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FUJITSU

FUJITSU Server PRIMEQUEST 2000 Series

Basic Installation Guide for Linux/KVM

FUJITSU LIMITED

Preface

This manual is a guide to assist in the configuration and installation of the PRIMEQUEST 2000 series.

This manual describes the basic procedures for the installation of hypervisor and guest OS using the virtual machine function (KVM) and for starting use of the virtual environment. Combination with middleware is not considered. If individual settings are required for a specific middleware, set the environment according to the settings.

System Configuration

This manual describes the case for the system configuration shown below.

Copying a virtual machine can easily create the same machine configuration.

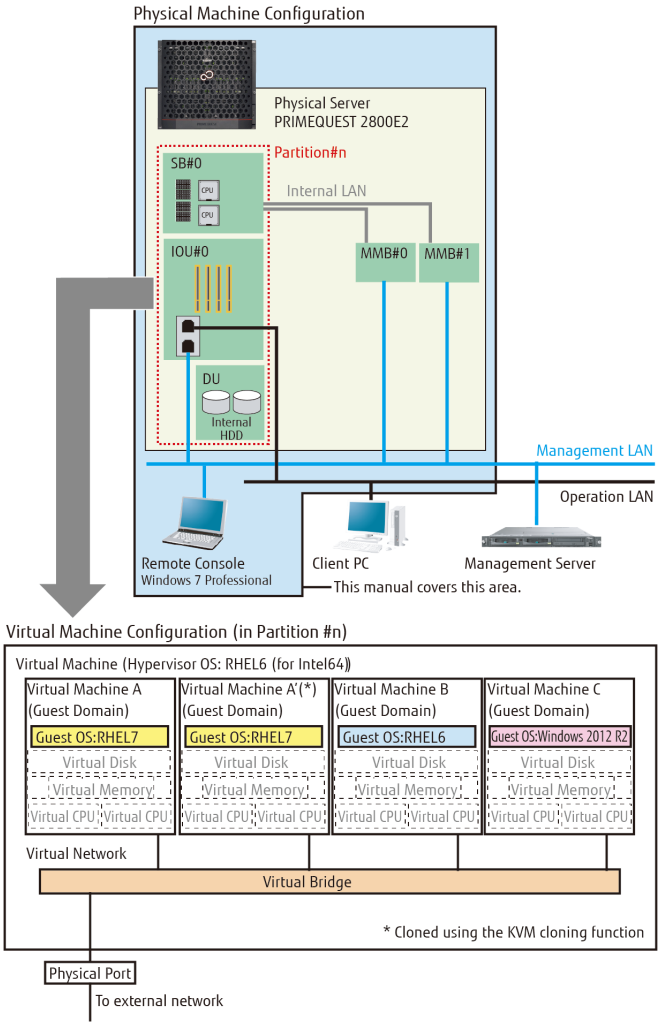

Figure System Configuration Described in This Manual

Caution

The maximum number of guest instances on RHEL-KVM is four guests (including other OSs such as Windows). If more than four guests are used, including OSs other than RHEL, Red Hat Enterprise Virtualization or another third party hypervisor is required.

Item		Configuration
Model		PRIMEQUEST 2800E2
Cluster		Not supported (single configuration)
Operating system boot (hypervisor, guest)		Internal disk
Memory mirror		Supported
Partition configuration	SB	1 (Per 1SB, CPU: 18-core (2.50GHz/45MB) × 2 Memory: 64GB (8GB × 8 sets))
	IO unit	1
	DU	HDD (300GB) × 2 units RAID level 1
Hypervisor		Red Hat® Enterprise Linux® 6.5 (for Intel64)
Operation management software		ServerView Suite 11.15.07
Virtual machine configuration (RHEL)	Guest OS and no. of domains	Red Hat® Enterprise Linux® 7.1 (for Intel64) × 2 domains Red Hat® Enterprise Linux® 6.5 (for Intel64) × 1 domain
	Virtual CPU	2vCPU per virtual machine
	Virtual memory	2048MB per virtual machine
	Virtual storage	25GB per virtual machine
	Virtual bridge	1 (shared by all virtual machines)
Virtual machine configuration (Windows)	Guest OS and no. of domains	Microsoft® Windows Server® 2012 R2 × 1 domain
	Virtual CPU	2vCPU
	Virtual memory	2048MB
	Virtual storage	40GB
	Virtual bridge	1 (shared by all virtual machines)

Abbreviations

This manual uses the following product name abbreviations:

Name	Abbreviation	
PRIMEQUEST 2400E	PRIMEQUEST 2000 series or PRIMEQUEST	
PRIMEQUEST 2400E2		
PRIMEQUEST 2800B		
PRIMEQUEST 2800B2		
PRIMEQUEST 2800E		
PRIMEQUEST 2800E2		
Red Hat® Enterprise Linux® 6 (for Intel64)	RHEL6.5, RHEL6	Linux, RHEL
Red Hat® Enterprise Linux® 6 (for x86)		
Red Hat® Enterprise Linux® 7 (for Intel64)	RHEL7.1, RHEL7	
Red Hat® Enterprise Linux® 7 (for x86)		
Microsoft® Windows Server® 2012 R2	Windows Server 2012 R2	Windows
ServerView Suite ServerView Installation Manager	SVIM	

Related Documents

Refer to the following documents as needed during system configuration:

Name	Abbreviation
PRIMEQUEST 2000 Series General Description	General Description
PRIMEQUEST 2000 Series Installation Manual	Installation Manual
PRIMEQUEST 2000 Series Tool Reference	Tool Reference
ServerView Suite ServerView Installation Manager	–
Red Hat Enterprise Linux 6 Developer Guide (*1)	Red Hat Enterprise Linux Developer Guide
Red Hat Enterprise Linux 7 System Administrator's Guide (*1)	
Red Hat Enterprise Linux 6 Virtualization Administration Guide (*1)	Virtualization Guide
Red Hat Enterprise Linux 6 Virtualization Getting Started Guide (*1)	
Red Hat Enterprise Linux 6 Virtualization Host Configuration and Guest Installation Guide (*1)	
Red Hat Enterprise Linux 6 Virtualization Security Guide (*1)	

(*1) Can be referred to from the document site of Red Hat, Inc. (https://access.redhat.com/documentation/en/)

Command Input

In this manual, command input is expressed as follows:

- Character strings that are user-dependent variables (variables depending on the user environment)

  Shown in italic type as follows:

```
# /sbin/e2label <device> <label>
```

- Character strings to be added or changed

  Shown in bold type as follows:

```
NETWORKING=yes
HOSTNAME=xxxx
:
VLAN=yes
```

Trademarks

- Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries.
- Red Hat and Red Hat Enterprise Linux are trademarks of Red Hat, Inc., registered in the U.S. and other countries.
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Table of Contents

1. Pre-installation Preparation

This chapter describes the operations required before a virtual environment is built with the PRIMEQUEST 2000 series.

1.1 Physical Machine Setting

Prepare a physical machine according to Chapters 1 to 3 in "Installation Manual".

The major operations and references are as follows:

Item	Operation	Refer to:
Connecting to the MMB and configuration setting	Network setting, etc.	"3.3 Connection and Setting of MMB" in "Installation Manual"
Partition setting	Partition configuration creation, etc.	"3.4 Partition Configuration (Physical Partition)" in "Installation Manual"
Saving the configuration information	Saving the MMB configuration information	"3.7 Storage of the configuration information" in "Installation Manual"
Canceling Boot Watchdog	Canceling Boot Watchdog using the [ASR Control] menu in MMB Web-UI	"11.4.1 Setting automatic partition restart conditions" in "Administration Manual"
Checking/changing CPU settings	Checking/changing the settings using the [Device Manager] - [CPU Configuration] menu in UEFI	The following descriptions and "Tool Reference"

- Checking/changing CPU settings

  Check/change the settings shown below using the [Device Manager] - [CPU Configuration] menu in UEFI.

  For details about how to set UEFI, refer to "Tool Reference".

  - To use KVM, enable the Intel VT function ([Intel Virtualization]). (Enabled by default.)

    Enable the function if it was disabled.
  - On the PRIMEQUEST 2400E2/2800B2/2800E2, enable [x2APIC Mode]. (Enabled by default.)
  - To correctly grasp the CPU usage, disable the hyper threading function ([Hyper-threading]).
  - To place more emphasis on performance than on power saving, disable the CPU power saving function ([Enhanced Speed Step]).

1.2 Preparation of Media

Prepare the following media required for the installation.

Media	Use	Acquisition method
ServerView Suite DVD	Installation settings for hypervisor	Bundled with the PRIMEQUEST main unit
RHEL distribution DVD image	Installation of hypervisor and guest OS	See "1.2.1 Preparation of RHEL Distribution DVD Image".
Windows Server 2012 installation media	Installation of guest OS	Bundled with the server main unit
virtio-win package		See "1.2.2 Preparation of Supplementary CD Image".

Remarks

For details about ServerView Suite, refer to "General Description".

1.2.1 Preparation of RHEL Distribution DVD Image

On another system, download the ISO image file of the distribution DVD from the Red Hat Customer Portal website (https://access.redhat.com).

Caution

- A subscription to the customer portal is required for downloads.
- The image file of the distribution DVD is different for each minor release and architecture (for x86/for Intel64). Download the targeted DVD image file.

1.2.2 Preparation of Supplementary CD Image

If Windows is installed as the guest OS, the supplementary CD image must be prepared. On another system, download the ISO image file of the supplementary CD from the Red Hat Customer Portal website (https://access.redhat.com).

Caution

- A subscription to the customer portal is required for downloads.
- The image file of the supplementary CD is different for each minor release and architecture (for x86/for Intel64). Download the targeted CD image file.

2. Installation of Hypervisor

This chapter describes the procedures for the installation of hypervisors.

2.1 Installation Using SVIM

This section describes the procedures for the installation of hypervisors in the Customized mode of SVIM.

This manual explains how to install RHEL6 (for Intel64) using ServerView Installation Manager 11.15.07.

1. Install "ServerView Suite DVD1" in the PC to connect to the virtual medium.
2. Prepare to boot the partition from a virtual medium.
    1. Start the video redirection from MMB Web-UI.
    For details about MMB Web-UI, refer to "Tool Reference".

    Caution

    Using the video redirection requires an environment where Java can be used on the browser on the PC for console.

    2. Select [Media] - [Virtual Media Wizard...] and add the drive in which "ServerView Suite DVD1" is inserted.
    3. Select [Connect CD/DVD] for the CD/DVD medium and click [OK].
3. Configure the settings to start from the inserted DVD, and turn on the partition.
    1. On the [Power Control] screen of MMB Web-UI, select [Force boot from UEFI DVD] from [Boot Selector] for the target partition.
    2. Select [Power on] for [Power Control] and click [Apply].

4. On the [Boot Manager] screen, select [ServerView Installation Manager (WinPE64)] and press the [Enter] key.

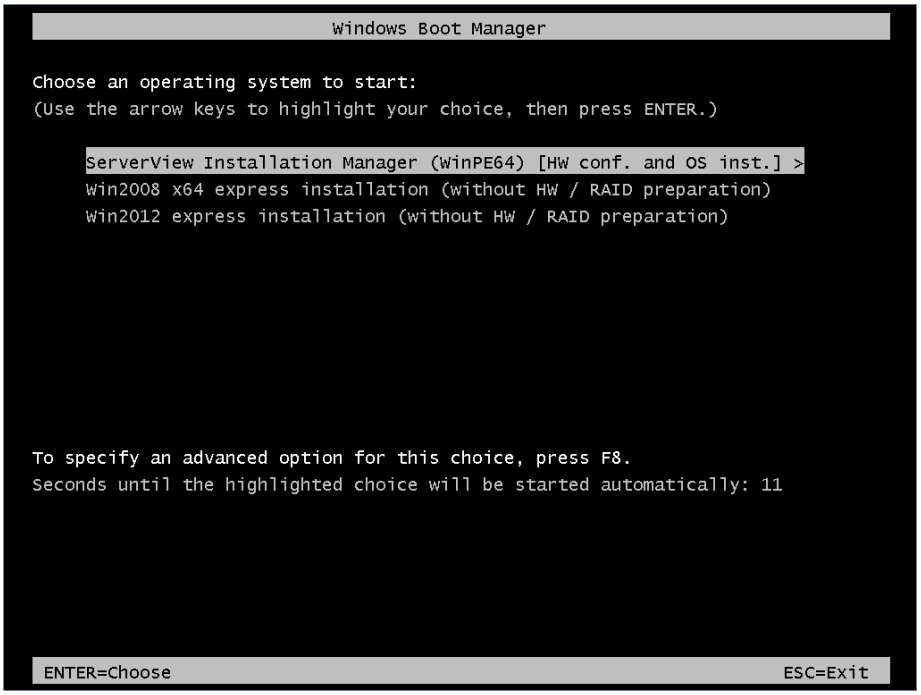

Figure 2-1 Boot Manager

5. On the language selection screen, select the language to be used for installation ([English] in the example below).

Figure 2-2 Language Selection

6. On the [Session Control Window] screen, click [Continue] without setting anything.

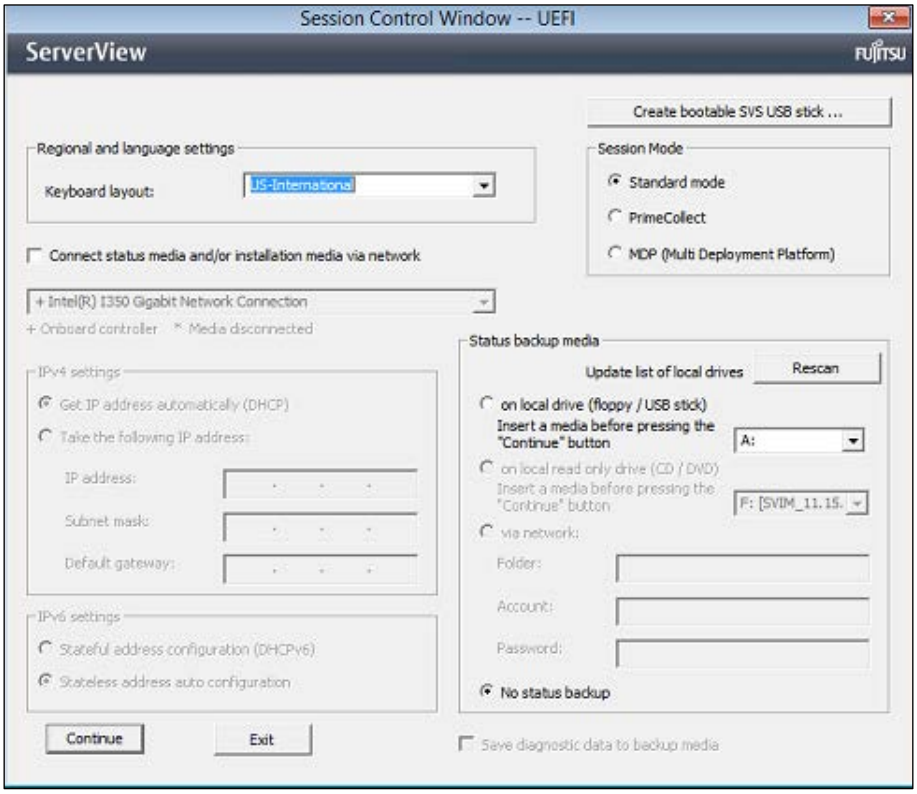

Figure 2-3 Session Control Window

7. On the [Welcome to ServerView Installation Manager] screen, click [Deployment].

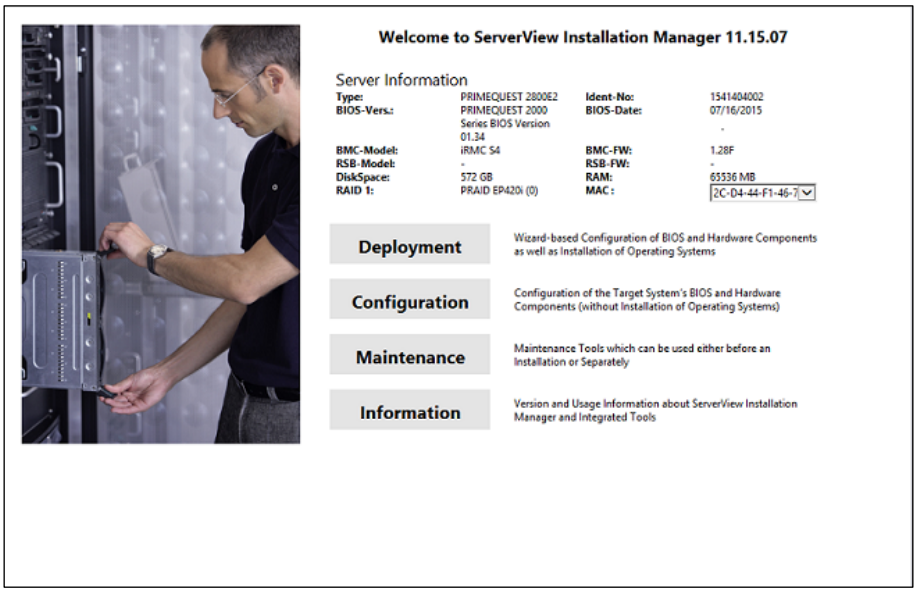

Figure 2-4 Welcome to ServerView Installation Manager

8. On the [Installation Manager Deployment Process Selection] screen, select [Customized] and click [Next].

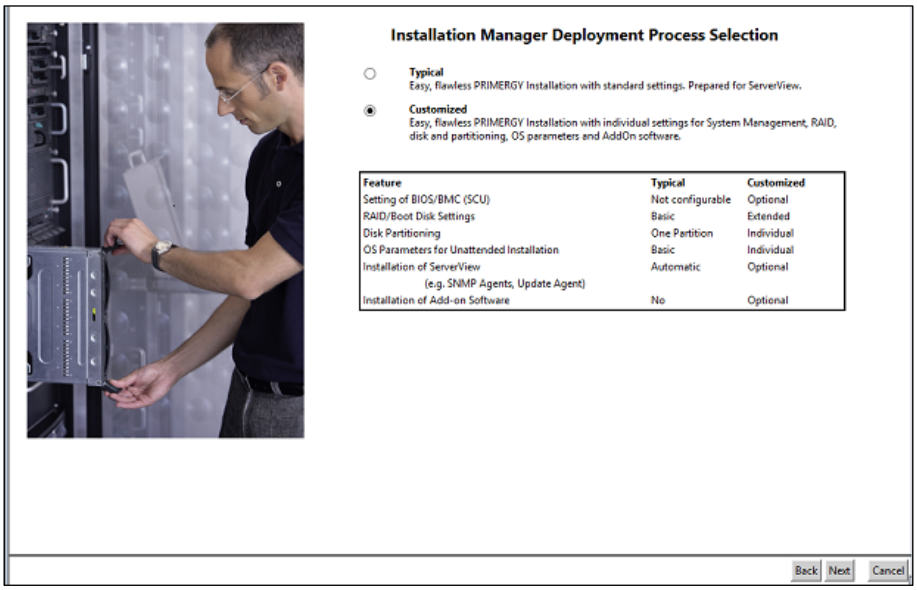

Figure 2-5 Installation Manager Deployment Process Selection

9. Select an operating system on the [Configure your Unattended Operating System Installation] screen.

   1. When no existing configurations are to be used, select [Create a new configuration file].
   2. Select [Linux] for the OS and [Red Hat Enterprise Linux] for distribution, and select the version and minor number to be used.
   3. Clear the [Edit Server Management Settings] checkbox.
   4. Click [Next].

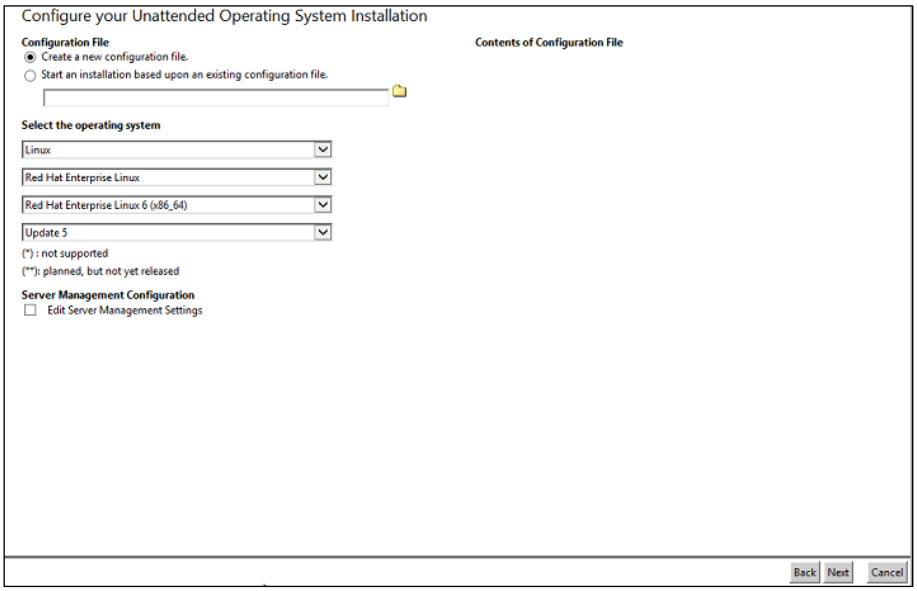

Figure 2-6 Configure Your Unattended Operating System Installation

10. On the [Configuration for Disks and RAID Controllers] screen, create the required partitions.

▸ Change the default settings for [/boot] and [/].

