RHEL Server Supplementary (v. 6 64-bit x86_64)**

   Click the **Change Subscription** button to finalize the change.

4. You are now ready to install the Red Hat Enterprise Virtualization Manager. Run the following command:

   ```bash
   # yum -y install rhevm
   ```

   This command will download the Red Hat Enterprise Virtualization Manager installation software and resolve all dependencies.

5. When the packages have finished downloading, run the installer:

   ```bash
   # rhevm-setup
   ```

6. The installer will take you through a series of interactive questions as listed in the following example. If you do not enter a value when prompted, the installer uses the default settings which are stated in [ ] brackets.
Example 2.1. Red Hat Enterprise Virtualization Manager installation

Welcome to RHEV Manager setup utility
In order to proceed the installer must stop the JBoss service
Would you like to stop the JBoss service? (yes|no): yes
Stopping JBoss... RHEV Manager uses httpd to proxy requests to the application server.
It looks like the httpd installed locally is being actively used.
The installer can override current configuration.
Alternatively you can use JBoss directly (on ports higher than 1024)
Do you wish to override current httpd configuration and restart the service? ['yes'| 'no'] [yes]: yes
Do you wish to override current httpd configuration and restart the service? ['yes'| 'no'] [yes]: yes
HTTP Port [80]:
HTTPS Port [443]:
Host fully qualified domain name. Note: this name should be fully resolvable [FQDN]:
Password for Administrator (admin@internal):
Confirm password:
Organization Name for the Certificate [Default Organization Name]:
The default storage type you will be using ['NFS'| 'FC'| 'ISCSI'] [NFS]: ISCSI
Enter DB type for installation ['remote'| 'local'] [local]: Local database password:
Confirm password:
Configure NFS share on this server to be used as an ISO Domain? ['yes'| 'no'] [yes]: yes
Local ISO domain path [/usr/local/exports/iso]:
Firewall ports need to be opened.
The installer can configure iptables automatically overriding the current configuration. The old configuration will be backed up.
Alternatively you can configure the firewall later using an example iptables file found under /usr/share/ovirt-engine/conf/iptables.example
Configure iptables ? ['yes'| 'no']: yes

Important points to note:
» The default ports 80 and 443 must be available to access the manager on HTTP and HTTPS respectively.
» If you elect to configure an NFS share it will be exported from the machine on which the manager is being installed.
» The storage type that you select will be used to create a data center and cluster. You will then be able to attach storage to these from the Administration Portal.

7. You are then presented with a summary of the configurations you have selected. Type yes to accept them.
Example 2.2. Confirm Manager installation settings

RHEV Manager will be installed using the following configuration:
=================================================================
override-httpd-config: yes
http-port: 80
https-port: 443
host-fqdn: rhevm-demo.name.com
auth-pass: *******
org-name: Organization Name
default-dc-type: ISCSI
db-remote-install: local
db-local-pass: *******
nfs-mp: /usr/local/exports/iso
config-nfs: yes
override-iptables: yes
Proceed with the configuration listed above? (yes|no): yes

8. The installation commences. The following message displays, indicating that the installation was successful.

Example 2.3. Successful installation

Installing:
Configuring RHEV Manager... [ DONE ]
Creating CA... [ DONE ]
Editing JBoss Configuration... [ DONE ]
Setting Database Configuration... [ DONE ]
Setting Database Security... [ DONE ]
Creating Database... [ DONE ]
Updating the Default Data Center Storage Type... [ DONE ]
Editing RHEV Manager Configuration... [ DONE ]
Editing Postgresql Configuration... [ DONE ]
Configuring the Default ISO Domain... [ DONE ]
Configuring Firewall (iptables)... [ DONE ]
Starting JBoss Service... [ DONE ]
Configuring HTTPD... [ DONE ]

**** Installation completed successfully ****

Your Red Hat Enterprise Virtualization Manager is now up and running. You can log in to the Red Hat Enterprise Virtualization Manager’s web administration portal with the username admin (the administrative user configured during installation) in the internal domain. Instructions to do so are provided at the end of this chapter.

Important

The internal domain is automatically created upon installation, however no new users can be added to this domain. To authenticate new users, you need an external directory service. Red Hat Enterprise Virtualization supports IPA and Active Directory, and provides a utility called rhevm-manage-domains to attach new directories to the system. Use of this tool is covered in the Red Hat Enterprise Virtualization Installation Guide.
2.2. Install Hosts

After you have installed the Red Hat Enterprise Virtualization Manager, it is time to install the hosts, which run your virtual machines. In Red Hat Enterprise Virtualization, you can use either Red Hat Enterprise Virtualization Hypervisor or Red Hat Enterprise Linux as hosts.

2.2.1. Install Red Hat Enterprise Virtualization Hypervisor - Overview

This document provides instructions for installing the Red Hat Enterprise Virtualization Hypervisor using a CD. For alternative methods including PXE networks or USB devices, see the Red Hat Enterprise Linux Hypervisor Deployment Guide.

Before installing the Red Hat Enterprise Virtualization Hypervisor, you need to download the hypervisor image from the Red Hat Network and create a bootable CD with the image. This procedure can be performed on any machine running Red Hat Enterprise Linux.

2.2.2. Registering the host on RHN and Acquiring ISO Hypervisor Images

Summary

The Red Hat Enterprise Virtualization Hypervisor (v. 6 x86_64) Red Hat Network channel contains the Hypervisor packages. The Hypervisor itself is contained in the rhev-hypervisor package. Additional tools supporting USB and PXE installations are installed as dependencies. Install the Hypervisor packages on the system you plan to use to create Hypervisor boot media.

Select one of the two options below:

Procedure 2.2. Subscribing to RHN Entitlement Pools and Installing the Red Hat Enterprise
Virtualization Hypervisor Packages

1. Subscribing to download the Hypervisor using certificate-based RHN
   a. Identify Available Entitlement Pools
      To subscribe the system to the Red Hat Enterprise Virtualization channels you need you must locate the identifier for the relevant entitlement pool. Use the list action in the subscription-manager to find these:

      ```
      # subscription-manager list --available | grep -A8 "Red Hat Enterprise Virtualization"
      ```
   b. Subscribe System to Entitlement Pools
      Using the pool identifiers located in the previous step, subscribe the system to Red Hat Enterprise Linux Server and Red Hat Enterprise Virtualization entitlements. Use the subscribe parameter of the subscription-manager command, and replace POOLID with one of the pool identifiers.