1. Click [+] on the left of each partition.
2. Change [Filesystem Type] to [ext3] and click [Apply].

▸ Create the partition for the guest OS.

1. Click [Add Partition].
2. Click [+] on the left of the added partition.
3. Select [custom] for [Mount Point] and enter the directory name of the mount point for the guest OS ("/var/lib/libvirt/images" in the example below).
4. Confirm that [Filesystem Type] is set to [ext3] and enter the disk size to be used in MB. (In the example below, enter "90000" in [Size (MB)] and select [Fill to maximum allowable size].)
5. Click [Apply].

11. Click [Next].

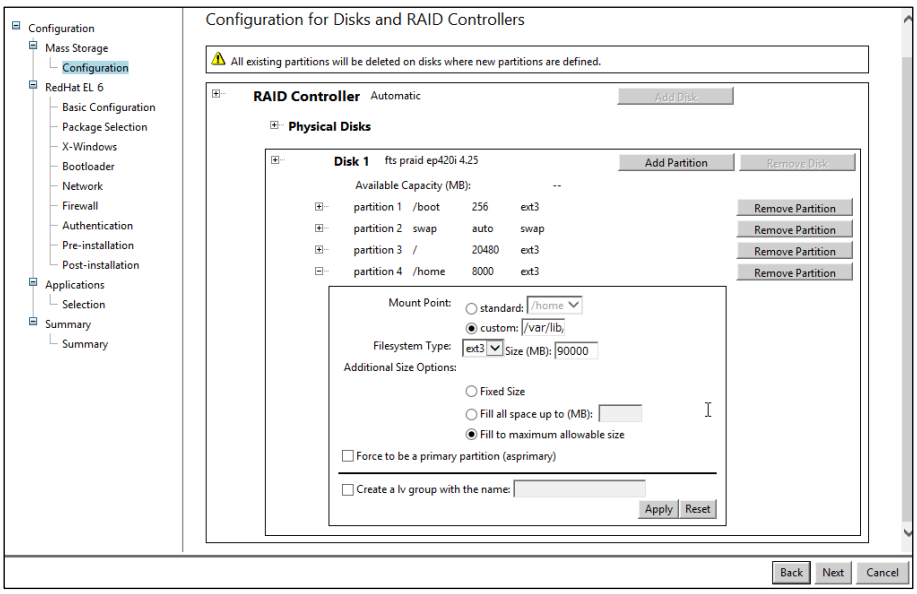

Figure 2-7 Configuration for Disks and RAID Controllers

12. Configure the basic settings for Red Hat Enterprise Linux on the [Basic Configuration] screen.

1. Configure [Localization].
   Example:
   - Select [English] for [Language].
   - Select [U.S. English] for [Keyboard].
   - Select [America/New_York] for [Time zone].
   - Clear the [System clock uses UTC] checkbox.
2. Enter the root password in [Password].
3. In [Installation settings], confirm that the [Reboot system after installation] checkbox is cleared.

4. Click [Next].

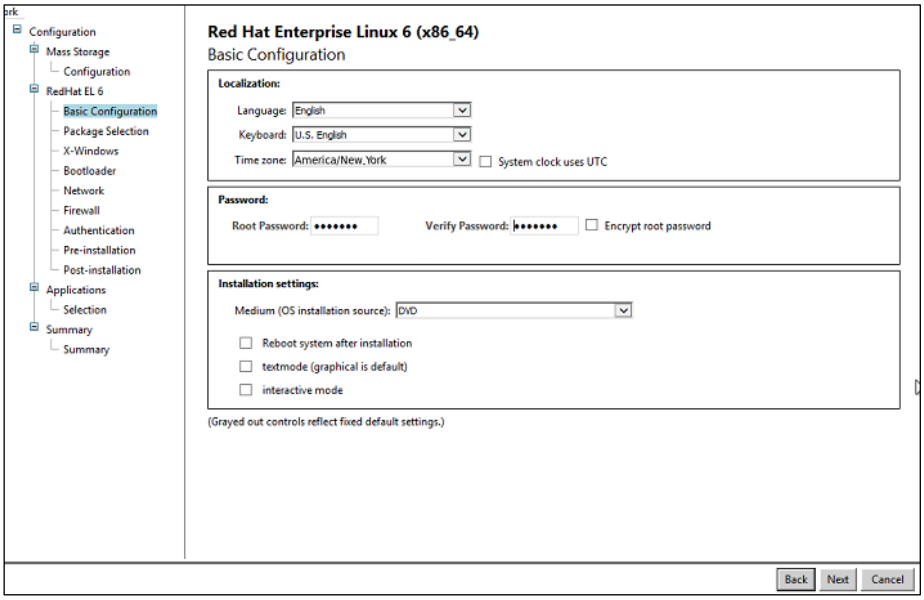

Figure 2-8 Basic Configuration

13. On the [Package Selection] screen, select the package to be installed.

1. In [Initialize package selection], click [Default package groups].

Caution

[Default package groups] is a group of packages recommended by Fujitsu.

Do not use [Minimal system] or [Install everything].

2. In [Select packages], select the [Virtualization] checkbox.
3. Click [Next].

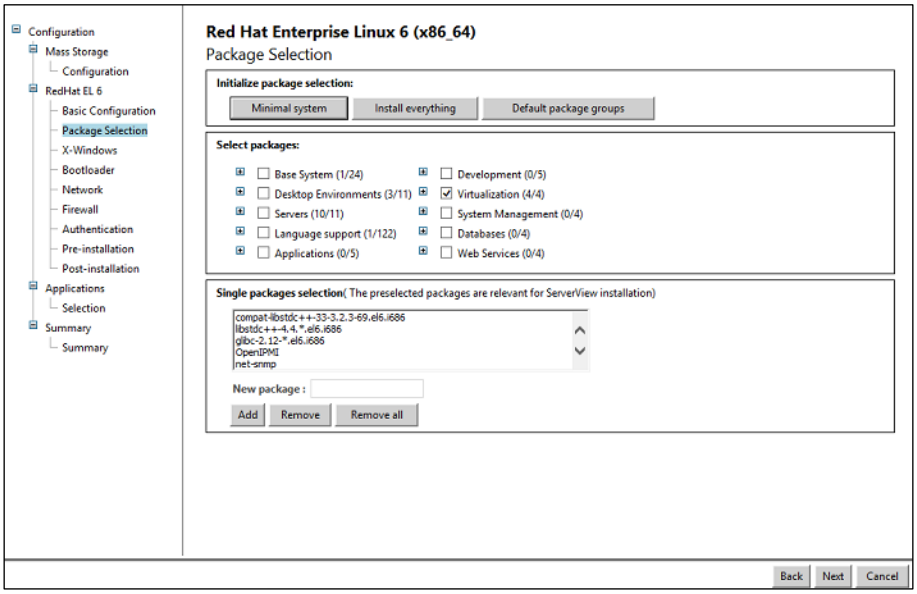

Figure 2-9 Package Selection

14. On the [X Configuration] screen, click [Next] without changing the default values.
15. On the [GRUB Bootloader Options / Mount Options] screen, click [Next] without changing the default values.
16. Configure the network settings on the [Network configuration] screen.
    1. In the [Computer name] field, enter the host name.
    2. Clear the [Configure all network interfaces via DHCP] checkbox.
    3. Click [Next].

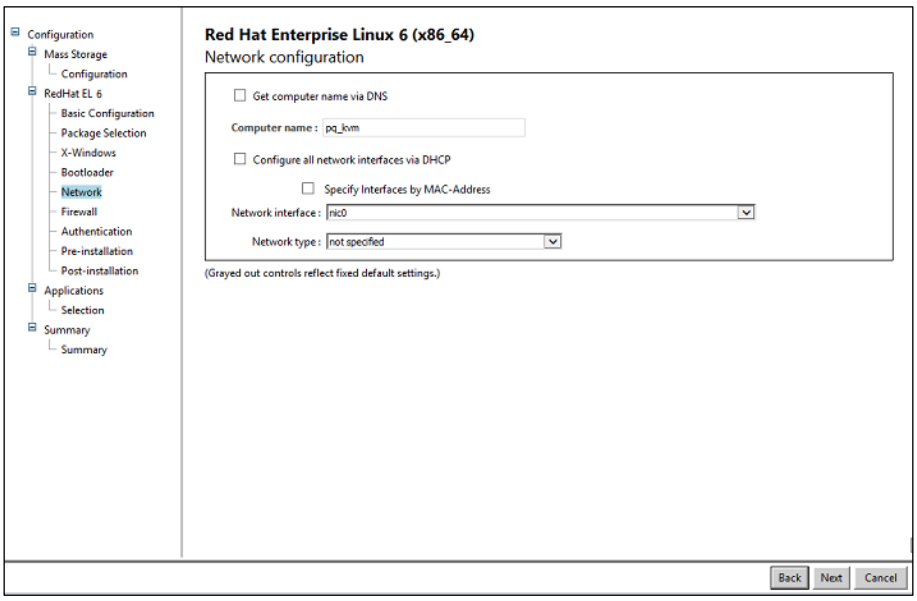

Figure 2-10 Network Configuration

17. On the [Security and Firewall] screen, click [Next] without changing the default values.
18. On the [Authentication] screen, click [Next] without changing the default values.
19. On the [Pre Installation Script] screen, click [Next] without changing the default values.
20. On the [Post Installation Script] screen, click [Next] without changing the default values.
21. On the [Application Wizard] screen, click [Next] without changing the default values.

22. Check the settings on the [Installation Info] screen, and click [Start Installation].
Automatic installation starts.

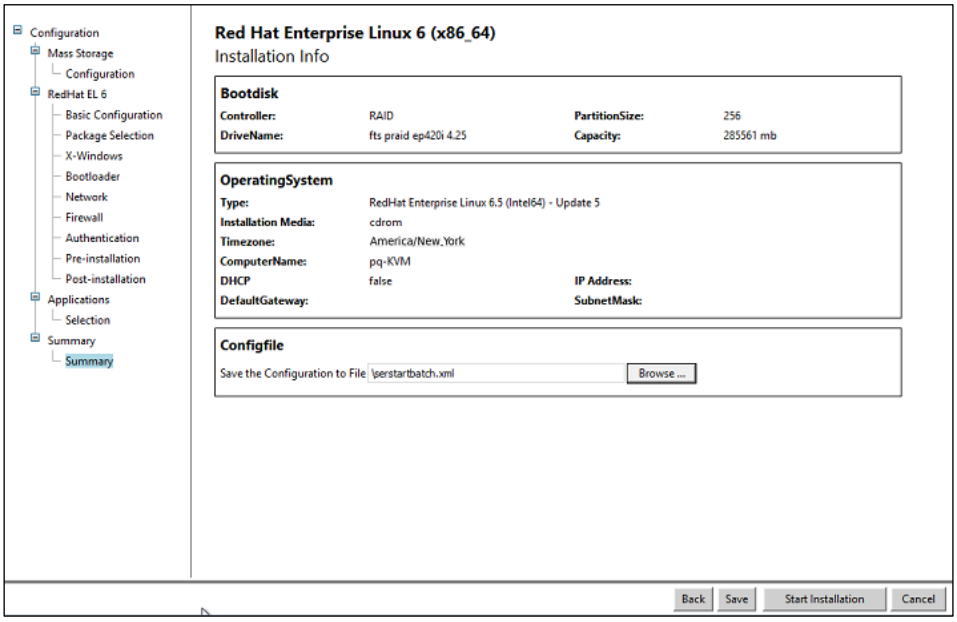

Figure 2-11 Installation Info

23. When the message shown below appears, disconnect the DVD drive by selecting [Media] from the video redirection, and click [OK].

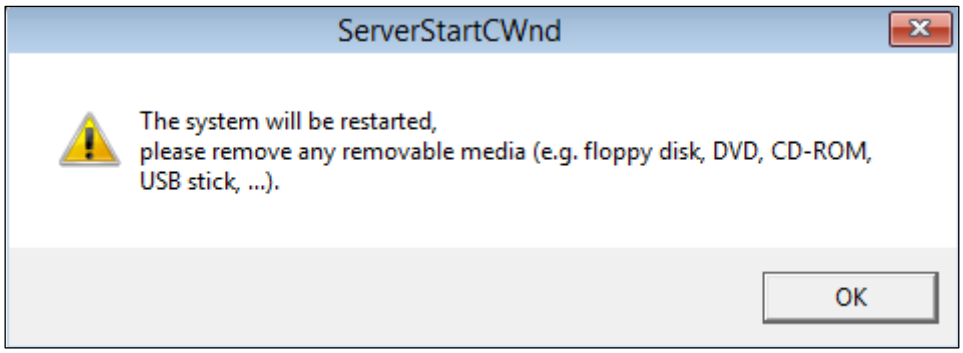

Figure 2-12 Media Removal Confirmation

24. When the message shown below appears after the restart, add and connect the ISO image of RHEL6 by selecting [Media] - [Virtual Media Wizard...] from the video redirection, and then press the [Enter] key.
The OS is installed.

Please attach CDROM Device (usb-device, iRMC, Console Switch)

25. When the completion screen shown below appears, disconnect the ISO image by selecting [Media] from the video redirection, and click [Reboot].

Figure 2-13 RHEL6 Installation Completion

After the required package is applied, the system reboots automatically. Before the reboot process is completed, disconnect the ISO image by selecting [Media] from the video redirection.

Remarks

After applying the package, if the system starts from the installation media of RHEL6 before the ISO image is disconnected, disconnect the ISO image and then reboot the system manually.

2.2 Checking and Setting After Installation

After the installation of the hypervisor, the operations shown below must be executed.

Item	Refer to:
Installation check of package, etc.	2.2.1 Installation Status Check
Date/time check	2.2.2 Date and Time Setting
Device name change prevention	2.2.3 Device Name Change Prevention Setting
File system option setting	2.2.4 File System Option Setting
Network setting	2.2.5 Network Setting
/etc/sysconfig/network setting	
/etc/hosts setting	
Network device name check	
NIC setting	
NTP setting	
Software update	2.2.6 Software Update
Dump environment setting	2.2.7 Dump Environment Setting
Saving management and configuration information	2.2.8 Saving Management and Configuration Information
Security settings	2.2.9 Security Settings
Installation of package for Windows guest (virtio-win)	2.2.10 Installation of Package for Windows Guest

Remarks

For details about the Linux settings, refer to the related RHEL manuals provided by Red Hat. For details about the management LAN and other functions specific to PRIMEQUEST, refer to the manuals (such as "General Description") for the PRIMEQUEST main unit.

2.2.1 Installation Status Check

■ Package Installation Check

After logging in to RHEL, check "install.log" to check if any error or warning was output during the installation.

Remarks

To check the complete installation log, refer to the /root/install.log file.

```
# less /root/install.log
```

2.2.2 Date and Time Setting

Set the date and time of the system.

Caution

To apply the time that was set with this procedure to the hardware, the system must be restarted after setting.

To check and set the system date and time using the "date" command, follow the procedure below.

1. Check the date and time of the system.

```
# date
Mon Aug 24 14 :45 :00 EST
```

2. If the system date and time are not correct, move to the single user mode and set the current time.
(Example) To set the system date and time to 14:47 on August 25, 2015:

```
# cd /
# shutdown now
...
# date 082514472015
Thu Aug 25 14 :47 :00 EST 2015
```

3. Restart the system.

```
# shutdown -r now
```

4. After the restart, log into the system and check whether the date and time are set correctly.

```
# date
Thu Aug 25 <current time> EST 2015
```

2.2.3 Device Name Change Prevention Setting

After the NIC is replaced or a new NIC is added, to prevent the device name from changing when the RHEL system is rebooted, record the network device information in the "udev" rule file.

For details, refer to the related RHEL manuals provided by Red Hat.

2.2.4 File System Option Setting

Specify the required file system options using the /etc/fstab file.

For details, refer to the related RHEL manuals provided by Red Hat.

2.2.5 Network Setting

■ /etc/sysconfig/network Setting

Configure the /etc/sysconfig/network file.

```
# vi /etc/sysconfig/network
NETWORKING=yes
HOSTNAME=<host name>
GATEWAY=<default gateway address>
```

■ /etc/hosts Setting

In /etc/hosts, describe the IP address of the local host.

```
# vi /etc/hosts

127.0.0.1 localhost localhost.localdomain localhost4
localhost4.localdomain4
::1       localhost localhost.localdomain localhost6
localhost6.localdomain6
<IP address>        <local host name>                    <- Add
...
```

Remarks

To configure a host other than the local host, add a line and describe the IP address and host name.

■ Network Device Name Check

Network devices are named in the order they are detected during system installation (eth0, eth1, ... ethX). Check which network device name is assigned to each LAN port of the main unit.

Check all network device names that are recognized by the system using the "ifconfig" command.

```
# /sbin/ifconfig -a

(Display Example)
eth0    Link encap:Ethernet HWaddr xx:xx:xx:xx:xx:xx
        inet6 addr: xxxx::xxx:xxxx:xxxx:xxxx/xx Scope:Link
        UP BROADCAST RUNNING MULTICAST  MTU:1500 Metric:1
        RX packet:2204  errors:0 dropped:0 overruns:0 frame:0
        TX packets:14 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:100
        RX bytes:150836 (147.3 KiB)  TX bytes:2700 (2.6 KiB)
        Memory: 93060000-93080000

eth1    Link encap:Ethernet HWaddr xx:xx:xx:xx:xx:xx
        BROADCAST MULTICAST MTU:1500 Metric:1
        RX packets:0  errors:0 dropped:0 overruns:0 frame:0
        TX packets:0  errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)
        Memory: 93220000-93240000
...
```

```
virbr0 Link encap: Ethernet HWaddr xx:xx:xx:xx:xx:xx
       inet addr:xxx.xxx.xxx.x Bcast:xxx.xxx.xxx.xxx Mask: xxx.xxx.xxx.x
       UP BROADCAST RUNNING MULTICAST MTU:1500  Metric:1
       RX packets:0 errors:0 dropped:0  overruns:0 frame:0
       TX packets:56 errors:0 dropped:0  overruns:0 carrier:0
       collisions:0 txqueuelen:1000
       RX bytes: 0 (0.0 b)  TX bytes:5097 (4.9 KiB)

virbr0-nic Link encap:  Ethernet HWaddr xx:xx:xx:xx:xx:xx
       BROADCAST MULTICAST MTU:1500  Metric:1
       RX packets:0 errors:0 dropped:0  overruns:0 frame:0
       TX packets:0 errors:0 dropped:0  overruns:0 carrier:0
       collisions:0 txqueuelen:500
       RX bytes: 0 (0.0 b)  TX bytes: 0 (0.0 b)
```

Remarks

After checking the network device name, check the following items using the "/sbin/ethtool -i ethX" command ("ethX" represents the checked network device name):

- Port number for internal LAN
  Check the interface name and driver name for which the bus-info (SEG:BUS:DEV.FUNC No.) is [0000:00:19.0].
- MAC address of the physical port that matches the network device name of the NIC to be used

■ NIC Setting

Set the address of the physical NIC to be used on the hypervisor.

Caution

The settings for the virtual bridge and the physical NIC to be connected to the virtual bridge are different from the descriptions below. See "3.1.2 Creation of Virtual Bridge for Guest OS".

1. For the NIC to be used, set the network address, broadcast address, and other settings.

```
# vi /etc/sysconfig/network-scripts/ifcfg-ethX
DEVICE="ethX"
BOOTPROTO="none"
HWADDR="<MAC address>"
IPV6INIT="yes"
#NM_CONTROLLED="yes"
NM_CONTROLLED="no"
IPADDR="<IP address>"
NETMASK="<subnet mask>"
```

```
NETWORK="<network address>"
BROADCAST="<broadcast address>"
ONBOOT=<Setting at OS boot>
```

Remarks

- Set "BOOTPROTO" to "none".
- Set "ONBOOT" to "yes" for the NIC to be used and "no" for the NIC not to be used.

2. Restart the network and apply the settings.

```
# service network restart
```

■ NTP Setting

Set the NTP client function.

1. In the ntp.conf file, describe the IP address of the upstream server that is used as the NTP reference. For stable NTP operation, install at least three reliable NTP servers.

```
# vi /etc/ntp.conf
server <IP address of NTP server-1>
server <IP address of NTP server-2>
server <IP address of NTP server-3>
```

Remarks

If the MMB uses NTP operation for time correction, specify the same NTP server that is specified by the MMB to each partition as well, in order to reduce differences in time between the MMB and partitions.

2. Set the IP address of the NTP server in the step-tickers file as well.

```
# vi /etc/ntp/step-tickers
# List of servers used for initial synchronization.
<IP address of NTP server-1>
<IP address of NTP server-2>
<IP address of NTP server-3>
```

3. Set the NTP service to the slew mode.
   Add the ntpd startup option "-x" to the ntpd file.

```
# vi /etc/sysconfig/ntpd

(Before change)
# Drop root to id 'ntp:ntp' by default.
OPTIONS="-u ntp:ntp -p /var/run/ntpd.pid -g"
(After change)
# Drop root to id 'ntp:ntp' by default.
OPTIONS="-x -u ntp:ntp -p /var/run/ntpd.pid -g"
```

4. Start NTP operation.

   1. Set the automatic startup of ntpdate and start the service.

```
# chkconfig ntpdate on
# service ntpdate start
(Display Example)
ntpdate: Synchronizing with time server:              [ OK ]
```

   2. Set the automatic startup of ntpd and start the service.

```
# chkconfig ntpd on
# service ntpd start
(Display Example)
Starting ntpd:                [ OK ]
```

5. Confirm that the ntpdate service is enabled at the run levels 2 - 5.

```
# /sbin/chkconfig --list ntpdate
(Display Example)
ntpdate   0:off  1:off  2:on  3:on  4:on  5:on  6:off
```

6. Confirm that ntpd is running and is enabled at the run levels 2 - 5.

```
# service ntpd status
(Display Example)
ntpd (pid xxx) is running...
# chkconfig --list ntpd
(Display Example)
ntpd   0:off  1:off  2:on  3:on  4:on  5:on  6:off
```

7. Check the NTP operation by using ntptrace (1M) or ntpq (1M) on the partition.
   It takes five or more minutes until synchronization between the NTP server and the client is established.
   When time synchronization is established, [*] is shown on the left of the host name or IP address of the NTP server.

```
# /usr/sbin/ntpq -p
(Display Example)
remote   refid   st t when poll reach delay offset jitter
*<NTP reference> LOCAL(0)  6u  42   64  377  0.56 -1.328  0.14
```

2.2.6 Software Update

If a new version of the driver or tool has been released, update the software.

For details about the update procedure for each piece of software, contact your sales representative.

2.2.7 Dump Environment Setting

For details about the dump environment settings, refer to the following documents:

- kdump

  Refer to the related RHEL manuals provided by Red Hat.

- sadump

  "5.3 Setting of sadump" in "Installation Manual"

2.2.8 Saving Management and Configuration Information

For details about saving management and configuration information, refer to "5.7 Saving management and configuration information" in "Installation Manual".

2.2.9 Security Settings

For details about the security settings, refer to the following documents:

- Settings on the MMB

  "6.5 Set up of security" in "Installation Manual"

- Settings on the OS

  General security settings: "Red Hat Enterprise Linux Developer Guide"

  Correction application: Refer to the related RHEL manuals provided by Red Hat.

2.2.10 Installation of Package for Windows Guest

1. Move to the directory (Example: Packages) where the virtio-win package in the supplementary CD prepared in advance is stored.

2. Enter the following command to install the virtio-win package:

   ```
   # rpm -ivh virtio-win-<version>.el6.noarch.rpm
   ```

   The file for Windows guest is expanded under /usr/share/virtio-win.

   Remarks

   If the hypervisor is RHEL6.5, the version of virtio-win is the default "virtio-win-1.6.7-2.el6.noarch.rpm".
   If "yum update" is performed, the version of virtio-win is updated.

   - "virtio-win-1.6.7-2.el6.noarch.rpm" if "yum update" has not been performed
   - "virtio-win-1.6.8-4.el6.noarch.rpm" or later if "yum update" has been performed

3. Configuration of Virtual Machine

This chapter describes the procedures for the configuration of a virtual machine and the installation of a guest OS.

This manual explains the procedures that use Virtual Machine Manager.

3.1 Preparation for Configuration

Perform the following preparations:

- 3.1.1 Allocation of Disk Space for Guest OS
- 3.1.2 Creation of Virtual Bridge for Guest OS
- 3.1.3 Preparation of Installation Media

3.1.1 Allocation of Disk Space for Guest OS

Check whether the location such as /var/lib/libvirt/images (*1) has enough disk space that can be used as the virtual storage for the virtual machine. If the space is insufficient, allocate more space using the "parted" command.

(*1) Installation directory of the virtual OS specified by Virtual Machine Manager by default

3.1.2 Creation of Virtual Bridge for Guest OS

To create a new virtual bridge on Virtual Machine Manager, follow the procedure below.

1. After logging in to the hypervisor with root privileges, start Virtual Machine Manager.
   Click [Applications] - [System Tools] - [Virtual Machine Manager].
2. On the toolbar, click [Edit] - [Connection Details].
3. Click the [Network Interfaces] tab.

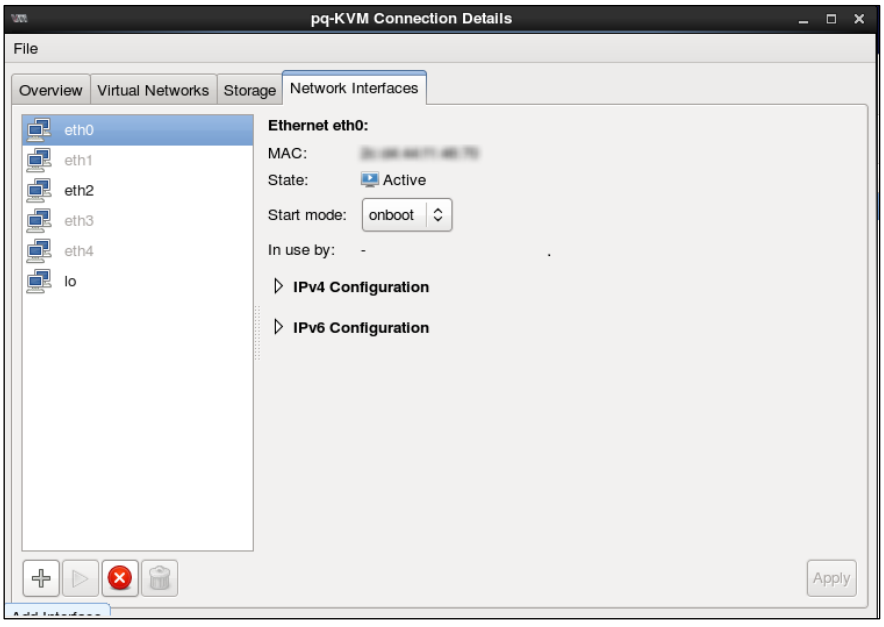

Figure 3-1 Network Interfaces (Before Setting)

4. Click [+] in the bottom left.

5. On the [Step 1 of 2] screen, confirm that [Interface type] is set to [Bridge], and click [Forward].

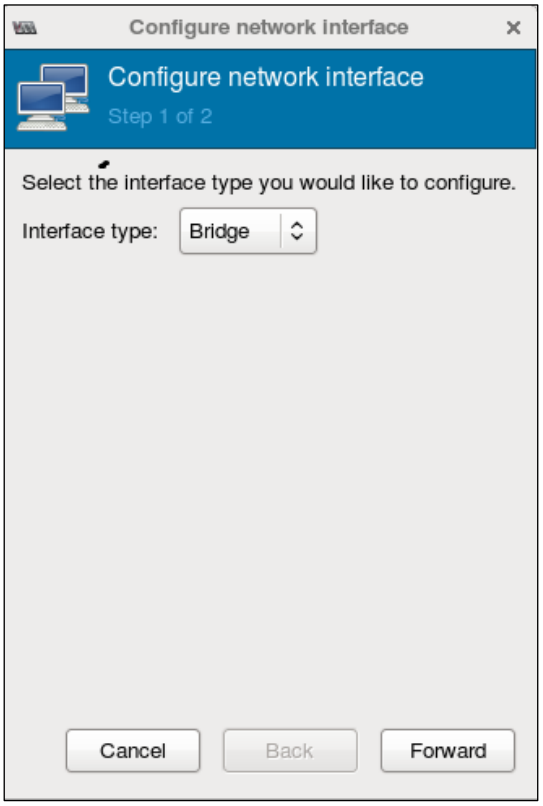

Figure 3-2 Configure Network Interface (1 of 2)

6. On the [Step 2 of 2] screen, perform the following procedure:

   1. Change the name when necessary ([br0] in the example below).
   2. Set [Start mode] to [onboot].
   3. Select the [Activate now] checkbox.
   4. Click [Configure] on the right of [Bridge settings] and clear the [Enable STP] checkbox.
   5. In [Choose interface(s) to bridge:], select the physical NIC ([eth2] in the example below) that connects the virtual bridge.
   6. Confirm that [IP settings] shows [Copy configuration from 'ethX'] ([eth2] in the example below).

7. Click [Finish].

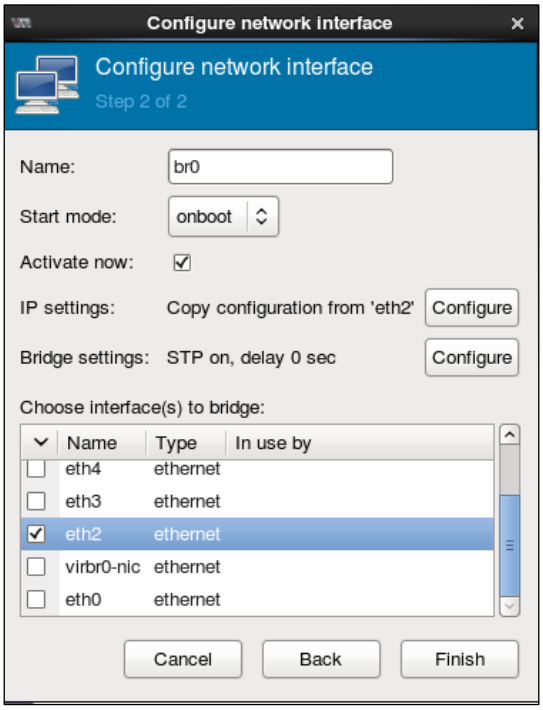

Figure 3-3 Configure Network Interface (2 of 2)

8. When the message shown below appears, click [Yes].
The virtual bridge is created.

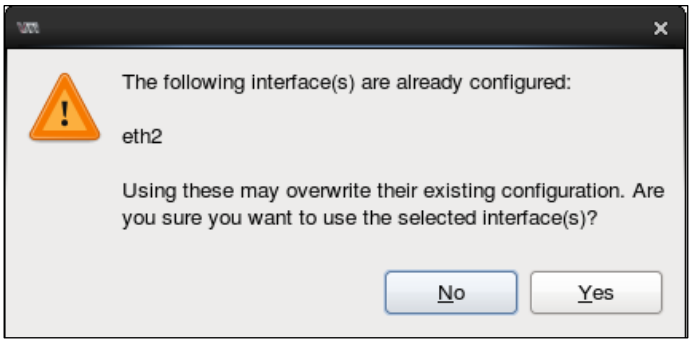

Figure 3-4 Network Interface Message

7. Return to the [Network Interfaces] tab. Confirm the settings, and close the screen.
   The configured virtual bridge name ([br0] in the example below) is added to the list on the left pane and the physical NIC name of the connection destination ([eth2] in the example below) is deleted.

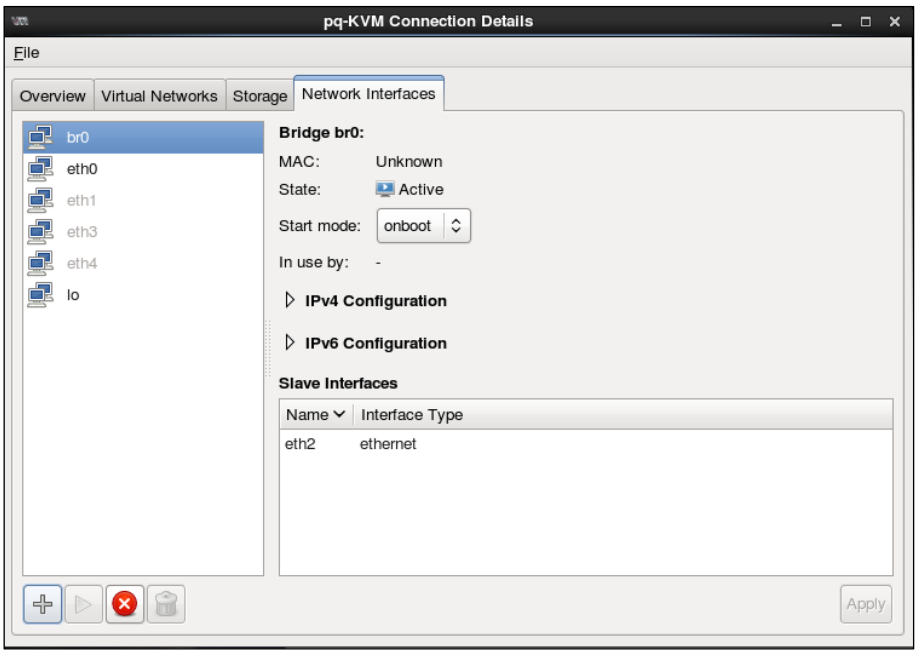

Figure 3-5 Network Interfaces (After Setting)

3.1.3 Preparation of Installation Media

Prepare the media required for installation of the guest OS so that it can be used as the local device of the hypervisor, according to "1.2 Preparation of Media".

3.2 Configuration of Virtual Machine

The configuration procedures described below apply to the case where the disk space for the virtual machine is mounted on /var/lib/libvirt/images.

1. Log into the hypervisor with root privileges.
2. Connect the installation media for the guest OS by selecting [Media] - [Virtual Media Wizard...] from the video redirection.
   If the media is not mounted automatically, mount it with root privileges.
3. When Virtual Machine Manager is not started, click [Applications] - [System Tools] - [Virtual Machine Manager].
4. On the [Virtual Machine Manager] screen, click the [Create a new virtual machine] icon ( ).

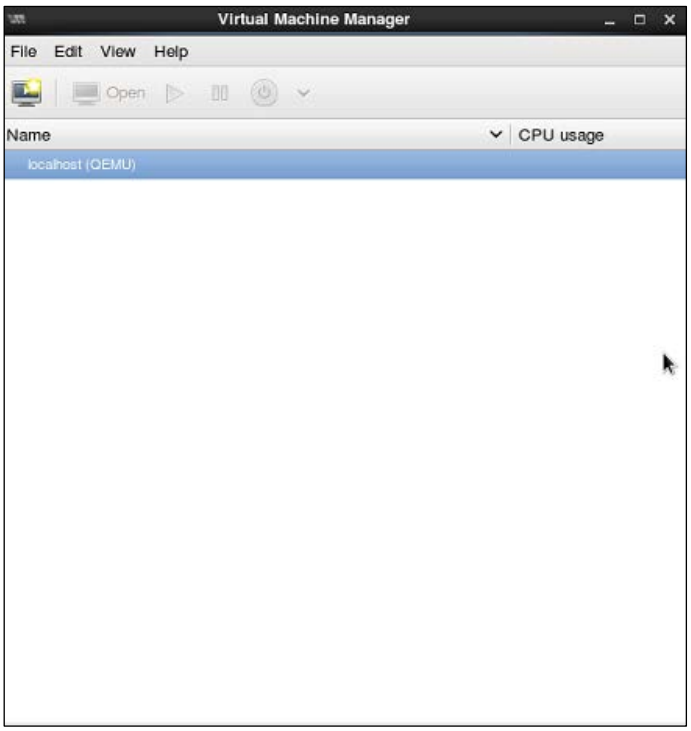

Figure 3-6 Virtual Machine Manager Screen

5. On the [Step 1 of 5] screen, perform the following procedure:
   1. Enter the virtual guest name to be used in [Name].
   2. In [Choose how you would like to install the operating system], select the installation method.
      In this example, select the [Local install media (ISO image or CDROM)] radio button, as the virtual media wizard is used as the DVD drive.

3. Click [Forward].

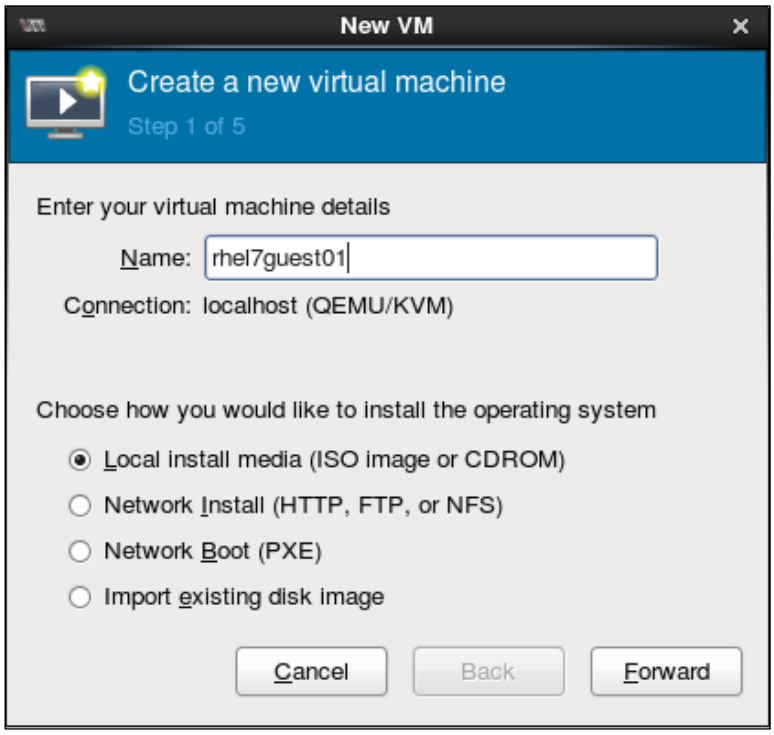

Figure 3-7 Create a New Virtual Machine (1 of 5)

6. On the [Step 2 of 5] screen, perform the following procedure:

   1. Select [Use CDROM or DVD] and the media to connect to the virtual media wizard.
   2. Select the guest OS in [OS type] and [Version] and click [Forward].

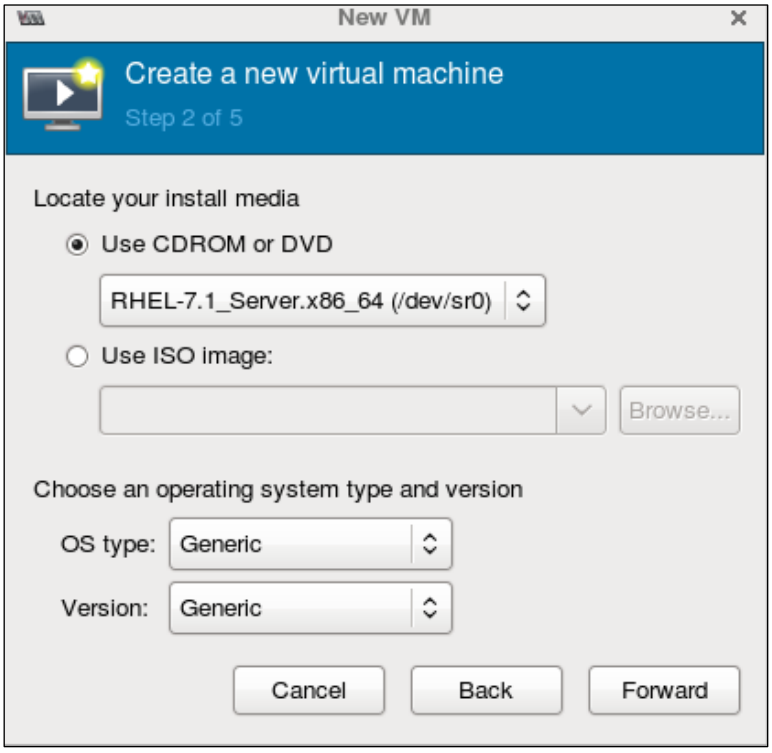

Figure 3-8 Create a New Virtual Machine (2 of 5) (Example for RHEL7.1)

7. On the [Step 3 of 5] screen, specify the virtual memory size in [Memory (RAM)] and the number of virtual CPUs in [CPUs], and click [Forward].

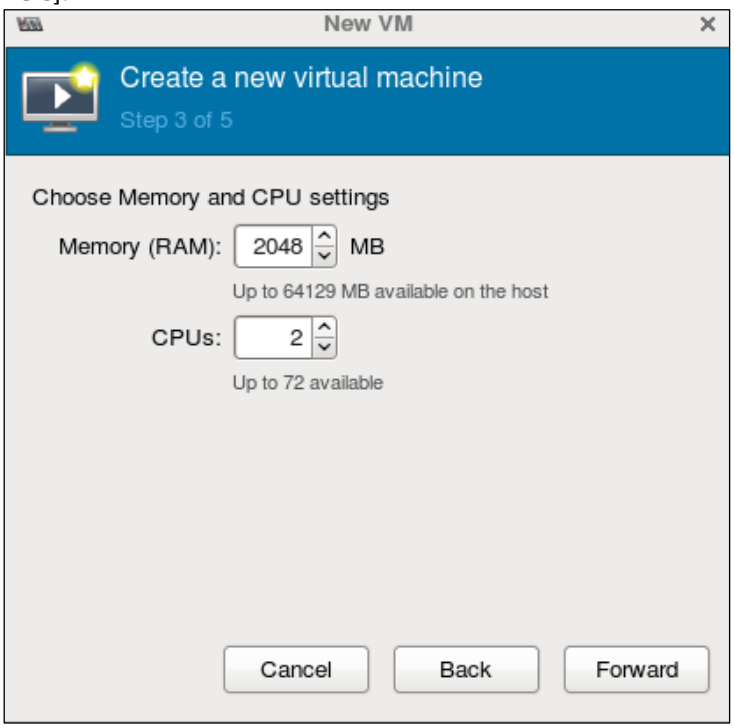

Figure 3-9 Create a New Virtual Machine (3 of 5)

8. On the [Step 4 of 5] screen, perform the following procedure:

   1. Confirm that the [Enable storage for this virtual machine] checkbox and the [Allocate entire disk now] checkbox are selected.