      ```
      # subscription manager subscribe --pool=POOLID
      ```

2. Subscribing to download the Hypervisor using RHN Classic
   b. Move the mouse cursor over the Subscriptions link at the top of the page, and then click Registered Systems in the menu that appears.
   c. Select the system to which you are adding channels from the list on the screen by clicking the name of the system.
   d. Click Alter Channel Subscriptions in the Subscribed Channels section of the screen.
   e. Select the Red Hat Enterprise Virtualization Hypervisor (v. 6 x86_64) channel from the list on the screen, then click the Change Subscription button to finalize the change.

3. Log in to the system on which the Red Hat Enterprise Virtualization Manager is installed. Log in as root.
4. Use `yum` to install the `rhev-hypervisor`.

   ```
   # yum install rhev-hypervisor
   ```

Result

The Hypervisor ISO image is installed into the `/usr/share/rhev-hypervisor/` directory. The `rhev-iso-to-disk` and `rhev-iso-to-pxeboot` scripts are installed to the `/usr/bin/` directory.
Note

Red Hat Enterprise Linux 6.2 and higher versions allow more than one version of the ISO image to be installed at one time. Because of this, `/usr/share/rhev-hypervisor/rhev-hypervisor.iso` is now a symbolic link to a uniquely-named version of the Hypervisor ISO image, for instance `/usr/share/rhev-hypervisor/rhev-6.2-20111006.0.el6.iso`. Different versions of the image can now be installed alongside each other, allowing administrators to run and maintain a cluster on a previous version of the Hypervisor while upgrading another cluster for testing. The symbolic links `/usr/share/rhev-hypervisor/rhev-latest6.iso` and `/usr/share/rhev-hypervisor/rhev-hypervisor6.iso` are created. These links target the most-recently installed version of the Red Hat Enterprise Virtualization ISO image.

2.2.3. Preparing Optical Hypervisor Installation Media

Summary

Burn the Hypervisor image to a CD-ROM with the `wodim` command. The `wodim` command is part of the `wodim` package.

Procedure 2.3. Preparing Optical Hypervisor Installation Media

1. Verify that the `wodim` package is installed on the system.
   
   **Example 2.4. Verify Installation of `wodim` Package**
   
   ```bash
   # rpm -q wodim
   wodim-1.1.9-11.el6.x86_64
   ```
   
   If the package version is in the output the package is available. If nothing is listed, install `wodim`:
   
   ```bash
   # yum install wodim
   ```

2. Insert a blank CD-ROM or DVD into your CD or DVD writer.
3. Record the ISO file to the disc. The `wodim` command uses the following:

   ```bash
   wodim dev=device image
   ```

   This example uses the first CD-RW (`/dev/cdrw`) device available and the default hypervisor image location, `/usr/share/rhev-hypervisor/rhev-hypervisor.iso`.

   **Example 2.5. Use of `wodim` Command**
   
   ```bash
   # wodim dev=/dev/cdrw /usr/share/rhev-hypervisor/rhev-hypervisor.iso
   ```

Result

If no errors occurred, the Hypervisor is ready to boot. Errors sometimes occur during the recording process due to errors on the media itself. If this occurs insert another writable disk and repeat the
command above.

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.

2.2.4. Installing Red Hat Enterprise Virtualization Hosts from Optical Installation Media

Now that you have registered the host with RHN, acquired the Hypervisor images, and used the Hypervisor images to create optical installation media, you will boot the system using the optical installation media.

Summary

Booting the Hypervisor from optical installation media requires the system to have a correctly defined BIOS boot configuration.

1. Ensure that the system's BIOS is configured to boot from the CD-ROM or DVD-ROM drive before proceeding.

   Note
   Refer to your manufacturer's manuals for further information on modifying the system's BIOS boot configuration.

2. Insert the Hypervisor CD-ROM in the CD-ROM or DVD-ROM drive.
3. Reboot the system.

Result

The host's screen will display the Hypervisor boot screen.

2.2.5. Configuring Red Hat Enterprise Virtualization installation settings

You have rebooted your host machine with the Hypervisor installation media in the CD-ROM or DVD-ROM drive. Now you will use the Red hat Enterprise Virtualization Hypervisor interactive menu to configure your hypervisor.

Table 2.1. Menu Navigation Keys

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up and Down arrow keys</td>
<td>Navigates between sections. Highlighted selections appear in white</td>
</tr>
<tr>
<td>Tab</td>
<td>Moves between fields</td>
</tr>
<tr>
<td>Spacebar</td>
<td>Selects check boxes, which are represented by square brackets: [ ]</td>
</tr>
<tr>
<td></td>
<td>Check boxes that have been selected contain asterisks: *</td>
</tr>
<tr>
<td>Enter</td>
<td>Accepts the configuration you have selected.</td>
</tr>
</tbody>
</table>

Procedure 2.4. Installing Red Hat Enterprise Virtualization Hypervisors

1. Insert the Red Hat Enterprise Virtualization Hypervisor installation CD into your CD-ROM drive of
the machine designated as a host. Reboot the machine. When the boot splash screen displays, press the Tab key and select Boot to boot from the hypervisor installation media. Press Enter.

2. On the installation confirmation screen, select Install RHEV Hypervisor and press Enter.

3. The installer automatically detects the drives attached to the system. The disk selected for booting the hypervisor is highlighted in white. Ensure that the local disk is highlighted, otherwise use the arrow keys to select the correct disk. Select Continue and press Enter.

4. You are prompted to select the drive on which the hypervisor is to be installed. Ensure that the local disk is highlighted, otherwise use the arrow keys to select the correct disk. While multiple installation drives can be used, select only one for this evaluation. Select Continue and press Enter.

5. Enter a password for local console access and confirm it. Select Install and press Enter. The Red Hat Enterprise Virtualization Hypervisor partitions the local drive, then commences installation.

6. Once installation is complete, a dialog prompts you to Reboot the hypervisor. Press Enter to confirm. Remove the installation disc.

7. After the hypervisor has rebooted, you will be taken to a login shell. Log in as the admin user with the password you provided during installation to enter the Red Hat Enterprise Virtualization Hypervisor management console.

8. On the hypervisor management console, there are eight tabs on the left. Press the Up and Down keys to navigate between them and Enter to access them.

   a. Select the Network tab. Fill in the required fields as shown in the following example. Substitute the DNS Server address according to your environment.