   2. Confirm that the [Create a disk image on the computer's hard drive] radio button is selected, and specify the virtual storage size in GB in the field below.

   3. Click [Forward].

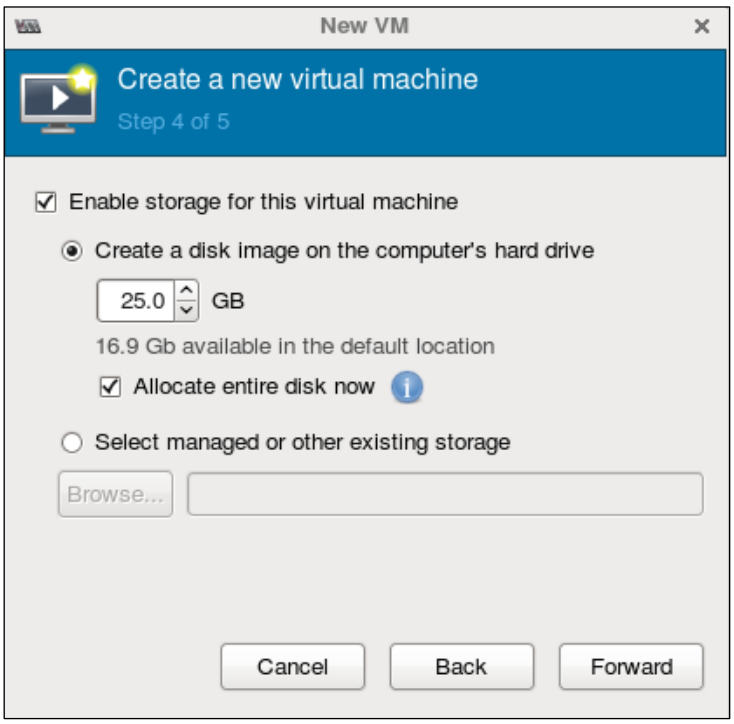

Figure 3-10 Create a New Virtual Machine (4 of 5)

9. On the [Step 5 of 5] screen, perform the following procedure:

    1. Confirm the settings that have been configured, and select the [Customize configuration before install] checkbox.

    2. Click [Advanced options] to expand the available options.

    3. In the virtual network selection field, confirm that the virtual bridge created beforehand ([Host device eth2 (Bridge 'br0')] in the example below) is selected.

    4. Click [Finish].

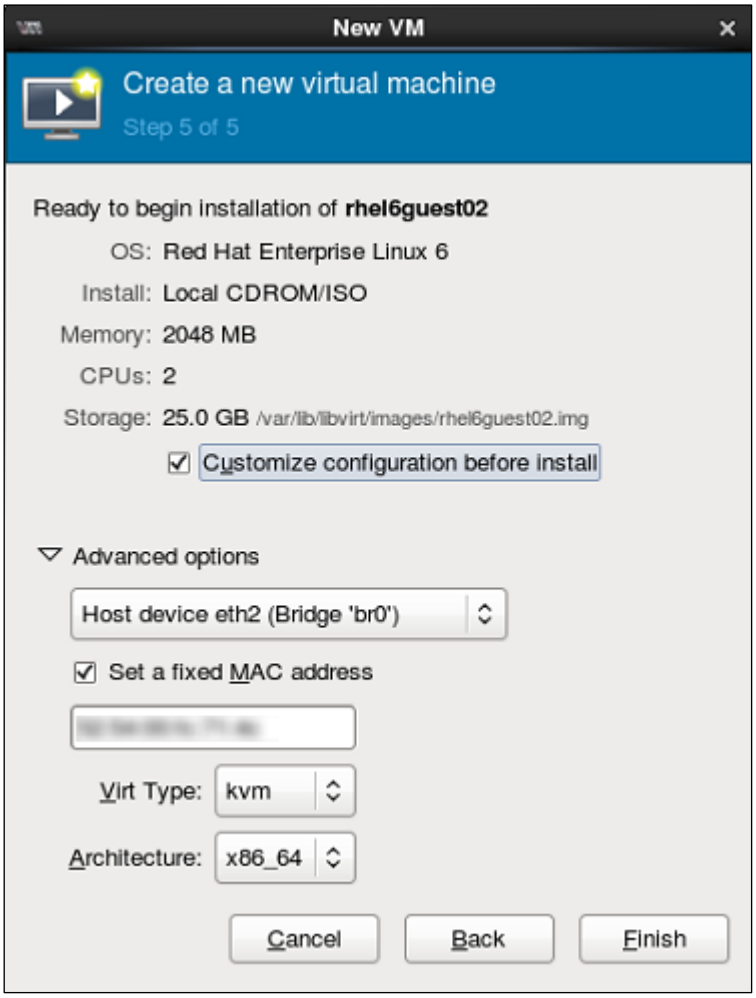

Figure 3-11 Create a New Virtual Machine (5 of 5)

5. On the [Basic Details] screen, click [Machine Settings] to expand the available options, select the [Enable ACPI] and [Enable APIC] checkboxes, and then click [Apply].

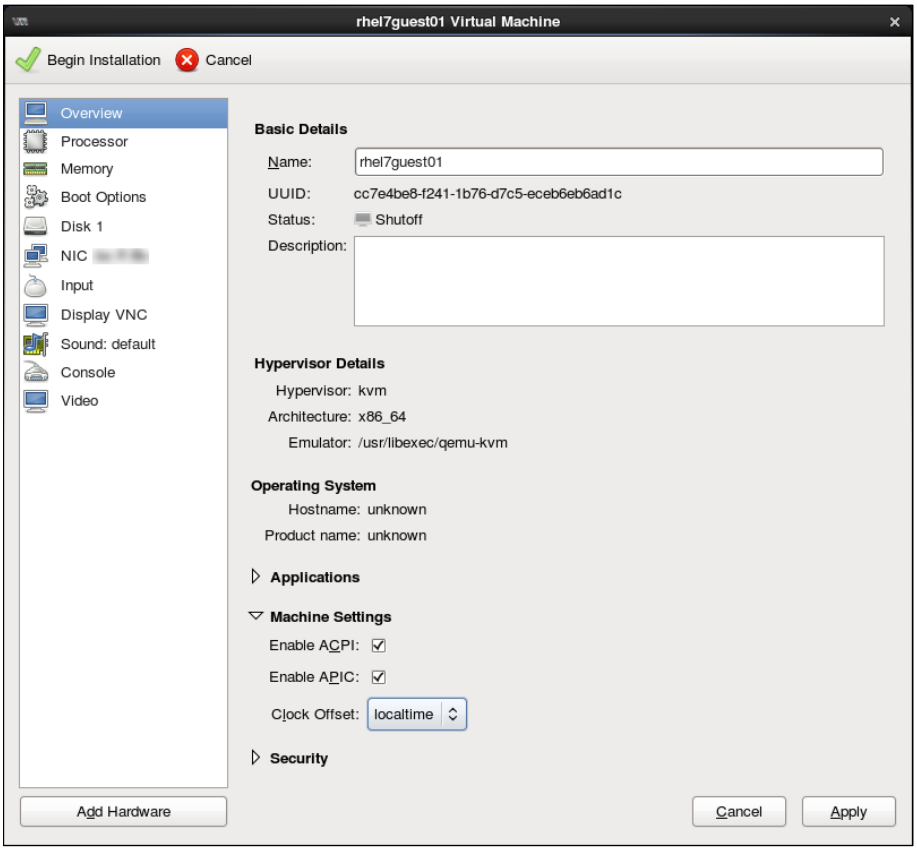

Figure 3-12 Basic Details

10. Set the keyboard for the virtual machine.

    1. On the hardware details screen, select [Display VNC].
    2. Change [Keymap] from [default] according to the keyboard to be used ([en-us] in the example below).
    3. Click [Apply].

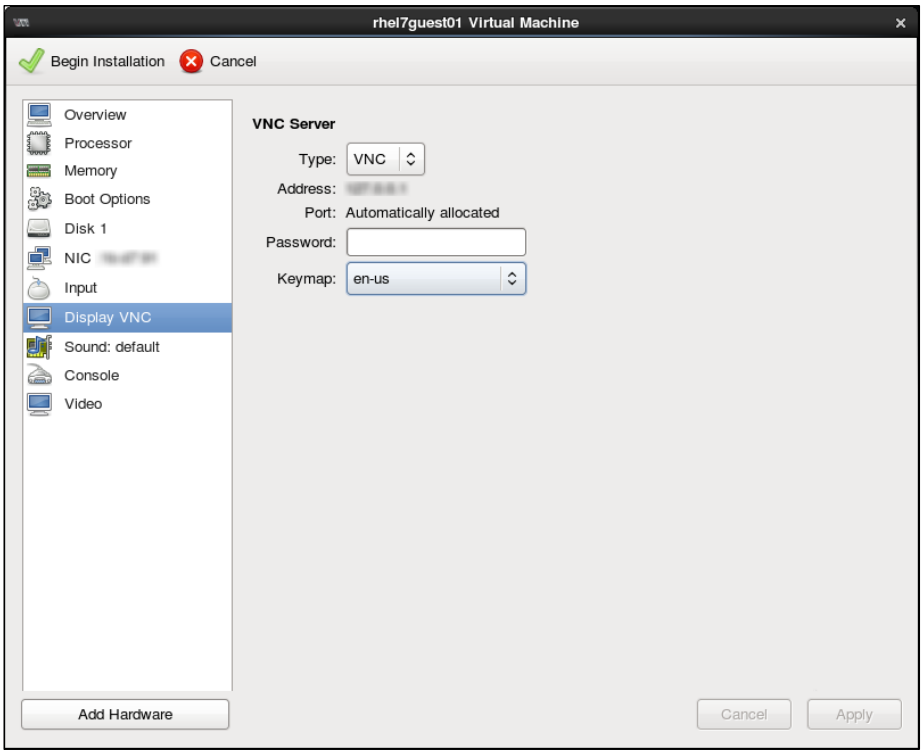

Figure 3-13 Hardware Details Screen

11. Change the virtual disk to virtio.

    1. On the hardware details screen, select the virtual disk to be changed ([Disk 1] in the example above). Click [Advanced options] to expand the available options and select [Virtio] for [Disk bus].

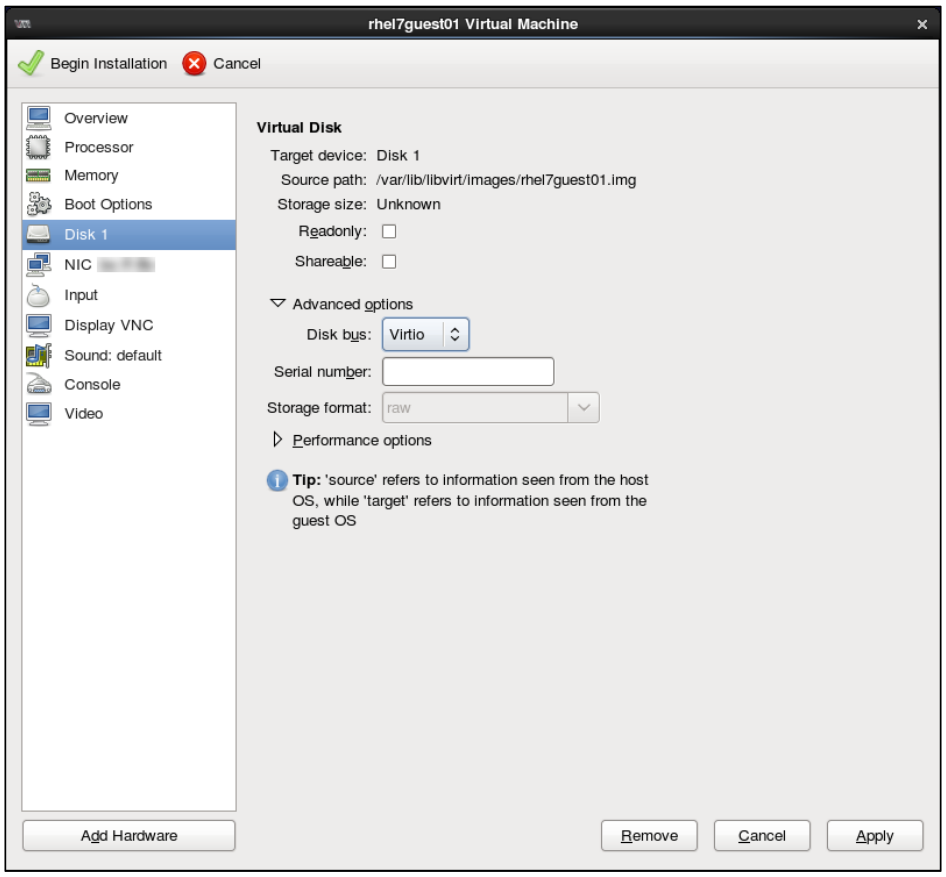

Figure 3-14 Virtual Disk Settings

    2. Click [Apply].
       The virtual disk type on the left pane changes from [Disk] to [VirtIO Disk].

Remarks

The change may not be reflected immediately after [Apply] is clicked. This is not a problem. Check again after a while.

12. Change the virtual network interface to the virtio driver.

    1. On the hardware details screen, select the virtual network interface to be changed. Select [virtio] for [Device model].

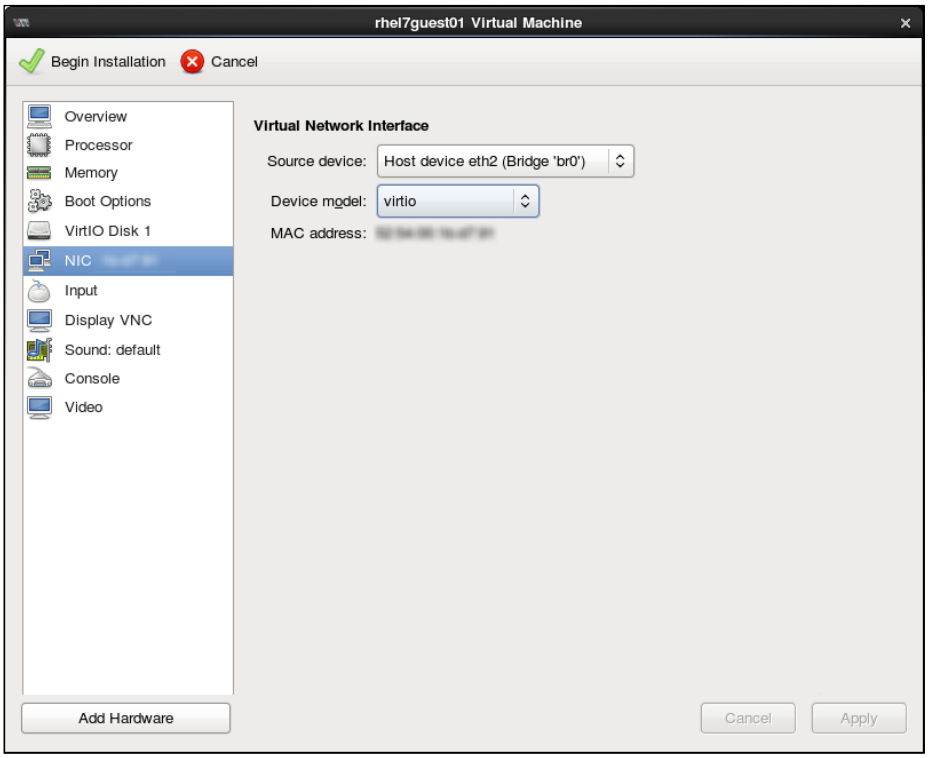

Figure 3-15 Virtual Network Interface Settings

    2. Click [Apply].

13. For Windows, the steps below are also required.
    For RHEL, proceed to Step 14.

    1. Click [Add Hardware] in the bottom left of the hardware details screen.

    2. From the hardware type on the left pane, select [Storage] and set as follows:
       - Select the [Select managed or other existing storage] checkbox and click [Browse]. Then select "/usr/share/virtio-win/virtio-win_amd64.vfd".
       - Select [Floppy disk] for [Device type].

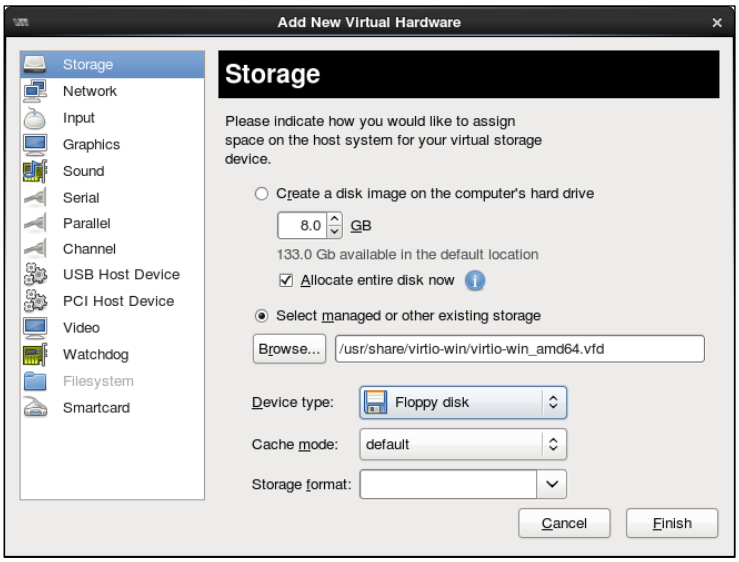

Figure 3-16 Storage Selection

    3. Click [Finish].
       The created storage is added to the hardware list.

14. Click [Begin Installation].
    After the virtual machine is created, installation of the guest OS starts.
    Complete installation according to "3.3 Installation of Guest OS".

3.3 Installation of Guest OS

Follow the applicable procedure according to the guest OS to be used.

- For RHEL7: "3.3.1 Installation of RHEL7", "3.3.2 Checking and Setting After Installation of RHEL7"
- For RHEL6: "3.3.3 Installation of RHEL6", "3.3.4 Checking and Setting After Installation of RHEL6"
- For Windows Server 2012 R2: "3.3.5 Installation of Windows Server 2012 R2", "3.3.6 Checking and Setting After Installation of Windows Server 2012 R2"

3.3.1 Installation of RHEL7

Caution

- Do not close the console screen during the installation of the guest OS.
- When proceeding to the next screen using the keyboard, do not use the [Enter] key in succession. Make sure that the [Enter] key is used only once.

1. On the RHEL7 boot screen, select [Install Red Hat Enterprise Linux 7.1] and press the [Enter] key.
   The installation media begins to be loaded.

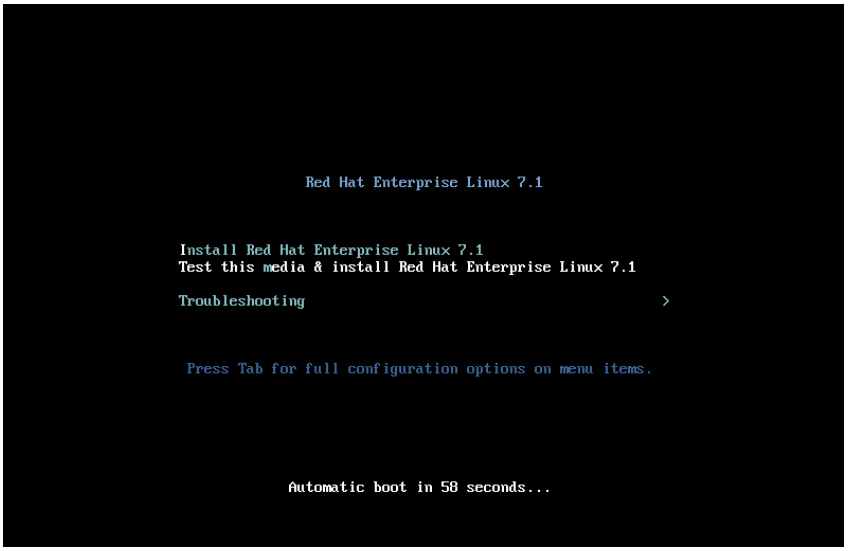

Figure 3-17 RHEL7 Boot Screen

2. On the language selection screen, select the language to be used in the installation screen ([English English] in the example below) and click [Continue].

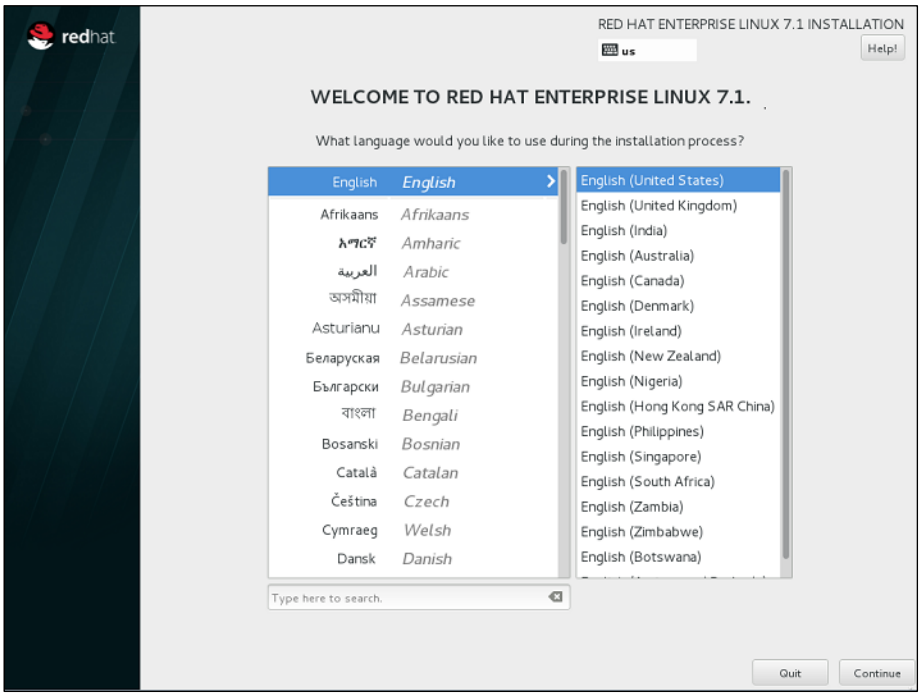

Figure 3-18 WELCOME TO RED HAT ENTERPRISE LINUX 7.1

3. On the [INSTALLATION SUMMARY] screen, confirm the [LOCALIZATION] settings.

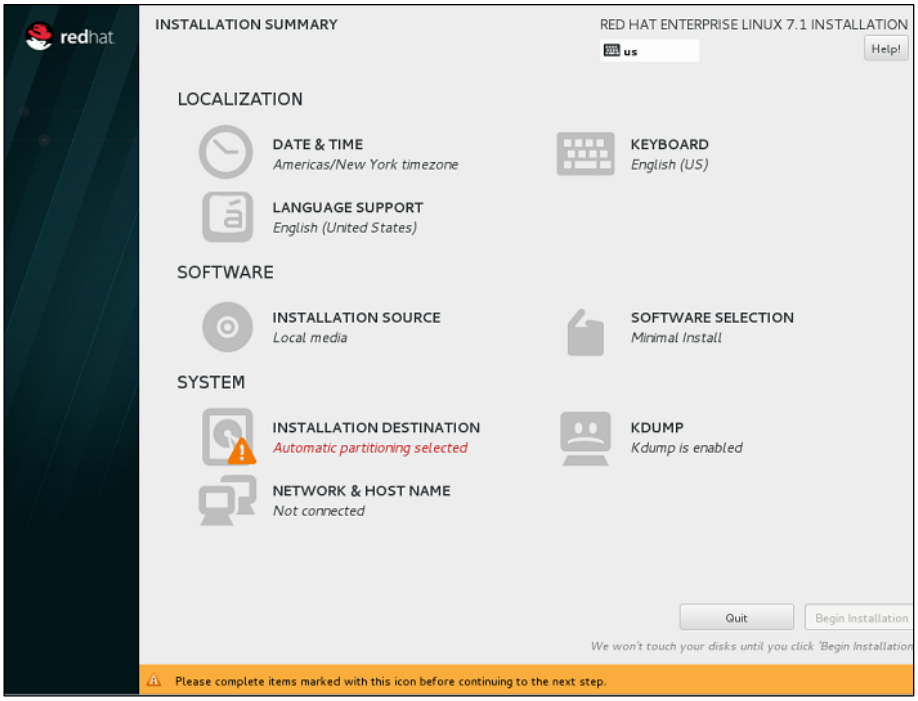

Figure 3-19 INSTALLATION SUMMARY

4. On the [INSTALLATION SUMMARY] screen, click [SOFTWARE SELECTION].

5. On the [SOFTWARE SELECTION] screen, select an option from [Base Environment] according to the use, and click [Done].

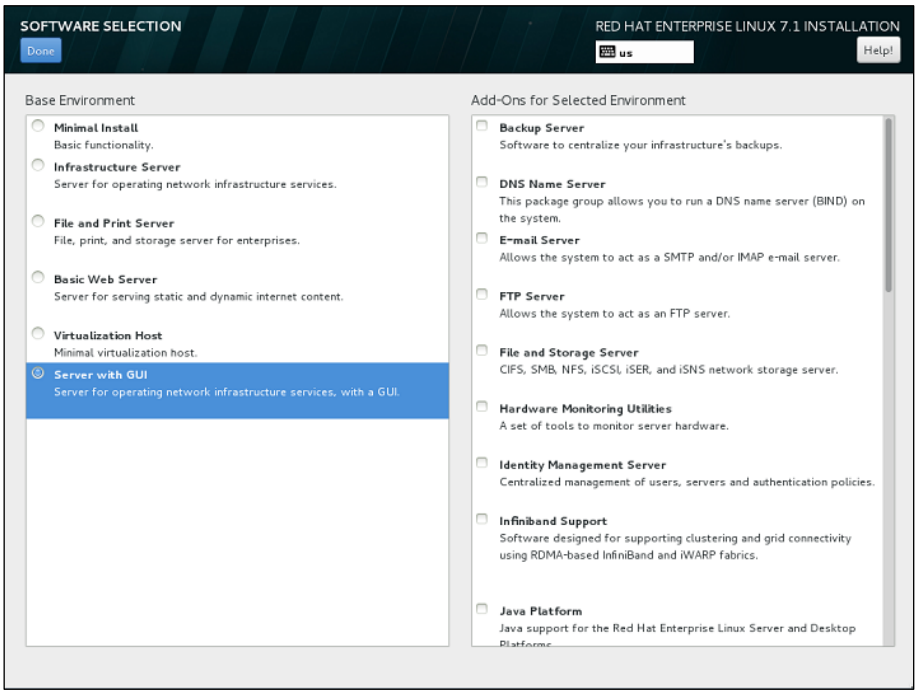

Figure 3-20 SOFTWARE SELECTION

6. On the [INSTALLATION SUMMARY] screen, click [NETWORK & HOST NAME].

7. On the [NETWORK & HOST NAME] screen, enter the host name and click [Done].
To configure the network settings during installation, click [Configure] in the bottom right of the screen.

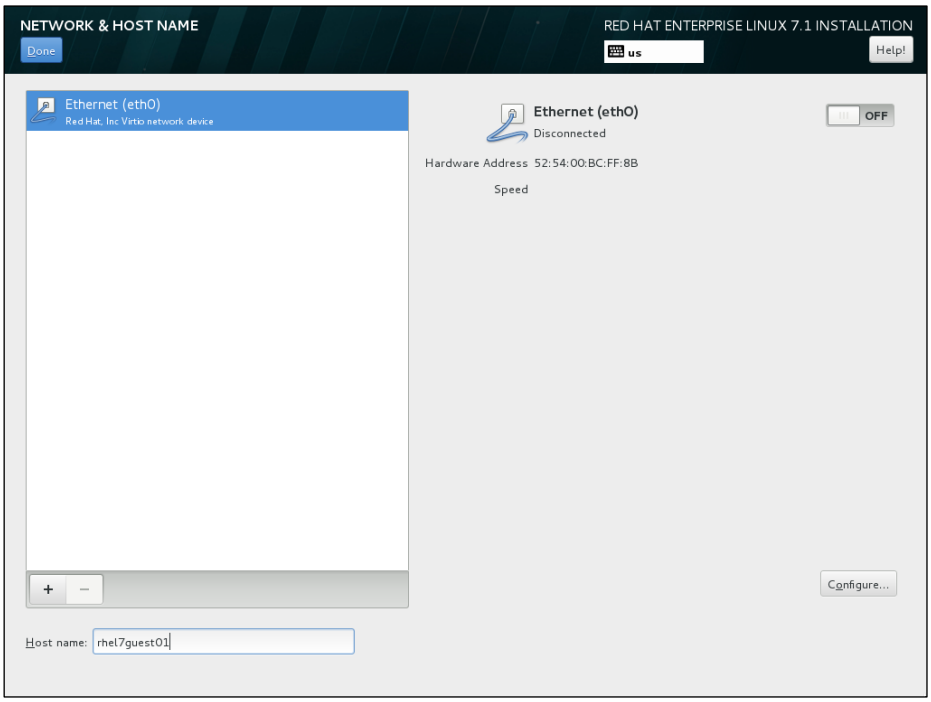

Figure 3-21 NETWORK & HOST NAME

8. On the [INSTALLATION SUMMARY] screen, click [INSTALLATION DESTINATION].

9. Click [Full disk summary and boot loader...] in the bottom left of the [INSTALLATION DESTINATION] screen.

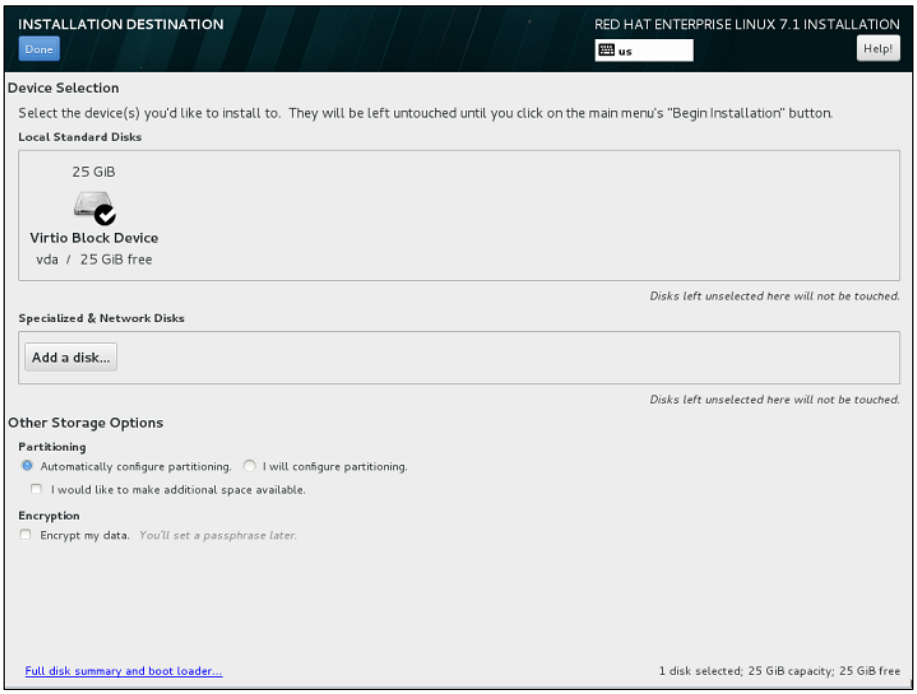

Figure 3-22 INSTALLATION DESTINATION

10. On the [SELECTED DISKS] screen, confirm that a tick mark is shown in the [Boot] field, and click [Close].

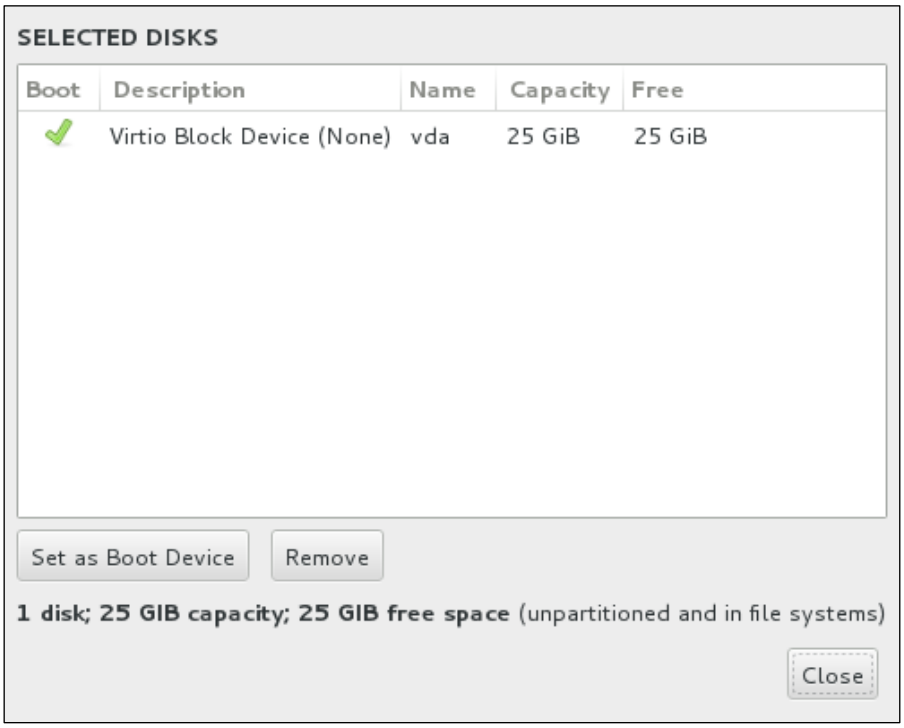

Figure 3-23 SELECTED DISKS

11. In [Other Storage Options], select [I will configure partitioning] and click [Done].

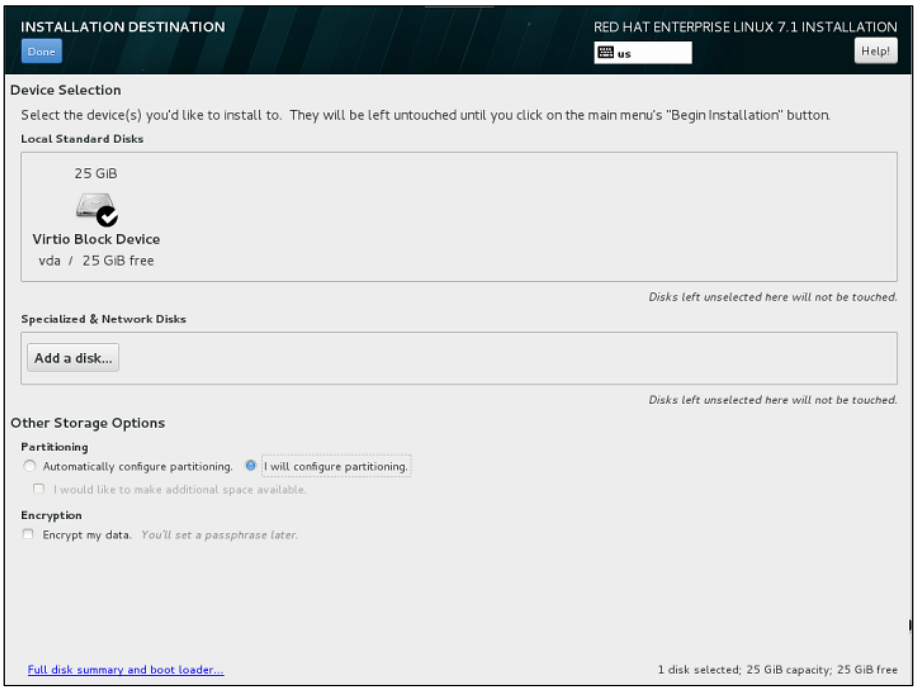

Figure 3-24 Other Storage Options

12. From [New mount points will use the following partitioning scheme] on the [MANUAL PARTITIONING] screen, select [Standard Partition].

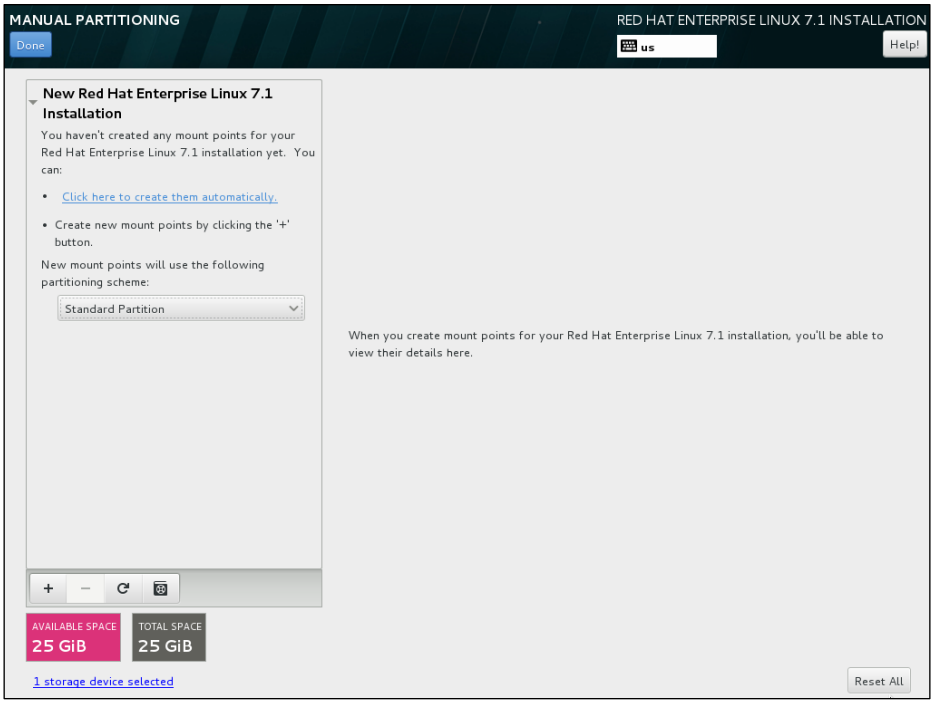

Figure 3-25 MANUAL PARTITIONING

13. Click [+] in the bottom left and create a required mount point.

    1. On the [ADD A NEW MOUNT POINT] screen, set the [/boot] mount point.
       Enter "/boot" for [Mount Point] and the disk capacity (MiB) for [Desired Capacity], and click [Add mount point].

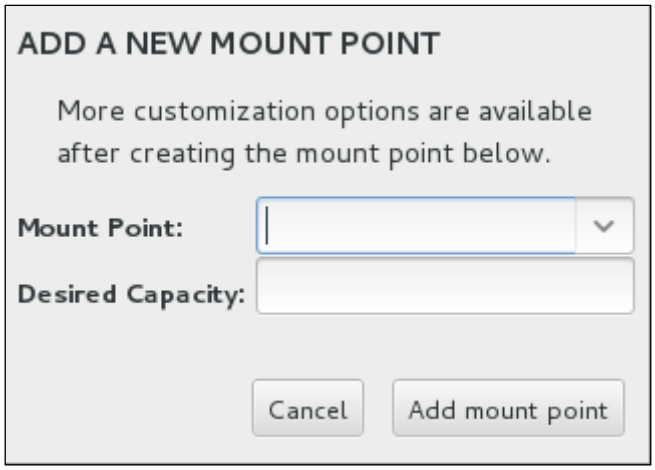

Figure 3-26 ADD A NEW MOUNT POINT

    2. On the [MANUAL PARTITIONING] screen, select [xfs] from [File System].

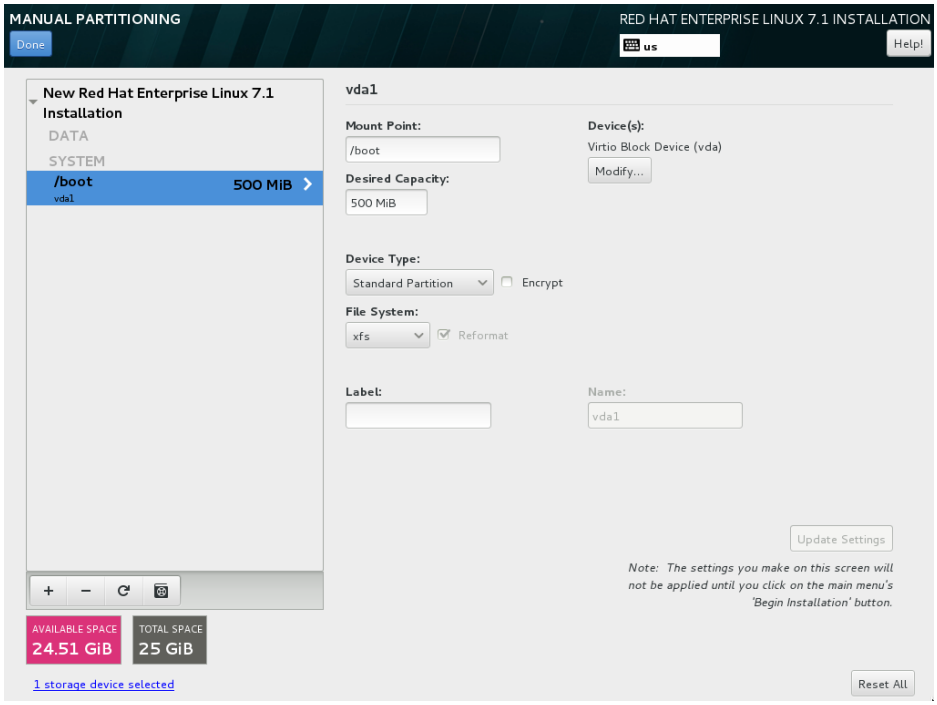

Figure 3-27 MANUAL PARTITIONING

3. Click [+] in the bottom left of the [MANUAL PARTITIONING] screen, and set the following mount points in the same way:

   - /

     Set [/] for [Mount Point].

     Enter the disk capacity (MiB) for [Desired Capacity].

     Set [xfs] for [File System].

   - swap

     Set [swap] for [Mount Point].

     Enter the disk capacity (MiB) for [Desired Capacity].

     On the [MANUAL PARTITIONING] screen, [File System] is set to [swap] and the mount point cannot be set.

Remarks

In free space, set partitions and mount points when necessary.
It is also possible to set those items after installation.