   ![Figure 2.3. Configure Hypervisor network settings](image)

   After you have filled in the fields, select Apply and press Enter. This saves your network settings.

   b. For this document, the eth0 device will be used to set up the management network. Select it and press Enter to access the interface configuration menu. Fill in the required fields as shown in the following example:
Under IPv4 Settings, select DHCP or Static IP addressing and press Spacebar to mark the option as enabled. If using static IP addressing you must also provide the IP Address, Netmask, and Gateway. Select Apply and press Enter. A dialog prompts you to confirm your network settings, select OK and press Enter.

You have now successfully installed a Red Hat Enterprise Virtualization Hypervisor. Repeat the above.
steps for each hypervisor you wish to use. The following sections will provide instructions on how to approve the hypervisors for use with the Red Hat Enterprise Virtualization Manager.

**Summary**

You will configure Red Hat Enterprise Virtualization Hypervisor, connecting it to Red Hat Enterprise Virtualization Manager and RHN.

**Procedure 2.5. Configuring Red Hat Enterprise Virtualization Hypervisor Installation Settings**

1. On the **Installation Confirmation** screen, select **Install RHEV Hypervisor** and press **Enter**.
2. The installer detects the drives attached to the system. The bootdisk is highlighted in white. Ensure that the local disk is highlighted by using the arrow keys to select the correct disk. Select **Continue** and press **Enter**.
3. Enter a password for local console access and confirm it. Select **Install** and press **Enter**. The Red Hat Enterprise Virtualization Hypervisor partitions the local drive and then begins the installation process.
4. When installation of Red Hat Enterprise Virtualization Hypervisor is complete, a window prompts you to **Reboot** the Hypervisor. Press **Enter** to confirm the reboot. Remove the installation disk from the CD-ROM or DVD-ROM drive.
5. After the hypervisor reboots, the screen will display a login shell. Log in as the **admin** user with the password you provided during installation to enter the Red Hat Enterprise Virtualization Hypervisor management console.
6. There are eight tabs on the left of the hypervisor management console. Press the **Up** and **Down** keys to navigate between the tabs and **Enter** to access them.
   a. Select the **Network** tab. Configure the following options:
      - **Hostname**: Enter the hostname in the format of `hostname.domain.example.com`.
      - **DNS Server**: Enter the Domain Name Server address in the format of `rhel.pool.ntp.org`. This synchronizes the hypervisor’s system clock with the manager’s system clock. You can use up to two NTP servers. Select **Apply** and press **Enter** to save your network settings.
      - The installer detects the available network interfaces that constitute the management network. Select a device and press **Enter** to access the interface configuration menu. Under **IPv4 Settings**, select either the **DHCP** or **Static** check box. If you are using static IPv4 network configuration, fill in the **IP Address**, **Netmask**, and **Gateway** fields.
      - To confirm your network settings, select **OK** and press **Enter**.
   b. Select the **RHEV-M** tab. Configure the following options:
      - **Management Server**: Enter the Red Hat Enterprise Virtualization Manager domain name in the format of `rhevm.demo.redhat.com`.
      - **Management Server Port**: Enter the management server port number. The default is **443**.
      - **Connect to the RHEV Manager and Validate Certificate**: Tick this check box if you wish to verify the RHEVM security certificate.
      - **Set RHEV-M Admin Password**: This field allows you to specify the root password for the hypervisor, and enable SSH password authentication from the Red Hat Enterprise Virtualization Manager. This field is optional, and is covered in more detail in the *Red Hat Enterprise Virtualization Installation Guide*. 

Select **Apply** and press **Enter**. A window appears, asking you to connect the hypervisor to the Red Hat Enterprise Virtualization Manager and to validate its certificate. Select **Approve** and press **Enter**. A message displays notifying you that the manager configuration has been updated successfully.

c. Under the **Red Hat Network** tab, you can register the host with the Red Hat Network. This enables the host to run Red Hat Enterprise Linux virtual machines with the proper RHN entitlements. Configure the following settings:

   - Enter your Red Hat Network credentials in the **Login** and **Password** fields.
   - To select the method by which the hypervisor receives updates, select either the **RHN** or the **Satellite** check box. Fill in the **RHN URL** and **RHN CA** fields.

   Confirm your RHN settings by selecting **Apply** and pressing **Enter**.

d. Accept all other default settings. For information regarding security configuration, logging, kdump, and remote storage, refer to **Red Hat Enterprise Linux 6 Hypervisor Deployment Guide** or **Red Hat Enterprise Virtualization Installation Guide**.

e. Select the **Status** tab. Select **Restart** and press **Enter** to reboot the host and apply all changes.

**Result**

You have now configured Red Hat Enterprise Virtualization Hypervisor, connecting it to Red Hat Enterprise Virtualization Manager and RHN.

### 2.3. Connect to Red Hat Enterprise Virtualization Manager

![Figure 2.5. Connect to the Manager administration portal](image-url)

**Figure 2.5. Connect to the Manager administration portal**
Now that you have installed the Red Hat Enterprise Virtualization Manager and hosts, you can log in to the Manager administration portal to start configuring your virtualization environment. Use a client running Firefox to access the web-based administration portal.

### 2.4. Connecting to Red Hat Enterprise Virtualization Web Administration Portal

1. Open a browser and navigate to `https://domain.example.com`. Substitute `domain.example.com` with the URL provided during installation.
2. Under the Portals heading, click Web Admin Portal.
3. If this is your first time connecting to the administration portal, Red Hat Enterprise Virtualization Manager will issue security certificates for your browser. Click the link labelled *this certificate* to trust the `ca.cer` certificate. A pop-up displays, click Open to launch the Certificate dialog. Click Install Certificate and select to place the certificate in Trusted Root Certification Authorities store.
4. The portal login screen displays. Enter *admin* as your User Name, and enter the Password that you provided during installation. Ensure that your domain is set to Internal. Click Login.

You have now successfully logged in to the Red Hat Enterprise Virtualization web administration portal. Here, you can configure and manage all your virtual resources.

### 2.5. Web Administration Portal Graphical User Interface

The administration portal graphical interface has two modes: Tree mode and flat mode. Tree mode allows you to browse the object hierarchy of a data center, and is the recommended manner of operation. On the other hand, flat mode is used for objects which are not in the data centers hierarchy, for example the Users tab which does not appear in tree mode.

The functions of the administration portal GUI are described in the following figure and list:

Figure 2.6. Administration Portal Features
1. **Header**: This bar contains the name of the logged in user, the sign out button, the option to configure user roles.