14. Confirm the settings and click [Done].

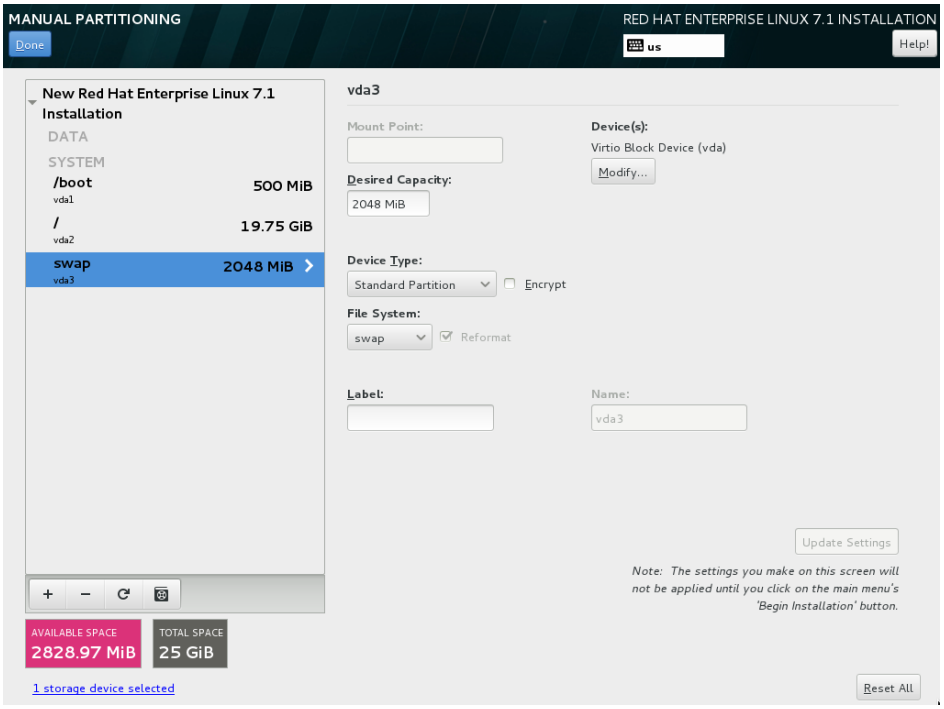

Figure 3-28 RHEL7 Add Partition

15. On the [SUMMARY OF CHANGES] screen, click [Accept Changes].

16. On the [INSTALLATION SUMMARY] screen, click [Begin Installation].
    Installation starts.

Figure 3-29 INSTALLATION SUMMARY

17. During installation, the [USER SETTINGS] screen appears.
    Make sure to set the root password.

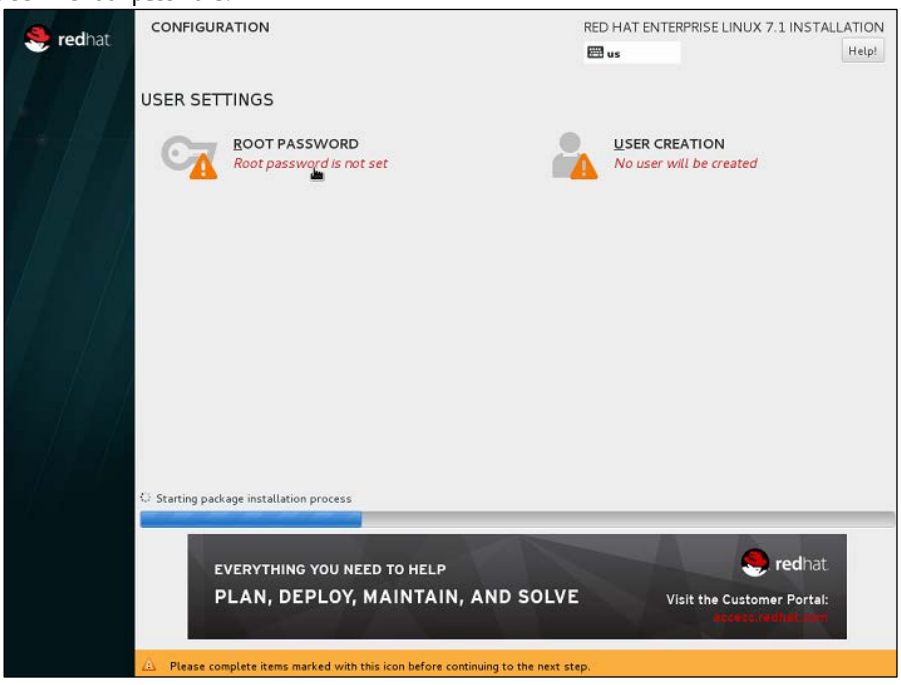

Figure 3-30 USER SETTINGS Screen

18. When the installation completion screen appears, click [Reboot].

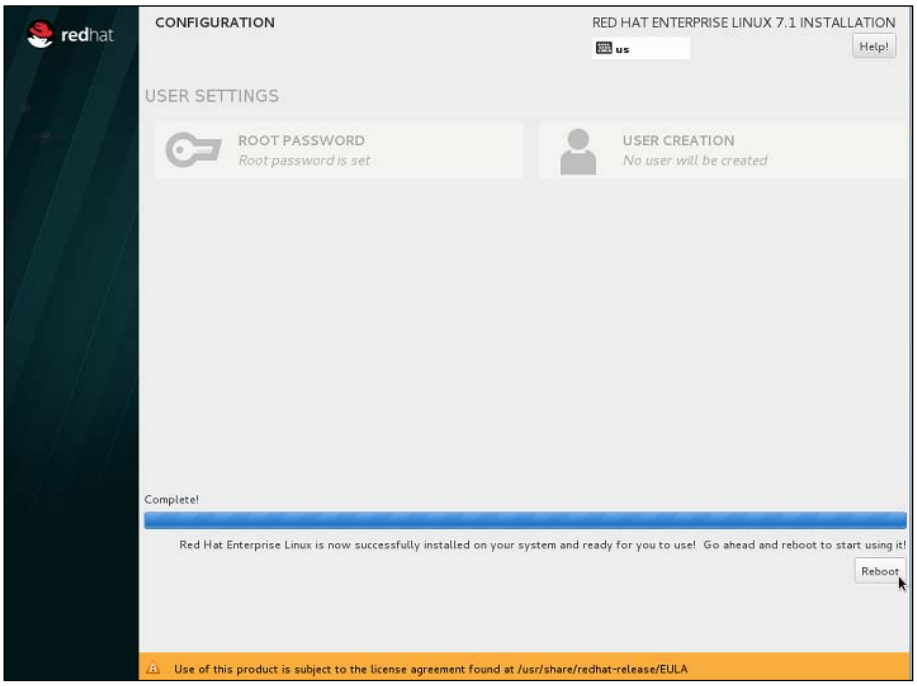

Figure 3-31 Installation Completion Screen

19. When the message shown below appears on the screen, disconnect the installation media from the hardware details screen of Virtual Machine Manager.

```
4m[terminated]
```

20. Disconnect the virtual media of the video redirection.
Then, configure the settings according to "3.3.2 Checking and Setting After Installation of RHEL7".

3.3.2 Checking and Setting After Installation of RHEL7

This section describes the settings required after the installation of the guest OS.

■ Time Setting

To operate the system clock in [localtime], perform the following setting.

1. Enter the following command in the console screen of Virtual Machine Manager.
   If the character string "UTC" exists in the /etc/adjtime file, "UTC" is changed to "LOCAL".

```
# sed -i -e "s/.*UTC.*/LOCAL/" /etc/adjtime
```

2. On the hardware details screen of Virtual Machine Manager, set [Clock Offset] in [Machine Settings] to [localtime] and click [Apply].

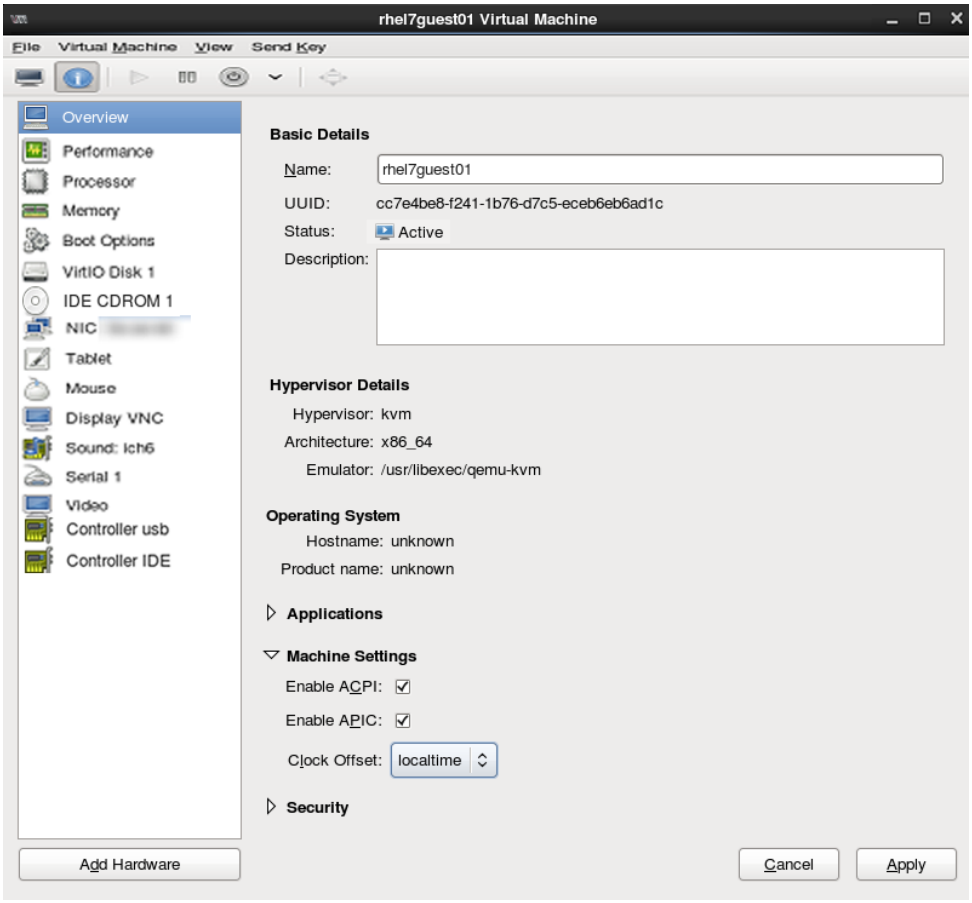

Figure 3-32 Clock Offset Setting

3. Shut down the virtual machine and then turn it on again.

■ Other Checking and Setting

Perform checking and setting in the same way as with the hypervisor.

During this process, note the following points:

- Setting [sadump] is not necessary since it does not run on a virtual machine.
- Console setting (console=ttyS0,19200n8r) is not necessary.

  If the setting is configured, the graphical console screen of Virtual Machine Manager is blacked out and disabled.

3.3.3 Installation of RHEL6

Caution

- Do not close the console screen during the installation of the guest OS.
- When proceeding to the next screen using the keyboard, do not use the [Enter] key in succession. Make sure that the [Enter] key is used only once.

1. On the RHEL6 boot screen, press the [Enter] key.
   The installation media begins to be loaded.

Figure 3-33 RHEL6 Boot Screen

2. When the [Disc Found] screen appears, select either [OK] to enable the disk check or [Skip] to disable the disk check, and press the [Enter] key.

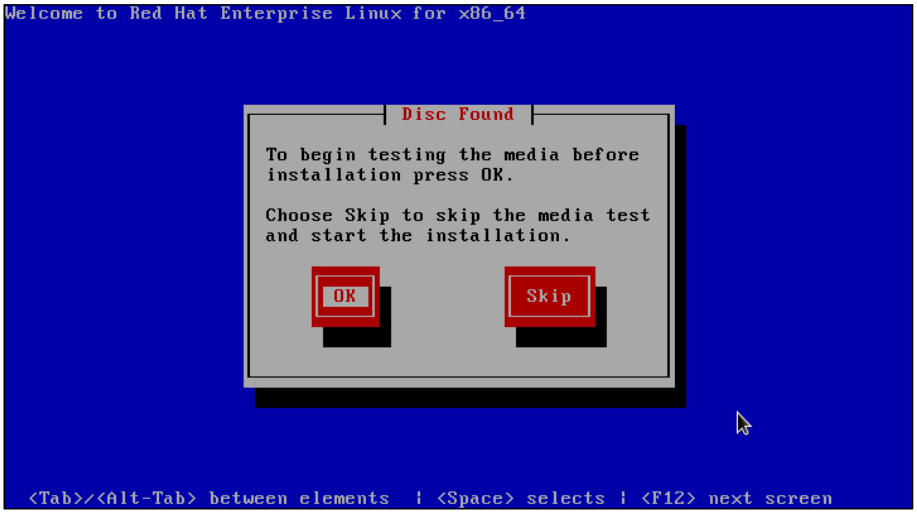

Figure 3-34 RHEL6 Disc Found

3. On the RHEL6 initial screen, click [Next].

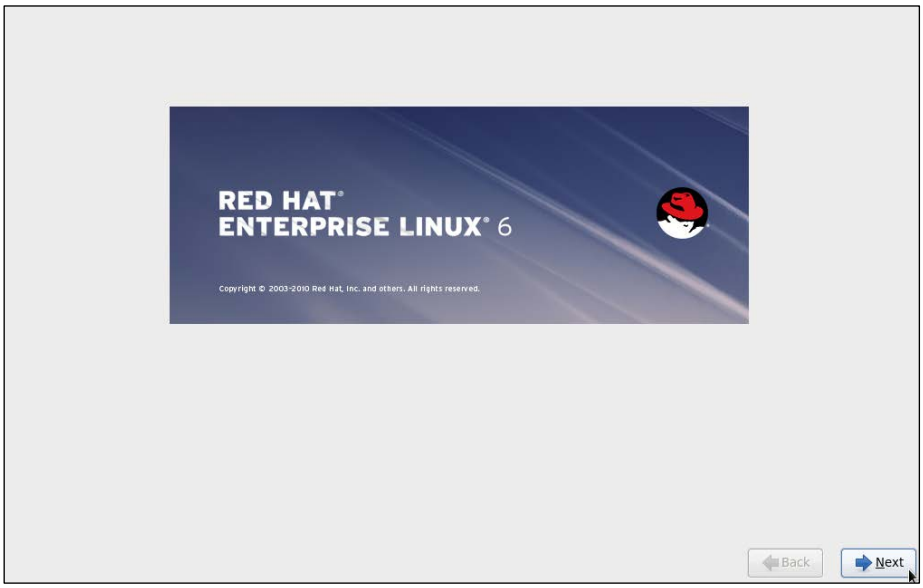

Figure 3-35 RHEL6 Initial Screen

4. On the language selection screen, select the language to be used in the installation screen ([English (English)] in the example in this manual) and click [Next].

5. On the keyboard selection screen, select the keyboard to be used for the guest OS, and click [Next].

6. On the storage device type selection screen, select [Basic Storage Devices] and click [Next].

Figure 3-36 RHEL6 Storage Selection

7. When a warning message appears, perform the following action:
   On the screen shown below, click [Yes, discard any data].

Figure 3-37 RHEL6 Storage Device Warning

8. On the network setting screen, enter the host name and click [Next].
   To configure the network settings during installation, click [Configure Network] in the bottom left of the screen.

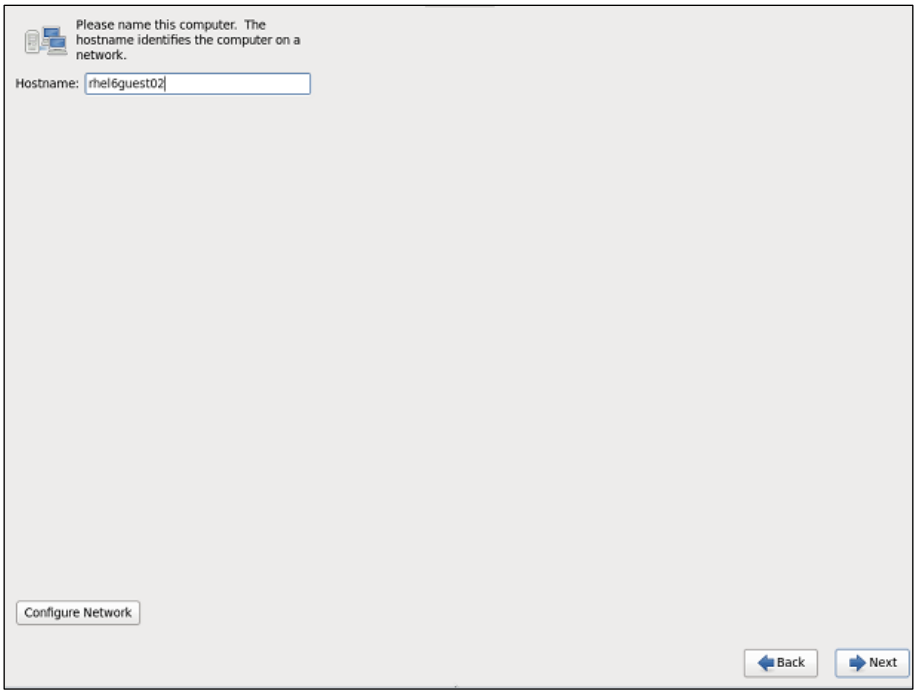

Figure 3-38 RHEL6 Network

9. On the time zone setting screen, confirm and set as follows and click [Next]:
   - Confirm that [America/New York] is selected.
   - Clear the [System clock uses UTC] checkbox.

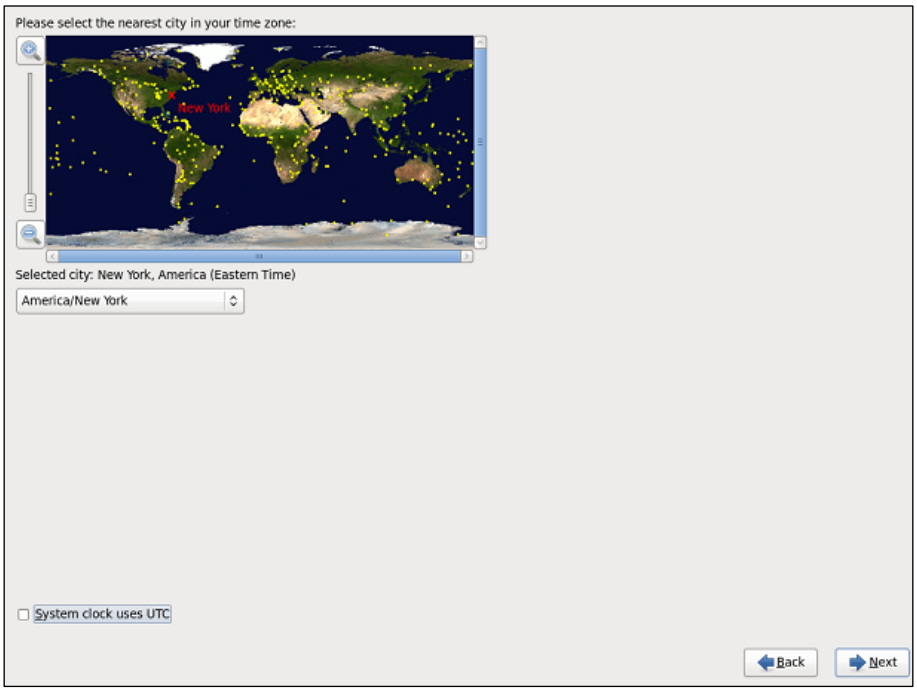

Figure 3-39 RHEL6 Time Zone

10. On the root user password setting screen, enter the root (administrator) password for the guest OS and click [Next].

11. On the installation type selection screen, select [Create Custom Layout] and click [Next].

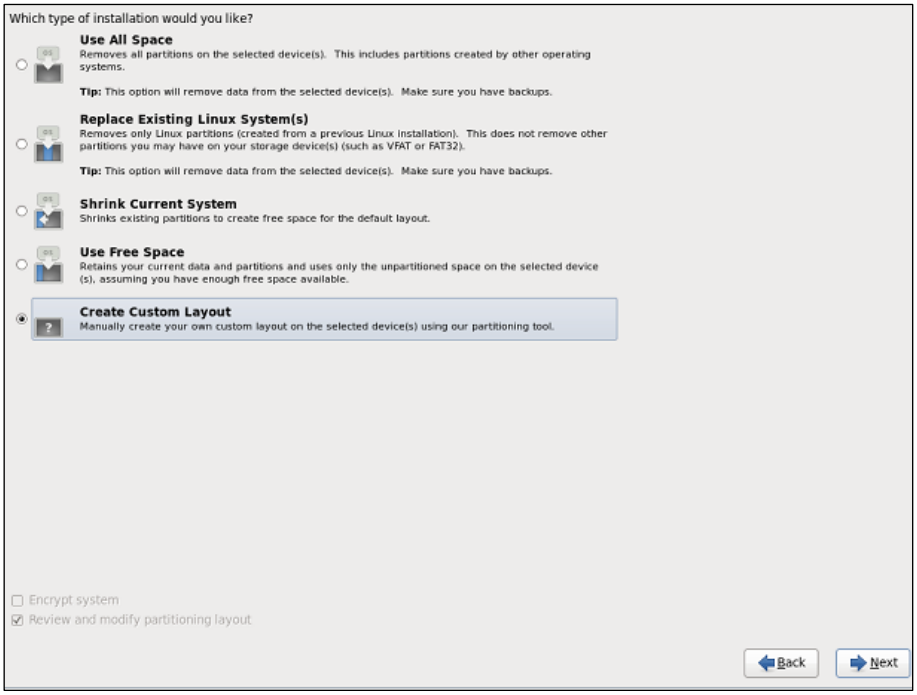

Figure 3-40 RHEL6 Installation Type Selection

12. On the hard drive setting screen, select the device to create a disk partition ([Free] in /dev/vda in the example below), and click [Create].

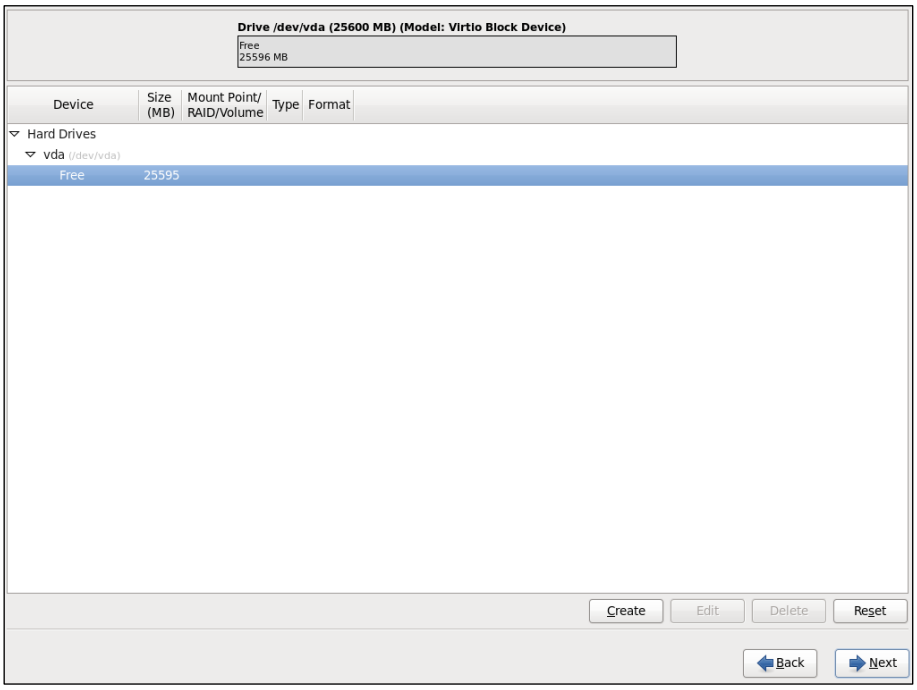

Figure 3-41 RHEL6 Hard Drive (Before Setting)

13. Create required partitions.

    1. On the [Create Storage] screen, select [Standard Partition] and click [Create].

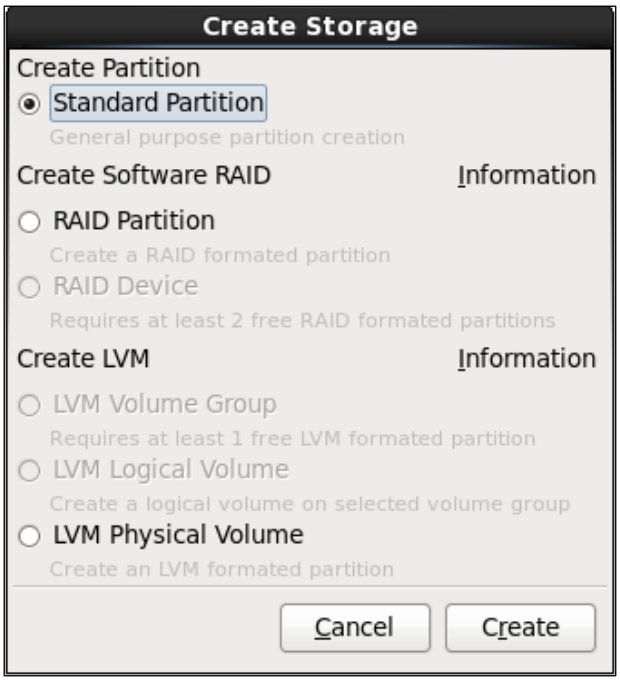

Figure 3-42 RHEL6 Create Storage

2. On the [Add Partition] screen, configure each partition.
   - /boot

     Set [/boot] for [Mount Point] and [ext3] for [File System Type] and enter the disk capacity (MB).

     Select the [Force to be a primary partition] checkbox and click [OK].
   - /

     Set [/] for [Mount Point] and [ext3] for [File System Type] and enter the disk capacity (MB).

     Select the [Force to be a primary partition] checkbox and click [OK].
   - swap

     Set [swap] for [File System Type] and enter the disk capacity (MB). Select the [Force to be a primary partition] checkbox and click [OK].

     If [File System Type] is set to [swap], the mount point cannot be set.

Remarks

In free space, set partitions and mount points when necessary.

It is also possible to set those items after installation.

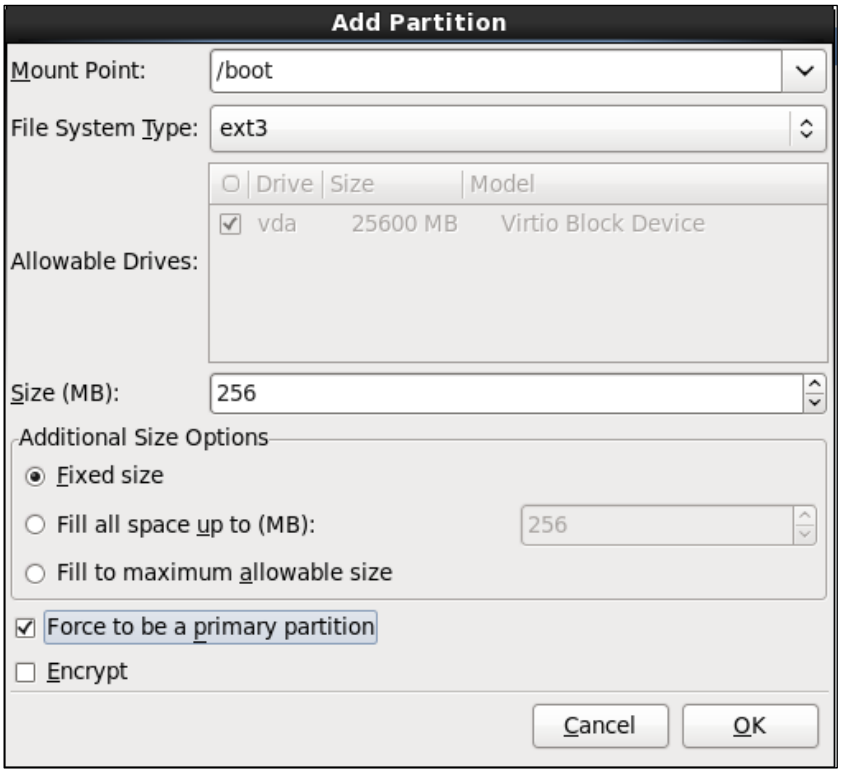

Figure 3-43 RHEL6 Add Partition

3. Confirm the settings and click [Next].

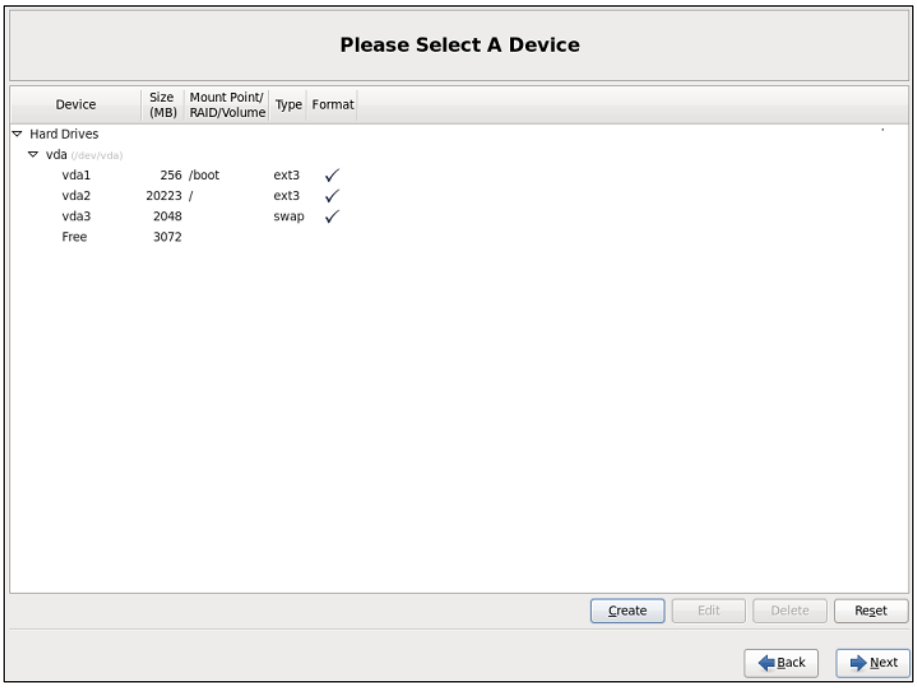

Figure 3-44 RHEL6 Hard Drive (After Setting)

14. On the [Format Warnings] screen, click [Format].

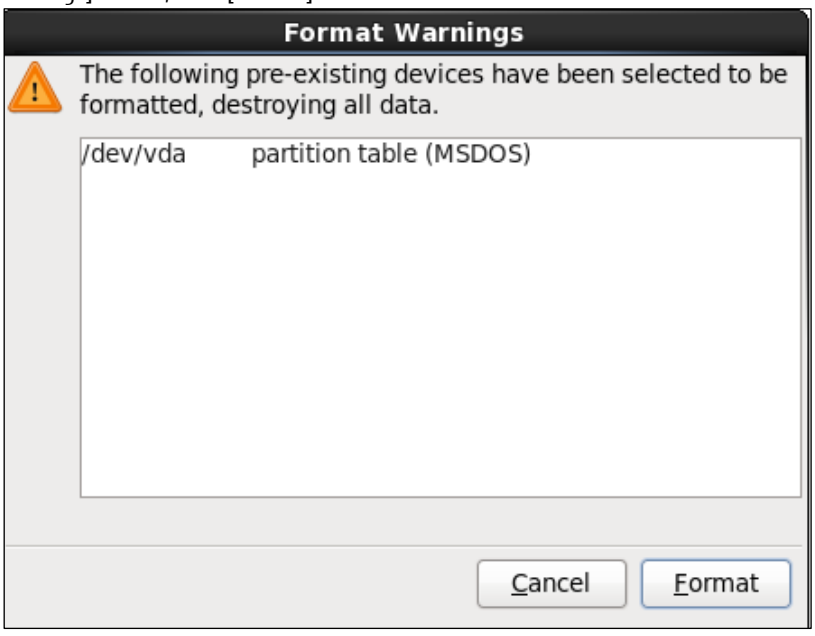

Figure 3-45 RHEL6 Format Warnings

15. On the [Writing storage configuration to disk] screen, click [Write changes to disk].

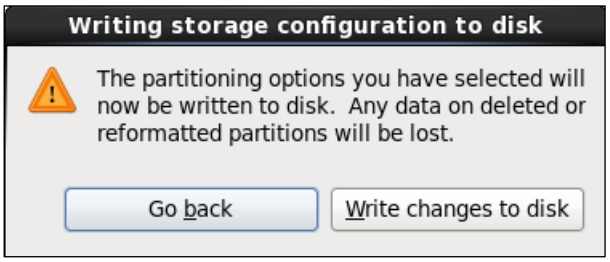

Figure 3-46 Writing Storage Configuration to Disk

16. On the boot loader setting screen, confirm that the [Install boot loader on /dev/vda] checkbox is selected and click [Next].

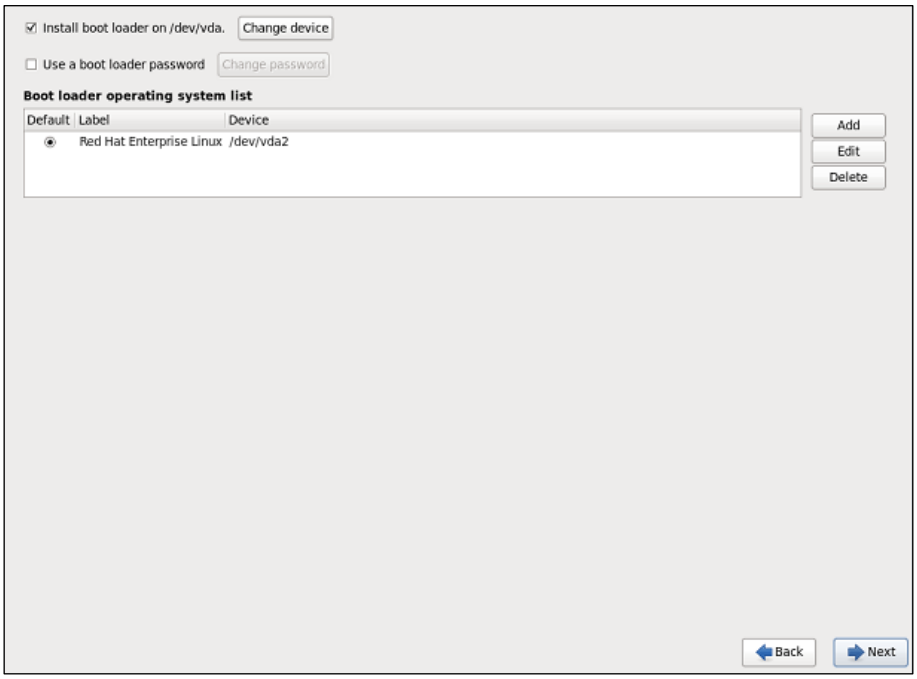

Figure 3-47 RHEL6 Boot Loader

17. On the screen where package groups are selected, configure the following settings and click [Next]:
    - Select an option other than [Virtualization Host] for the installation set.
    - Select [Customize now].

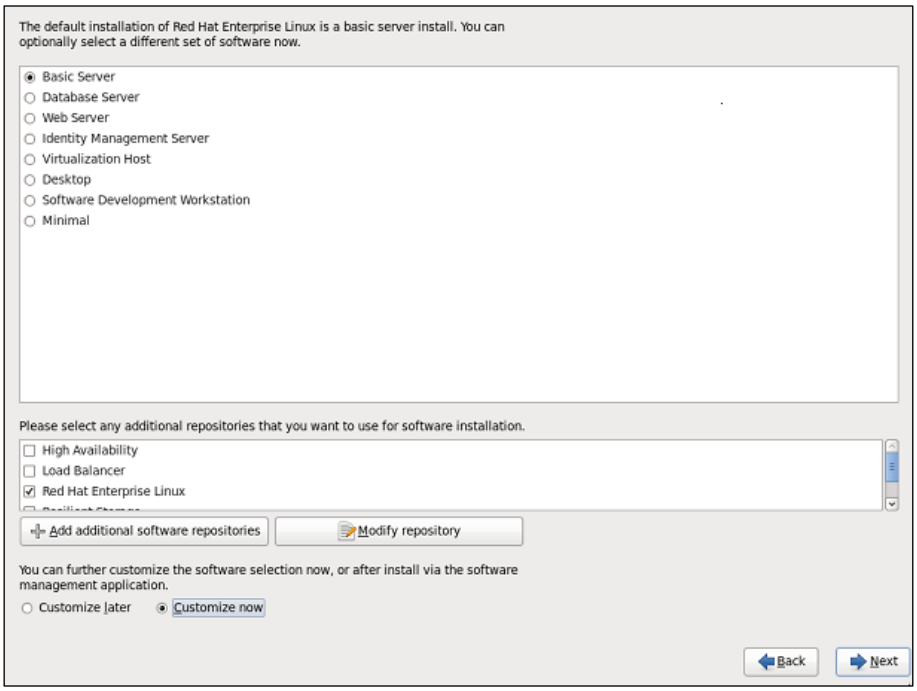

Figure 3-48 RHEL6 Package Selection

18. On the screen with the details of the package groups, confirm that [Base] is selected for the [Base System] group. Then, click [Next].
    Installation starts.

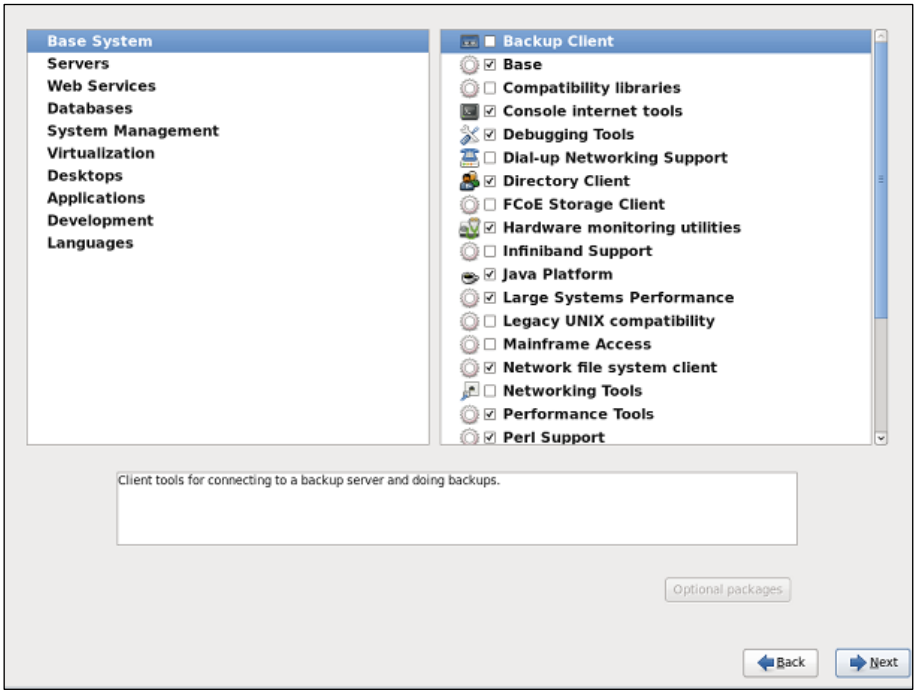

Figure 3-49 RHEL6 Package Group Details

Caution

Do not select a package group included in the [Virtualization] package group.

Remarks

- Do not change other option packages that are already selected.
- Option packages may be displayed in a different order depending on the guest OS version.

19. After the installation completion screen appears, disconnect the installation media from the hardware details screen of Virtual Machine Manager.

20. Disconnect the installation media by selecting [Media] - [Virtual Media Wizard...] and click [Reboot].
Then, configure the settings according to "3.3.4 Checking and Setting After Installation of RHEL6."

3.3.4 Checking and Setting After Installation of RHEL6

This section describes the settings required after installation of the guest OS.

■ Time Synchronization Setting

For time synchronization, configure the hypervisor as the NTP server.

■ Other Checking and Setting

Perform checking and setting in the same way as with the hypervisor.

During this process, note the following points:

- Setting [sadump] is not necessary since it does not run on a virtual machine.
- Console setting (console=ttyS0,19200n8r) is not necessary.

  If the setting is configured, the graphical console screen of Virtual Machine Manager is blacked out and disabled.

3.3.5 Installation of Windows Server 2012 R2

Caution

- Do not close the console screen during the installation of the guest OS.
- When proceeding to the next screen using the keyboard, do not use the [Enter] key in succession. Make sure that the [Enter] key is used only once.

1. After the virtual machine is created, execute installation according to the instructions on the screen. When the screen to select the installation location appears, click [Load driver].