2. **Navigation Pane**: This pane allows you to navigate between the Tree, Bookmarks and Tags tabs. In the Tree tab, tree mode allows you to see the entire system tree and provides a visual representation your virtualization environment's architecture.

3. **Resources Tabs**: These tabs allow you to access the resources of Red Hat Enterprise Virtualization. You should already have a Default Data Center, a Default Cluster, a Host waiting to be approved, and available Storage waiting to be attached to the data center.

4. **Results List**: When you select a tab, this list displays the available resources. You can perform a task on an individual item or multiple items by selecting the item(s) and then clicking the relevant action button. If an action is not possible, the button is disabled.

5. **Details Pane**: When you select a resource, this pane displays its details in several subtabs. These subtabs also contain action buttons which you can use to make changes to the selected resource.

Once you are familiar with the layout of the administration portal, you can start configuring your virtual environment. Begin by approving your Hypervisor hosts for use, as detailed in the next section.
Chapter 3. Configure Red Hat Enterprise Virtualization

Now that you have logged in to the administration portal, you must configure your Red Hat Enterprise Virtualization environment by defining the data center, host cluster, networks and storage. If you are setting up a Red Hat Enterprise Virtualization environment with completely new components, you should perform the configuration procedure in the sequence given here.

3.1. Configure Data Centers

A data center is a logical entity that defines the set of physical and logical resources used in a managed virtual environment. Think of it as a container which houses clusters of hosts, virtual machines, storage and networks.

By default, Red Hat Enterprise Virtualization creates a data center at installation. Its type is configured from the installation script. To access the default data center, navigate to the Tree pane, click Expand All, and select the Default data center. The Data Centers tab displays the Default data center.
The **Default** data center is used for this document. If you wish to create a new data center see the *Red Hat Enterprise Virtualization Administration Guide*.

### 3.2. Configure Cluster

A cluster is a set of physical hosts that are treated as a resource pool for a set of virtual machines. Hosts in a cluster share the same network infrastructure, the same storage, and the same type of CPU.
They constitute a migration domain within which virtual machines can be moved from host to host.

By default, Red Hat Enterprise Virtualization creates a cluster at installation. To access it, navigate to the Tree pane, click Expand All and select the Default cluster. The Clusters tab displays the Default cluster.

![Figure 3.4. Clusters Tab](image)

For this document, the Red Hat Enterprise Virtualization Hypervisor and Red Hat Enterprise Linux hosts will be attached to the Default host cluster. If you wish to create new clusters, or live migrate virtual machines between hosts in a cluster, see the Red Hat Enterprise Virtualization Evaluation Guide.

### 3.3. Configure Networking
At installation, Red Hat Enterprise Virtualization defines a Management network for the default data center. This network is used for communication between the manager and the host. New logical networks—for example for guest data, storage or display—can be added to enhance network speed and performance. All networks used by hosts and clusters must be added to data center they belong to.

To access the Management network, click on the **Clusters** tab and select the default cluster. Click the **Logical Networks** tab in the Details pane. The **rhev** network displays.
The **rhevm** Management network is used for this document. If you wish to create new logical networks see the *Red Hat Enterprise Virtualization Administration Guide*.

### 3.4. Configure Hosts

![Figure 3.7. Configure Hosts](image)

You have already installed your Red Hat Enterprise Virtualization Hypervisor and Red Hat Enterprise Linux hosts, but before they can be used, they have to be added to the Manager. The Red Hat Enterprise Virtualization Hypervisor is designed for the Red Hat Enterprise Virtualization platform, and needs a simple click of approval. On the other hand, Red Hat Enterprise Linux is a general purpose operating system, and additional configuration is required to reprogram it as a host.

#### 3.4.1. Approve Red Hat Enterprise Virtualization Hypervisor Host

The Hypervisor you installed in [Section 2.2.1, “Install Red Hat Enterprise Virtualization Hypervisor - Overview”](#) is automatically registered with the Red Hat Enterprise Virtualization platform. Red Hat Enterprise Virtualization Manager displays it, and it must be approved for use.

**To set up a Red Hat Enterprise Virtualization Hypervisor host**

1. On the **Tree** pane, click **Expand All** and select **Hosts** under the Default cluster. On the **Hosts** tab, select the name of your newly installed hypervisor.
2. Click the **Approve** button. The **Edit and Approve Host** dialog displays. Accept the defaults or make changes as necessary, then click **OK**.

3. The host status will change from **Non Operational** to **Up**.
3.4.2. Attach Red Hat Enterprise Linux Host

In contrast to the hypervisor host, the Red Hat Enterprise Linux host you installed earlier is not automatically detected. It has to be manually attached to the Red Hat Enterprise Virtualization platform before it can be used.

To attach a Red Hat Enterprise Linux host

1. On the Tree pane, click Expand All and select **Hosts** under the Default cluster. On the **Hosts** tab, click **New**.

2. The **New Host** dialog displays.

![New Host dialog](image)

**Figure 3.10. Attach Red Hat Enterprise Linux Host**

Enter the details in the following fields:

- **Data Center**: the data center to which the host belongs. Select the **Default** data center.
- **Host Cluster**: the cluster to which the host belongs. Select the **Default** cluster.
- **Name**: a descriptive name for the host.
- **Address**: the IP address, or resolvable hostname of the host, which was provided during installation.
- **Root Password**: the password of the designated host; used during installation of the host.
- **Configure iptables rules**: This check box allows you to override the firewall settings on the host with the default rules for Red Hat Enterprise Virtualization.

3. If you wish to configure this host for Out of Band (OOB) power management, select the **Power**
Management tab. Tick the Enable Power Management check box and provide the required information in the following fields:

- **Address**: The address of the host.
- **User Name**: A valid user name for the OOB management.
- **Password**: A valid, robust password for the OOB management.
- **Type**: The type of OOB management device. Select the appropriate device from the drop down list.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>alom</td>
<td>Sun Advanced Lights Out Manager</td>
</tr>
<tr>
<td>apc</td>
<td>American Power Conversion Master</td>
</tr>
<tr>
<td></td>
<td>MasterSwitch network power switch</td>
</tr>
<tr>
<td>bladecenter</td>
<td>IBM Bladecentre Remote Supervisor Adapter</td>
</tr>
<tr>
<td>drac5</td>
<td>Dell Remote Access Controller for Dell computers</td>
</tr>
<tr>
<td>eps</td>
<td>ePowerSwitch 8M+ network power switch</td>
</tr>
<tr>
<td>ilo</td>
<td>HP Integrated Lights Out standard</td>
</tr>
<tr>
<td>ilo3</td>
<td>HP Integrated Lights Out 3 standard</td>
</tr>
<tr>
<td>ipmilan</td>
<td>Intelligent Platform Management Interface</td>
</tr>
<tr>
<td>rsa</td>
<td>IBM Remote Supervisor Adaptor</td>
</tr>
<tr>
<td>rsb</td>
<td>Fujitsu-Siemens RSB management interface</td>
</tr>
<tr>
<td>wti</td>
<td>Western Telematic Inc Network PowerSwitch</td>
</tr>
<tr>
<td>cisco_ucs</td>
<td>Cisco Unified Computing System Integrated Management Controller</td>
</tr>
</tbody>
</table>

- **Options**: Extra command line options for the fence agent. Detailed documentation of the options available is provided in the man page for each fence agent.