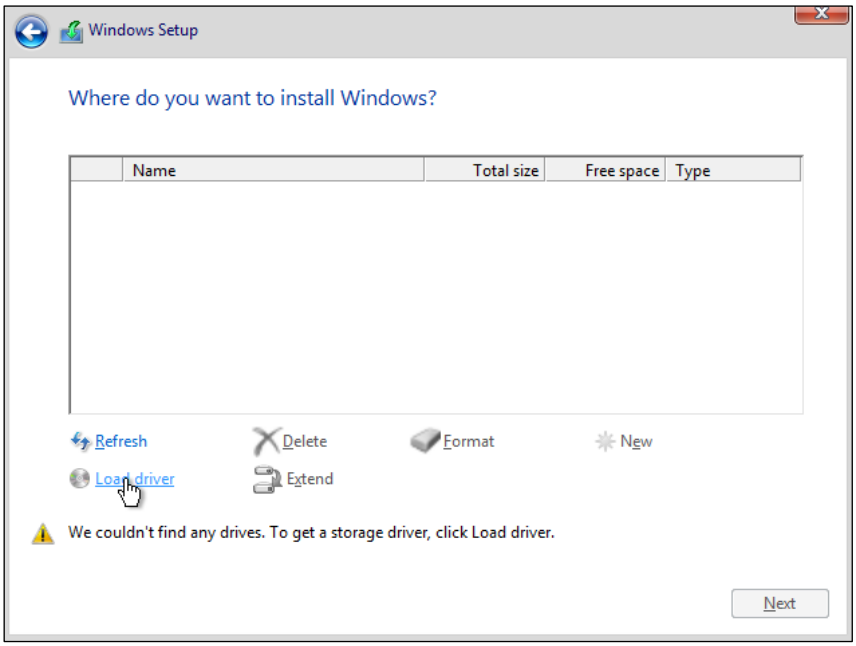

Figure 3-50 Windows Installation Location Selection

2. On the [Load driver] screen, click [Browse] and browse the target folder on the floppy disk.
The target folder to browse differs depending on the version of virtio-win.
   - Win2012 folder for "virtio-win-1.6.7-2.el6.noarch.rpm" (or if "yum update" has not been performed)
   - Win2012 R2 folder for "virtio-win-1.6.8-4.el6.noarch.rpm" or later (or if "yum update" has been performed)

3. On the [Select the driver to install] screen, select the items shown below and click [Next].
The items to select differ depending on the version of virtio-win.
   - For "virtio-win-1.6.7-2.el6.noarch.rpm" (or if "yum update" has not been performed)

     [Red Hat VirtIO Ethernet Adapter (A: \amd64\Win2012\netkvm.inf)]

     [Red Hat VirtIO SCSI controller (A: \amd64\Win2012\viostor.inf)]
   - For "virtio-win-1.6.8-4.el6.noarch.rpm" or later (or if "yum update" has been performed)

     [Red Hat VirtIO Ethernet Adapter (A: \amd64\Win2012R2\netkvm.inf)]

     [Red Hat VirtIO SCSI controller (A: \amd64\Win2012R2\viostor.inf)]

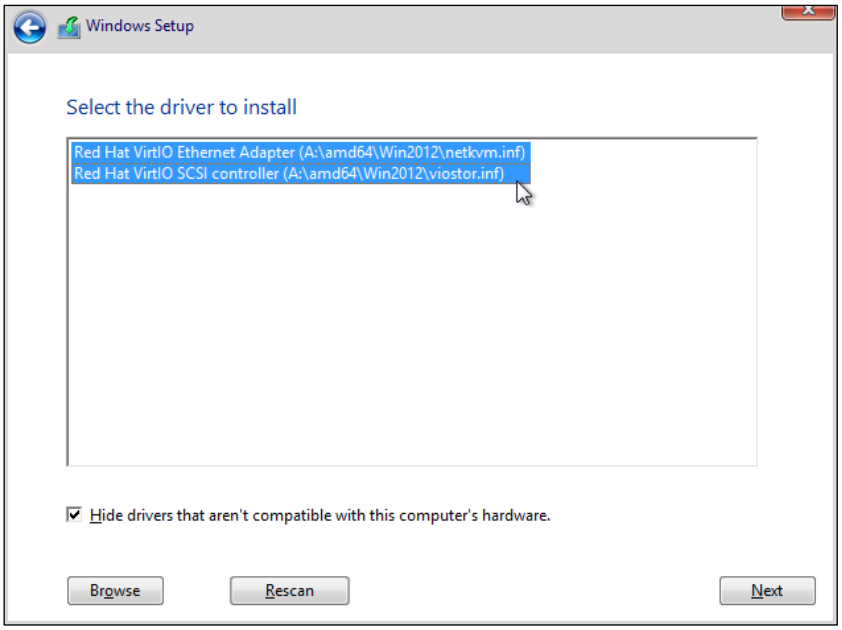

Figure 3-51 Select the Driver to Install

4. Return to the Windows installation location screen. Confirm that the installation destination drive is selected and click [Next].

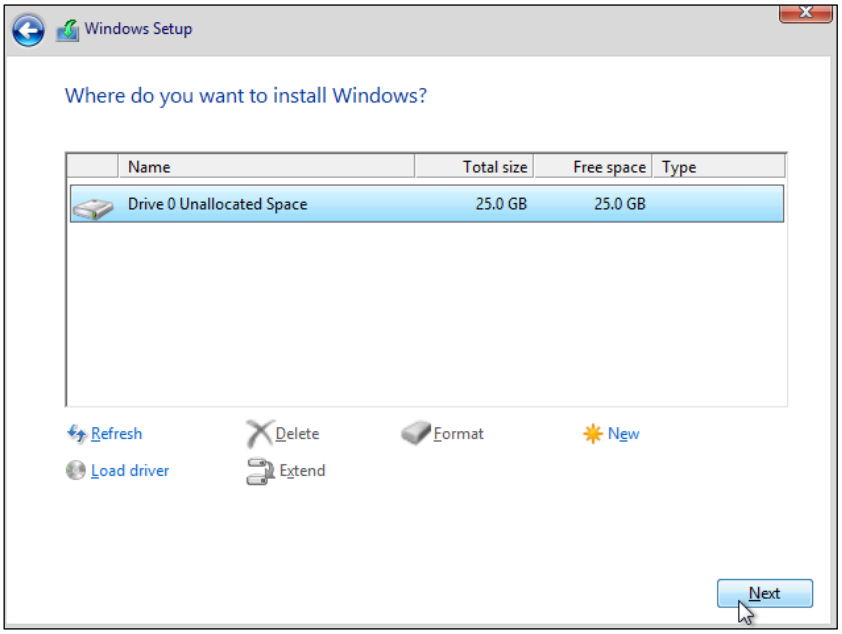

Figure 3-52 Windows Installation Location Selection

5. Complete installation according to the instructions on the screen.
6. Disconnect the installation media from the hardware details screen of Virtual Machine Manager.
7. Disconnect the installation media by selecting [Media] - [Virtual Media Wizard...].

3.3.6 Checking and Setting After Installation of Windows Server 2012 R2

■ OS Setting

Set the OS according to the instructions on the Windows screen.

■ Time Synchronization Setting

For time synchronization, configure the hypervisor as the NTP server.

■ Installation of Balloon Driver

1. On the hardware details screen of Virtual Machine Manager, select the [CDROM] device.
2. Click [Connect], and from the [Choose Media] screen, connect "/usr/share/virtio-win/virtio-win.iso".

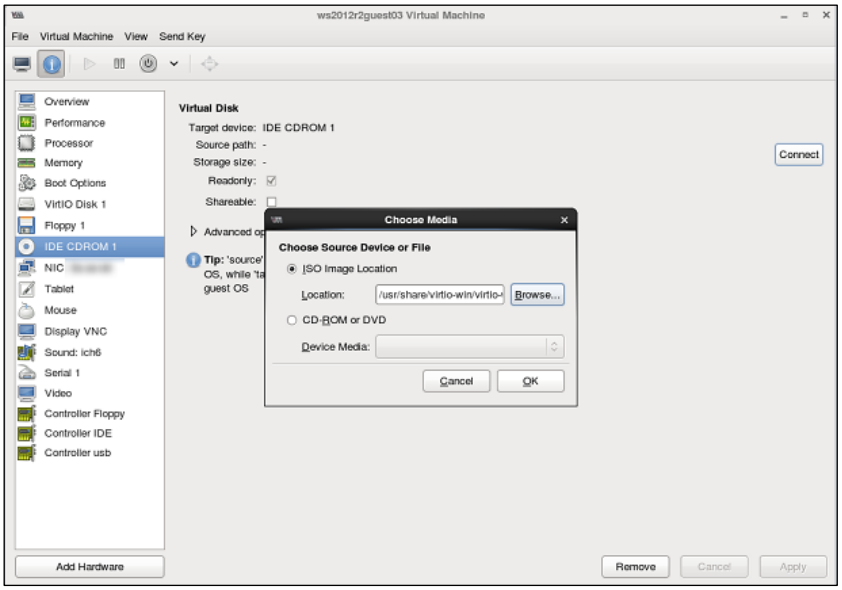

Figure 3-53 Connection of virtio-win.iso

3. From the console screen of Virtual Machine Manager, open Windows Device Manager.
If the AutoPlay screen for the media appears, close it.

4. Click [System devices], right-click [PCI standard RAM Controller], and click [Update Driver Software].

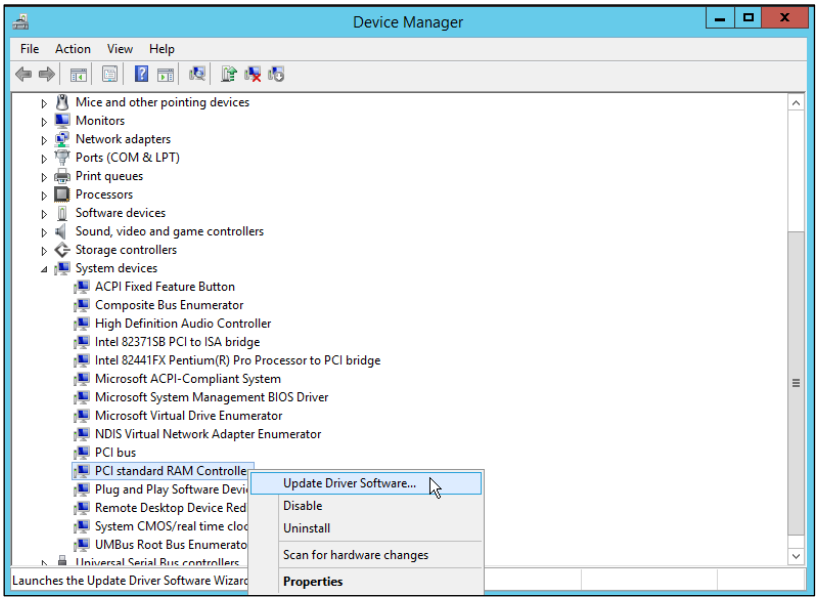

Figure 3-54 Device Manager

5. As the installation location of the driver, select the folder that includes the Balloon driver and install the Balloon driver.
   The folder to select differs depending on the version of virtio-win.
   - [D:\Balloon\2k12\amd64] for "virtio-win-1.6.7-2.el6.noarch.rpm" (or if "yum update" has not been performed)
   - [D:\Balloon\2k12R2\amd64] for "virtio-win-1.6.8-4.el6.noarch.rpm" or later (or if "yum update" has been performed)

6. Restart the virtual machine.

■ Other Checking and Setting

- On the hardware details screen of Virtual Machine Manager, disconnect the media that is connected to the virtual floppy disk.

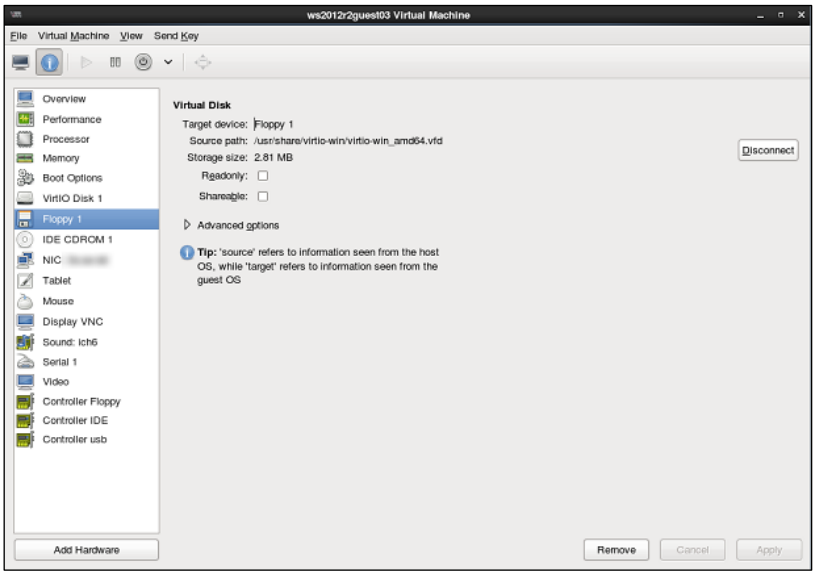

Figure 3-55 Disconnection of Virtual Floppy Disk

- On the hardware details screen of Virtual Machine Manager, disconnect the media that is connected to the CD-ROM.

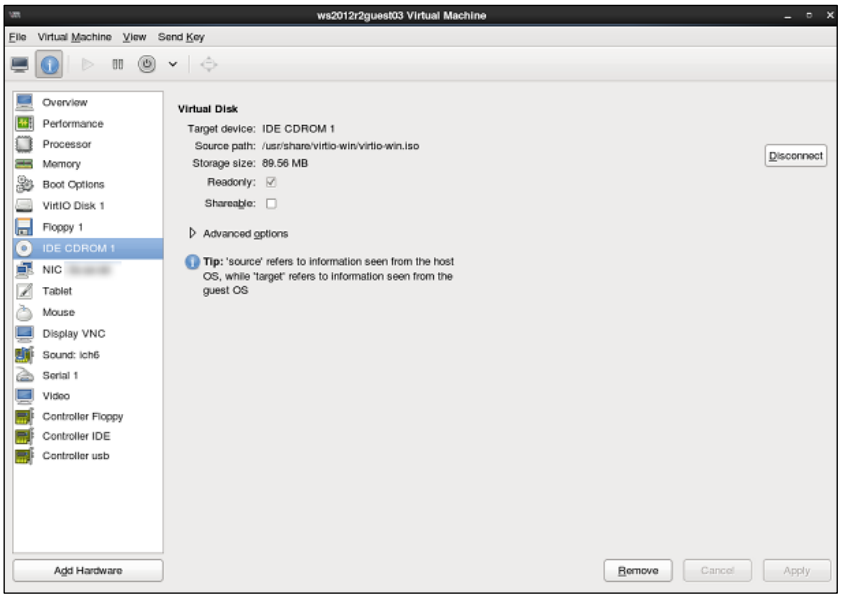

Figure 3-56 Disconnection of CD-ROM

- Collection of investigation data

  For information collection in the event of a problem, check the following documents for required support tools and settings:

  - Software support guide/DSNAP

    Refer to "13.4 Collecting Maintenance Data" in "Administration Manual".

  - Dump setting

    "13.4 Collecting Maintenance Data" in "Administration Manual".

3.4 Copy of Virtual Machine

Copying a created virtual machine can easily create a new virtual machine.

This section describes the procedures for copying (or cloning) a virtual machine on the same physical machine using Virtual Machine Manager.

Caution

- Before copying a virtual machine, check the license agreement conditions for the software to be installed and prepare the required license.
- The following information is also copied: guest OS specific information (host name and network settings), user information (such as the account and password), and ISV product settings. After copying a virtual machine, change the user information.

3.4.1 Cloning of Virtual Machine

1. Start Virtual Machine Manager and confirm that the virtual machine to be cloned is stopped.
   If not, stop the machine.

   Caution

   Do not start the virtual machine to be cloned until cloning is completed.

2. Right-click the virtual machine to be cloned and select [Clone].

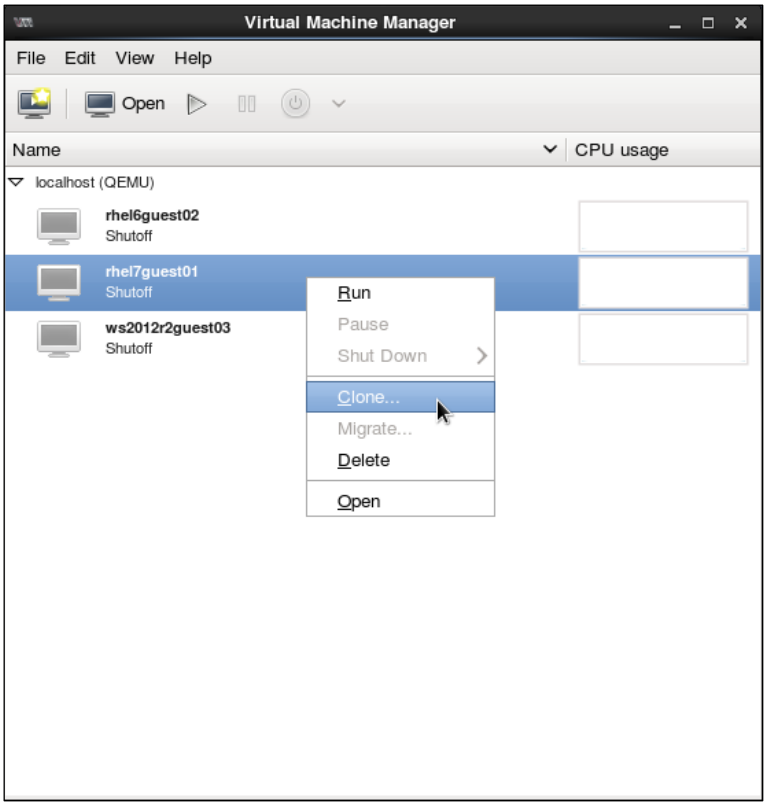

Figure 3-57 Virtual Machine Manager (Cloning Selection)

3. Enter the required information and click [Clone].
   Cloning starts.

   On the [Clone virtual machine] screen, enter the following information:

   - Name

     Enter the name of the virtual machine to be created as a clone.

   - Networking

     Displays the network interface name of the machine to be created as a clone ([Bridge br0] in the example below) and the MAC address.

   - Storage

     Confirm that [Clone this disk] is selected.

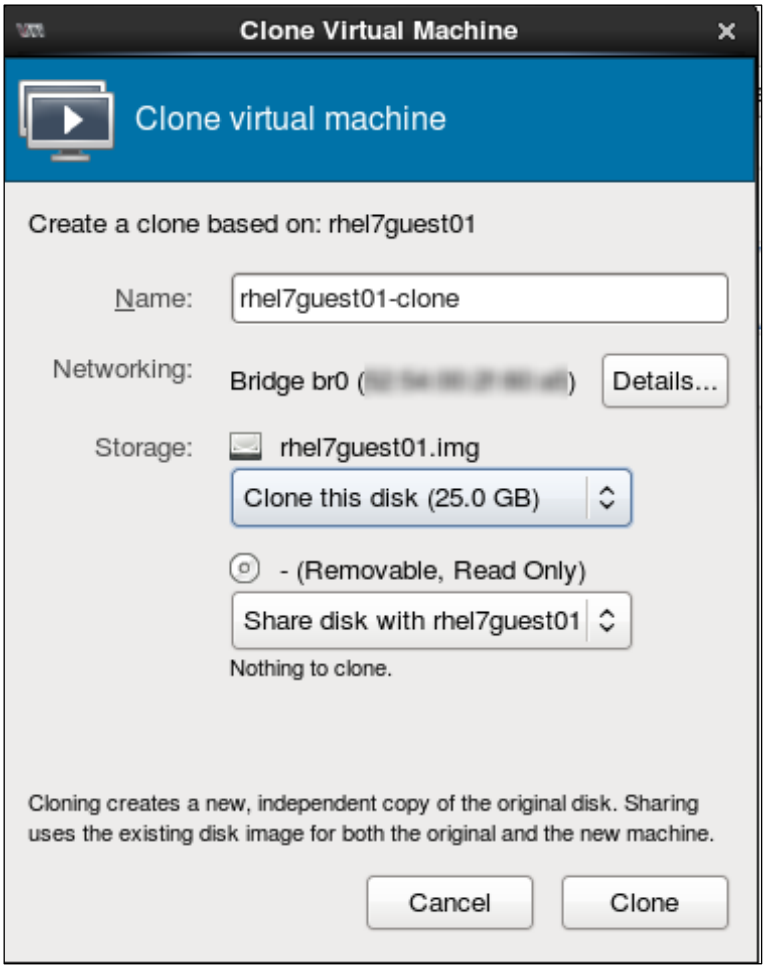

Figure 3-58 Clone Virtual Machine

4. After cloning is completed, confirm that the virtual machine created as a clone ([rhel7guest01-clone] in the example below) is shown on the [Virtual Machine Manager] screen.

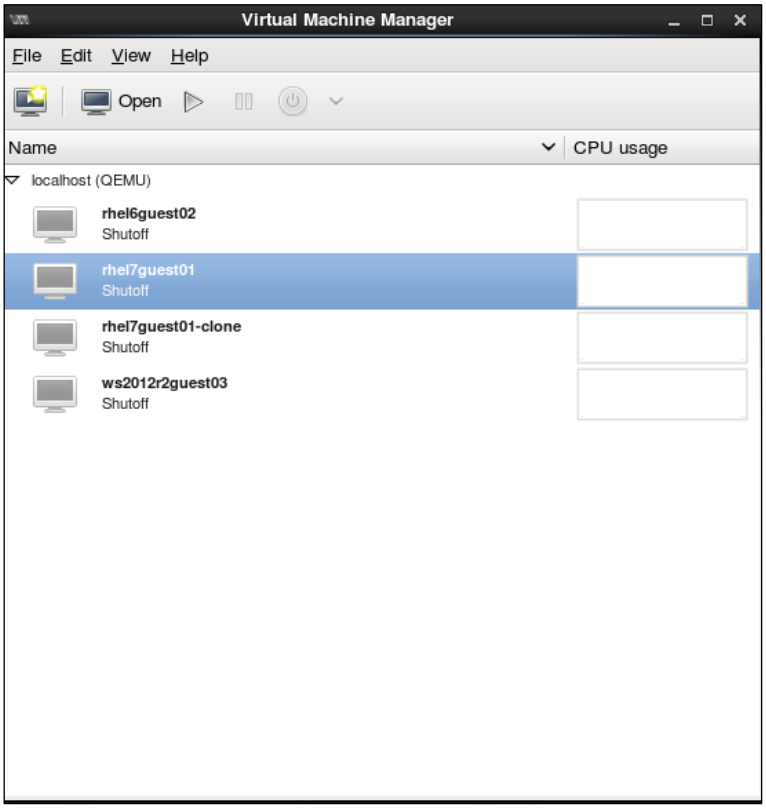

Figure 3-59 Virtual Machine Manager (After Cloning Is Completed)

3.4.2 Setting After Cloning

After cloning is completed, the guest OS specific information set for the virtual machine created as a clone is the same as the information of the original machine.

Start the virtual machine created as a clone and change the OS specific information on the guest OS.

For details, refer to the related RHEL manuals provided by Red Hat.

Caution

Do not start the original virtual machine and the clone virtual machine simultaneously before changing the guest OS specific information.

Revision Record

Edition	Date	Revised location	Description
01	2015-12-24	–	Created the first edition

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