Click the Test button to test the operation of the OOB management solution.

If you do not wish to configure power management, leave the Enable Power Management check box unmarked.

4. Click OK. If you have not configured power management, a pop-up window prompts you to confirm if you wish to proceed without power management. Select OK to continue.

5. The new host displays in the list of hosts with a status of Installing. Once installation is complete, the status will update to Reboot and then Awaiting. When the host is ready for use, its status changes to Up.

You have now successfully configured your hosts to run virtual machines. The next step is to prepare data storage domains to house virtual machine disk images.

### 3.5. Configure Storage
After configuring your logical networks, you need to add storage to your data center.

Red Hat Enterprise Virtualization uses a centralized shared storage system for virtual machine disk images and snapshots. Storage can be implemented using Network File System (NFS), Internet Small Computer System Interface (iSCSI) or Fibre Channel Protocol (FCP). Storage definition, type, and function, are encapsulated in a logical entity called a **Storage Domain**. Multiple storage domains are supported. For more information on storage types refer to the *Red Hat Enterprise Linux Storage Administration Guide*.

For this guide you will use two types of storage domains. The first is an NFS share for ISO images of installation media. You have already created this ISO domain during the Red Hat Enterprise Virtualization Manager installation.

The second storage domain will be used to hold virtual machine disk images. For this domain, you need at least one of the supported storage types. You have already set a default storage type during installation. Ensure that you use the same type when creating your data domain.

**Select your next step by checking the storage type you should use:**

1. Navigate to the *Tree* pane and click the *Expand All* button. Under System, click *Default*. On the results list, the *Default* data center displays.
2. On the results list, the *Storage Type* column displays the type you should add.
3. Now that you have verified the storage type, create the storage domain:
For NFS storage, refer to Section 3.5.1, “Create an NFS Data Domain”.  
For iSCSI storage, refer to Section 3.5.2, “Create an iSCSI Data Domain”.  
For FCP storage, refer to Section 3.5.3, “Create an FCP Data Domain”.

**Note**

This document provides instructions to create a single storage domain, which is automatically attached and activated in the selected data center. If you wish to create additional storage domains within one data center, see the *Red Hat Enterprise Virtualization Administration Guide* for instructions on activating storage domains.

### 3.5.1. Create an NFS Data Domain

Because you have selected NFS as your default storage type during the Manager installation, you will now create an NFS storage domain. An NFS type storage domain is a mounted NFS share that is attached to a data center and used to provide storage for virtual machine disk images.

**Important**

If you are using NFS storage, you must first create and export the directories to be used as storage domains from the NFS server. These directories must have their numerical user and group ownership set to 36:36 on the NFS server, to correspond to the vdsm user and kvm group respectively on the Red Hat Enterprise Virtualization Manager server. In addition, these directories must be exported with the read write options (rw). For more information see the *Red Hat Enterprise Virtualization Installation Guide*.

**To add NFS storage:**

1. Navigate to the **Tree** pane and click the **Expand All** button. Under System, select the **Default** data center and click on **Storage**. The results list displays the available storage domains. Click **New Domain**.
2. The **New Domain** window appears.
Configure the following options:

- **Name**: Enter a suitably descriptive name.
- **Data Center**: The Default data center is already pre-selected.
- **Domain Function / Storage Type**: In the drop down menu, select Data → NFS. Storage domain types that are not compatible with the Default data center do not display in the drop-down menu. Note the presence of the Export Path field.
- **Use Host**: Select any of the hosts from the drop down menu. Only hosts which belong in the pre-selected data center will display in this list.
- **Export path**: Enter the IP address or a resolvable hostname of the chosen host. The export path should be in the format of `192.168.0.10:/data` or `domain.example.com:/data`

3. Click **OK**. The new NFS 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.

You have created an NFS storage domain. Now, you need to attach an ISO domain to the data center and upload installation images so you can use them to create virtual machines. Proceed to Section 3.5.4, “Attach and Populate ISO domain”.

![Figure 3.12. Add New Storage](image)
3.5.2. Create an iSCSI Data Domain

Because you have selected iSCSI as your default storage type during the Manager installation, you will now create an iSCSI storage domain. Red Hat Enterprise Virtualization platform supports iSCSI storage domains spanning multiple pre-defined Logical Unit Numbers (LUNs).

To add iSCSI storage:

1. On the side pane, select the Tree tab. On System, click the + icon to display the available data centers.
2. Double-click on the Default data center and click on Storage. The available storage domains display on the results list. Click New Domain.
3. The New Domain window opens.

![New Domain](image)

**Figure 3.13. Add iSCSI Storage**

Configure the following options:

a. **Name**: Enter a suitably descriptive name.

b. **Data Center**: The Default data center is already pre-selected.

c. **Domain Function / Storage Type**: In the drop down menu, select Data/iSCSI. The storage domain types which are not compatible with the Default data center are grayed out. After you select your domain type, the Use Host and Discover Targets fields display.

d. **Use host**: Select any of the hosts from the drop down menu. Only hosts which belong in this data center will display in this list.

4. To connect to the iSCSI target, click the Discover Targets bar. This expands the menu to display further connection information fields.
Enter the required information:

a. **Address**: Enter the address of the iSCSI target.

b. **Port**: Select the port to connect to. The default is 3260.

c. **User Authentication**: If required, enter the username and password.

5. Click the **Discover** button to find the targets. The iSCSI targets display in the results list with a **Login** button for each target.

6. Click **Login** to display the list of existing LUNs. Tick the **Add LUN** check box to use the selected LUN as the iSCSI data domain.

7. Click **OK**. The new NFS 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.

You have created an iSCSI storage domain. Now, you need to attach an ISO domain to the data center and upload installation images so you can use them to create virtual machines. Proceed to Section 3.5.4, “Attach and Populate ISO domain”.

### 3.5.3. Create an FCP Data Domain

Because you have selected FCP as your default storage type during the Manager installation, you will now create an FCP storage domain. Red Hat Enterprise Virtualization platform supports FCP storage
domains spanning multiple pre-defined Logical Unit Numbers (LUNs).

**To add FCP storage:**

1. On the side pane, select the **Tree** tab. On **System**, click the + icon to display the available data centers.
2. Double-click on the **Default** data center and click on **Storage**. The available storage domains display on the results list. Click **New Domain**.
3. The **New Domain** window opens.

![New Domain Window](image)

**Figure 3.15. Add FCP Storage**

Configure the following options:

- **Name**: Enter a suitably descriptive name.
- **Data Center**: The **Default** data center is already pre-selected.
- **Domain Function / Storage Type**: Select **FCP**.
- **Use Host**: Select the IP address of either the hypervisor or Red Hat Enterprise Linux host.
- The list of existing LUNs display. On the selected LUN, tick the **Add LUN** check box to use it as the FCP data domain.

4. Click **OK**. 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.
You have created an FCP storage domain. Now, you need to attach an ISO domain to the data center and upload installation images so you can use them to create virtual machines. Proceed to Section 3.5.4, "Attach and Populate ISO domain".

### 3.5.4. Attach and Populate ISO domain

You have defined your first storage domain to store virtual guest data, now it is time to configure your second storage domain, which will be used to store installation images for creating virtual machines. You have already created a local ISO domain during the installation of the Red Hat Enterprise Virtualization Manager. To use this ISO domain, attach it to a data center.

**To attach the ISO domain**

1. Navigate to the **Tree** pane and click the **Expand All** button. Click **Default**. On the results list, the **Default** data center displays.
2. On the details pane, select the **Storage** tab and click the **Attach ISO** button.
3. The **Attach ISO Library** dialog appears with the available ISO domain. Select it and click **OK**.

![Attach ISO Library](image)

**Figure 3.16. Attach ISO Library**

4. The ISO domain appears in the results list of the **Storage** tab. It displays with the **Locked** status as the domain is being validated, then changes to **Inactive**.
5. Select the ISO domain and click the **Activate** button. The status changes to **Locked** and then to **Active**.

Media images (CD-ROM or DVD-ROM in the form of ISO images) must be available in the ISO repository for the virtual machines to use. To do so, Red Hat Enterprise Virtualization provides a utility that copies the images and sets the appropriate permissions on the file. The file provided to the utility and the ISO share have to be accessible from the Red Hat Enterprise Virtualization Manager.

Log in to the Red Hat Enterprise Virtualization Manager server console to upload images to the ISO domain.

**To upload ISO images**

1. Create or acquire the appropriate ISO images from boot media. Ensure the path to these images
is accessible from the Red Hat Enterprise Virtualization Manager server.

2. The next step is to upload these files. First, determine the available ISO domains by running:

```
# rhevm-iso-uploader list
```

You will be prompted to provide the admin user password which you use to connect to the administration portal. The tool lists the name of the ISO domain that you attached in the previous section.

**ISO Storage Domain List:**
- local-iso-share

Now you have all the information required to upload the required files. On the Manager console, copy your installation images to the ISO domain. For your images, run:

```
# rhevm-iso-uploader upload -i local-iso-share [file1] [file2] .... [fileN]
```

You will be prompted for the admin user password again, provide it and press **Enter**. Note that the uploading process can be time consuming, depending on your storage performance.

3. After the images have been uploaded, check that they are available for use in the Manager administration portal.
   a. Navigate to the **Tree** and click the **Expand All** button.
   b. Under **Storage**, click on the name of the ISO domain. It displays in the results list. Click on it to display its details pane.
   c. On the details pane, select the **Images** tab. The list of available images should be populated with the files which you have uploaded. In addition, the **RHEV-toolsSetup.iso** and **virtio-win.vfd** images should have been automatically uploaded during installation.

![Figure 3.17. Uploaded ISO images](image)

Now that you have successfully prepared the ISO domain for use, you are ready to start creating virtual machines.
Chapter 4. Manage Virtual Machines

The final stage of setting up Red Hat Enterprise Virtualization is the virtual machine lifecycle - spanning the creation, deployment and maintenance of virtual machines; using templates; and configuring user permissions. This chapter will also show you how to log in to the user portal and connect to virtual machines.

4.1. Create Virtual Machines

On Red Hat Enterprise Virtualization, you can create virtual machines from an existing template, as a clone, or from scratch. Once created, virtual machines can be booted using ISO images, a network boot (PXE) server, or a hard disk. This document provides instructions for creating a virtual machine using an ISO image.

4.1.1. Create a Red Hat Enterprise Linux Virtual Machine

In your current configuration, you should have at least one host available for running virtual machines, and uploaded the required installation images to your ISO domain. This section guides you through the creation of a Red Hat Enterprise Linux 6 virtual server. You will perform a normal attended installation using a virtual DVD.

To create a Red Hat Enterprise Linux server

1. Navigate to the Tree pane and click Expand All. Click the VMs icon under the Default cluster. On the Virtual Machines tab, click New Server.
You only need to fill in the **Name** field and select **Red Hat Enterprise Linux 6.x** as your **Operating System**. You may alter other settings but in this example we will retain the defaults. Click OK to create the virtual machine.

2. A **New Virtual Machine - Guide Me** window opens. This allows you to add networks and storage disks to the virtual machine.
3. Click **Configure Network Interfaces** to define networks for your virtual machine. The parameters in the following figure are recommended, but can be edited as necessary. When you have configured your required settings, click **OK**.

4. You are returned to the Guide Me window. This time, click **Configure Virtual Disks** to add storage to the virtual machine. The parameters in the following figure are recommended, but can
be edited as necessary. When you have configured your required settings, click OK.

Figure 4.5. New Virtual Disk configurations

5. Close the Guide Me window by clicking Configure Later. Your new RHEL 6 virtual machine will display in the Virtual Machines tab.

You have now created your first Red Hat Enterprise Linux virtual machine. Before you can use your virtual machine, install an operating system on it.

To install the Red Hat Enterprise Linux guest operating system

1. Right click the virtual machine and select Run Once. Configure the following options:
Figure 4.6. Run Red Hat Enterprise Linux Virtual Machine

- **Attach CD**: Red Hat Enterprise Linux 6
- **Boot Sequence**: CD-ROM
- **Display protocol**: SPICE

Retain the default settings for the other options and click **OK** to start the virtual machine.

2. Select the virtual machine and click the **Console** icon. As this is your first time connecting to the virtual machine, allow the installation of the Spice Active X and the SPICE client.

3. After the SPICE plugins have been installed, select the virtual machine and click the **Console** icon again. This displays a window to the virtual machine, where you will be prompted to begin installing the operating system. For further instructions, see the Red Hat Enterprise Linux Installation Guide.

4. After the installation has completed, shut down the virtual machine and reboot from the hard drive.

You can now connect to your Red Hat Enterprise Linux virtual machine and start using it.
4.1.2. Create a Windows Virtual Machine

You now know how to create a Red Hat Enterprise Linux virtual machine from scratch. The procedure of creating a Windows virtual machine is similar, except that it requires additional virtio drivers. This example uses Windows 7, but you can also use other Windows operating systems. You will perform a normal attended installation using a virtual DVD.

To create a Windows desktop

1. Navigate to the **Tree** pane and click **Expand All**. Click the **VMs** icon under the Default cluster. On the **Virtual Machines** tab, click **New Desktop**.

2. A **New Virtual Machine - Guide Me** window opens. This allows you to define networks for the virtual machine. Click **Configure Network Interfaces**. See Figure 4.4, "New Network Interface configurations" for details.
3. You are returned to the Guide Me window. This time, click **Configure Virtual Disks** to add storage to the virtual machine. See Figure 4.5, “New Virtual Disk configurations” for details.


**To install Windows guest operating system**

1. Right click the virtual machine and select **Run Once**. The Run Once dialog displays as in Figure 4.6, “Run Red Hat Enterprise Linux Virtual Machine”. Configure the following options:
   - **Attach Floppy**: virtio-win
   - **Attach CD**: Windows 7
   - **Boot sequence**: CD-ROM
   - **Display protocol**: SPICE

   Retain the default settings for the other options and click **OK** to start the virtual machine.

2. Select the virtual machine and click the **Console** icon. This displays a window to the virtual machine, where you will be prompted to begin installing the operating system.

3. Accept the default settings and enter the required information as necessary. The only change you must make is to manually install the VirtIO drivers from the virtual floppy disk (vfd) image. To do so, select the **Custom (advanced)** installation option and click **Load Driver**. Press Ctrl and select:
   - **Red Hat VirtIO Ethernet Adapter**
   - **Red Hat VirtIO SCSI Controller**

   The installation process commences, and the system will reboot itself several times.

4. Back on the administration portal, when the virtual machine’s status changes back to **Up**, right click on it and select **Change CD**. From the list of images, select **RHEV-toolsSetup** to attach the Guest Tools ISO which provides features including USB redirection and SPICE display optimization.

5. Click **Console** and log in to the virtual machine. Locate the CD drive to access the contents of the Guest Tools ISO, and launch the **RHEV-toolsSetup** executable. After the tools have been installed, you will be prompted to restart the machine for changes to be applied.

You can now connect to your Windows virtual machine and start using it.

### 4.2. Using Templates
Figure 4.8. Create Templates

Now that you know how to create a virtual machine, you can save its settings into a template. This template will retain the original virtual machine’s configurations, including virtual disk and network interface settings, operating systems and applications. You can use this template to rapidly create replicas of the original virtual machine.

4.2.1. Create a Red Hat Enterprise Linux Template

To make a Red Hat Enterprise Linux virtual machine template, use the virtual machine you created in Section 4.1.1, “Create a Red Hat Enterprise Linux Virtual Machine” as a basis. Before it can be used, it has to be sealed. This ensures that machine-specific settings are not propagated through the template.

Summary

You will now generalize (or “seal”) a Linux virtual machine before you make it into a template. This prevents conflicts between virtual machines deployed from the template.

Procedure 4.1. Preparing a Red Hat Enterprise Linux virtual machine for use as a template

1. Log in to the virtual machine. Flag the system for re-configuration by running the following command as root:

   ```
   # touch /.unconfigured
   ```

2. Remove ssh host keys. Run:

   ```
   # rm -rf /etc/ssh/ssh_host_*
   ```

3. Set HOSTNAME=localhost.localdomain in /etc/sysconfig/network

4. Remove /etc/udev/rules.d/70-* Run:
5. Remove the `HWADDR=` line from `/etc/sysconfig/network-scripts/ifcfg-eth*`.
6. Delete all the logs from `/var/log` and build logs from `/root`.
7. Shut down the virtual machine. Run:

   ```
   # poweroff
   ```

**Result**

The virtual machine is sealed and can be made into a template. You can deploy Linux virtual machines from this template without experiencing configuration-file-related conflicts.

**To create a template from a Red Hat Enterprise Linux virtual machine**

1. In the administration portal, click the **Virtual Machines** tab. Select the sealed Red Hat Enterprise Linux 6 virtual machine. Ensure that it has a status of **Down**.
2. Click **Make Template**. The **New Virtual Machine Template** displays.

![Figure 4.9. Make new virtual machine template](image)

Enter information into the following fields:

- **Name**: Name of the new template
- **Description**: Description of the new template
Host Cluster: The Host Cluster for the virtual machines using this template.

Make Private: If you tick this check box, the template will only be available to the template’s creator and the administrative user. Nobody else can use this template unless they are given permissions by the existing permitted users.

3. Click OK. The virtual machine displays a status of "Image Locked" while the template is being created. The template is created and added to the Templates tab. During this time, the action buttons for the template remain disabled. Once created, the action buttons are enabled and the template is ready for use.

4.2.2. Clone a Red Hat Enterprise Linux Virtual Machine

In the previous section, you created a Red Hat Enterprise Linux template complete with pre-configured storage, networking and operating system settings. Now, you will use this template to deploy a pre-installed virtual machine.

To clone a Red Hat Enterprise Linux virtual machine from a template

1. Navigate to the Tree pane and click Expand All. Click the VMs icon under the Default cluster. On the Virtual Machines tab, click New Server.

![New Server Virtual Machine](image)

Figure 4.10. Create virtual machine based on Linux template
a. On the **General** tab, select the existing Linux template from the **Based on Template** list.
b. Enter a suitable **Name** and appropriate **Description**, then accept the default values inherited from the template in the rest of the fields. You can change them if needed.
c. Click the **Resource Allocation** tab. In the **Provisioning** field, select the **Clone** option.

![New Server Virtual Machine](image)

**Figure 4.11. Set the provisioning to Clone**

2. Retain all other default settings and click **OK** to create the virtual machine. The virtual machine displays in the Virtual Machines list.

### 4.2.3. Create a Windows Template

To make a Windows virtual machine template, use the virtual machine you created in **Section 4.1.2, “Create a Windows Virtual Machine”** as a basis.

Before a template for Windows virtual machines can be created, it has to be sealed with **sysprep**. This ensures that machine-specific settings are not propagated through the template.

Note that the procedure below is applicable for creating Windows 7 and Windows 2008 R2 templates. If you wish to seal a Windows XP template, refer to the **Red Hat Enterprise Virtualization Administration**
Guide.

To seal a Windows virtual machine with `sysprep`

1. In the Windows virtual machine to be used as a template, open a command line terminal and type `regedit`.
2. The Registry Editor window displays. On the left pane, expand `HKEY_LOCAL_MACHINE → SYSTEM → SETUP`.
3. On the main window, right click to add a new string value using `New → String Value`. Right click on the file and select `Modify`. When the `Edit String` dialog box displays, enter the following information in the provided text boxes:
   - Value name: `UnattendFile`
   - Value data: `a:\sysprep.inf`
4. Launch `sysprep` from `C:\Windows\System32\sysprep\sysprep.exe`
   - Under `System Cleanup Action`, select `Enter System Out-of-Box-Experience (OOBE)`.
   - Tick the `Generalize` check box if you need to change the computer's system identification number (SID).
   - Under `Shutdown Options`, select `Shutdown`.
   - Click `OK`. The virtual machine will now go through the sealing process and shut down automatically.

To create a template from an existing Windows machine

1. In the administration portal, click the `Virtual Machines` tab. Select the sealed Windows 7 virtual machine. Ensure that it has a status of `Down` and click `Make Template`.
2. The `New Virtual Machine Template` displays. Enter information into the following fields:
   - `Name`: Name of the new template
   - `Description`: Description of the new template
   - `Host Cluster`: The Host Cluster for the virtual machines using this template.
   - `Make Public`: Check this box to allow all users to access this template.
3. Click `OK`. In the `Templates` tab, the template displays the "Image Locked" status icon while it is being created. During this time, the action buttons for the template remain disabled. Once created, the action buttons are enabled and the template is ready for use.

You can now create new Windows machines using this template.

4.2.4. Create a Windows Virtual Machine from a Template

This section describes how to create a Windows 7 virtual machine using the template created in Section 4.2.3, “Create a Windows Template”.

To create a Windows virtual machine from a template

1. Navigate to the `Tree` pane and click `Expand All`. Click the `VMs` icon under the Default cluster. On the `Virtual Machines` tab, click `New Desktop`.
   a. Select the existing Windows template from the `Based on Template` list.
   b. Enter a suitable `Name` and appropriate `Description`, and accept the default values inherited from the template in the rest of the fields. You can change them if needed.
2. Retain all other default setting and click `OK` to create the virtual machine. The virtual machine displays in the Virtual Machines list with a status of "Image Locked" until the virtual disk is created.
The virtual disk and networking settings are inherited from the template, and do not have to be reconfigured.

3. Click the Run icon to turn it on. This time, the Run Once steps are not required as the operating system has already been installed onto the virtual machine hard drive. Click the green Console button to connect to the virtual machine.

You have now learned how to create Red Hat Enterprise Linux and Windows virtual machines with and without templates. Next, you will learn how to access these virtual machines from a user portal.

4.3. Using Virtual Machines

Now that you have created several running virtual machines, you can assign users to access them from the user portal. You can use virtual machines the same way you would use a physical desktop.

4.3.1. Assign User Permissions

Red Hat Enterprise Virtualization has a sophisticated multi-level administration system, in which customized permissions for each system component can be assigned to different users as necessary. For instance, to access a virtual machine from the user portal, a user must have either UserRole or PowerUserRole permissions for the virtual machine. These permissions are added from the manager administration portal. For more information on the levels of user permissions refer to the Red Hat Enterprise Virtualization Administration Guide.

**To assign PowerUserRole permissions**

1. Navigate to the Tree pane and click Expand All. Click the VMs icon under the Default cluster. On the Virtual Machines tab, select the virtual machine you would like to assign a user to.
2. On the **Details** pane, navigate to the **Permissions** tab. Click the **Add** button.

3. The **Add Permission to User** dialog displays. Enter a Name, or User Name, or part thereof in the **Search** textbox, and click **Go**. A list of possible matches display in the results list.

4. Select the check box of the user to be assigned the permissions. Scroll through the **Assign role to user** list and select **PowerUserRole**. Click **OK**.

### 4.3.2. Log in to the User Portal
Now that you have assigned PowerUserRole permissions on a virtual machine to the user named admin, you can access the virtual machine from the user portal. To log in to the user portal, all you need is a Linux client running Mozilla Firefox.

If you are using a Red Hat Enterprise Linux client, install the SPICE plug-in before logging in to the User Portal. Run:

```
# yum install spice-xpi
```

**To log in to the User Portal**

1. Open your browser and navigate to `https://domain.example.com/UserPortal`. Substitute `domain.example.com` with the Red Hat Enterprise Virtualization Manager server address.
2. The login screen displays. Enter your User Name and Password, and click Login.

You have now logged into the user portal. As you have PowerUserRole permissions, you are taken by default to the Extended User Portal, where you can create and manage virtual machines in addition to using them. This portal is ideal if you are a system administrator who has to provision multiple virtual machines for yourself or other users in your environment. For more information, see the *Red Hat Enterprise Virtualization Power User Portal Guide*. 
You can also toggle to the Basic User Portal, which is the default (and only) display for users with UserRole permissions. This portal allows users to access and use virtual machines, and is ideal for everyday users who do not need to make configuration changes to the system. For more information, see the Red Hat Enterprise Virtualization User Portal Guide.

You have now completed the Quick Start Guide, and successfully set up Red Hat Enterprise Virtualization. However, this is just the first step for you to familiarize yourself with basic Red Hat Enterprise Virtualization operations. You can further customize your own unique environment based on your organization’s needs by working with our solution architects. To learn more visit the Red Hat Customer Portal at https://access.redhat.com/home.
## Revision History

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