

# Hitachi Compute Blade Series OS Installation Guide for Red Hat Enterprise Linux

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# Preface

This document describes how to use the Compute Blade 2500 series, 500 series and 2000 series.

**Notice:** The use of Compute Blade 2500 series, 500 series, 2000 series, and all other Hitachi Data Systems products is governed by the terms of your agreement(s) with Hitachi Data Systems.

This preface includes the following information:

- ☐ [Intended Audience](#)
- ☐ [Product Version](#)
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- ☐ [Document Organization](#)
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## Intended Audience

This document is intended for the personnel who are involved in planning, managing, and performing the tasks to prepare your site for Compute Blade installation and to install the same.

This document assumes the following:

- The reader has a background in hardware installation of computer systems.
- The reader is familiar with the location where the Compute Blade will be installed, including knowledge of physical characteristics, power systems and specifications, and environmental specifications.

## Product Version

This document revision applies to support for CB2500 Web Console Client.

## Release Notes

Read the release notes before installing and using this product. They may contain requirements or restrictions that are not fully described in this document or updates or corrections to this document.

## Document Organization

The table below provides an overview of the contents and organization of this document. Click the chapter title in the left column to go to that chapter. The first page of each chapter provides links to the sections in that chapter.

Chapter	Description
<a href="#">Chapter 1, Installation Overview</a>	Describes installation overview for Red Hat Enterprise Linux.
<a href="#">Chapter 2, Red Hat Enterprise Linux 6</a>	Describes installation procedure for Red Hat Enterprise Linux 6.
<a href="#">Chapter 3, Red Hat Enterprise Linux 7</a>	Describes installation procedure for Red Hat Enterprise Linux 7.
<a href="#">Chapter 4, Red Hat Enterprise Linux 8</a>	Describes installation procedure for Red Hat Enterprise Linux 8.
<a href="#">Chapter 5, Utilities</a>	Describes installation procedures of utilities for Red Hat Enterprise Linux.

## Referenced Documents

- Hitachi Compute Blade 500 Series manuals

- Hitachi Compute Blade 500 Series EFI User's Guide, MK-91CB500024
- Hitachi Compute Blade 500 Series Logical partitioning manager User's Guide, MK-91CB500068
- Hitachi Compute Blade 500 Series Remote Console User's Guide, MK-91CB500018
- Hitachi Compute Blade 500 Series Server Blade Setup Guide, MK-91CB500012
- Related documents
  - The following two documents are described as *MegaRAID Storage Manager Version xxx Instruction Manual* in this document.
    - MegaRAID Storage Manager Version 8.31-01 Instruction Manual, MK-99COM085
    - MegaRAID Storage Manager Version 11.08.03-02 Instruction Manual, MK-99COM030
  - Hitachi Compute Blade Emulex Adapter User's Guide for Driver, MK-99COM103
  - Hitachi Gigabit Fibre Channel Adapter User's Guide (BIOS/EFI), MK-99COM009
- Hitachi Compute Blade 2500 Series manuals
  - Hitachi Compute Blade 2500 Series Getting Started Guide, MK-99CB2500003
  - Hitachi Compute Blade 2500 Series Management Module User Guide, MK-99CB2500004
  - Hitachi Compute Blade 2500 Series UEFI Setup Guide, MK-99CB2500005
  - Hitachi Compute Blade 2500 Series Logical partitioning manager User Guide, MK-99CB2500006
- Hitachi Compute Blade 2000 Series manuals
  - Hitachi Compute Blade 2000 User's Guide, ESD-99BDS2K001

## Document Conventions





This term "Compute Blade" refers to all the models of the Compute Blade, unless otherwise noted.

The Hitachi Virtualization Manager (HVM) name has been changed to Hitachi logical partitioning manager (LPAR manager, or LP). If you are using HVM based logical partitioning feature, substitute references to Hitachi logical partitioning manager (LPAR manager, or LP) with HVM.

This document uses the following typographic conventions:

Convention	Description
<b>Regular text bold</b>	In text: keyboard key, parameter name, property name, hardware labels, hardware button, hardware switch In a procedure: user interface item
<i>Italic</i>	Variable, emphasis, reference to document title, called-out term
Screen text	Command name and option, drive name, file name, folder name, directory name, code, file content, system and application output, user input
< > (angle brackets)	Variable (used when italic is not enough to identify variable)
[ ] (square brackets)	Optional value
{ } (braces)	Required or expected value
(vertical bar)	Choice between two or more options or arguments.

This document uses the following icons to draw attention to information:

Icon	Meaning	Description
 <b>WARNING</b>	WARNING	This indicates the presence of a potential risk that might cause death or severe injury.
 <b>CAUTION</b>	CAUTION	This indicates the presence of a potential risk that might cause relatively mild or moderate injury.
<b>NOTICE</b>	NOTICE	This indicates the presence of a potential risk that might cause severe damage to the equipment and/or damage to surrounding properties.
 <b>Note</b>	Note	This indicates notes not directly related to injury or severe damage to equipment.
 <b>Tip</b>	Tip	This indicates advice on how to make the best use of the equipment.

## Convention for storage capacity values

Physical storage capacity values (for example, disk drive capacity) are calculated based on the following values:

Physical capacity unit	Value
1 kilobyte (KB)	1,000 ( $10^3$ ) bytes
1 megabyte (MB)	1,000 KB or $1,000^2$ bytes
1 gigabyte (GB)	1,000 MB or $1,000^3$ bytes
1 terabyte (TB)	1,000 GB or $1,000^4$ bytes
1 petabyte (PB)	1,000 TB or $1,000^5$ bytes



Physical capacity unit	Value
1 exabyte (EB)	1,000 PB or 1,000 <sup>6</sup> bytes

Logical storage capacity values (for example, logical device capacity) are calculated based on the following values:

Logical capacity unit	Value
1 block	512 bytes
1 KB	1,024 (2 <sup>10</sup> ) bytes
1 MB	1,024 KB or 1,024 <sup>2</sup> bytes
1 GB	1,024 MB or 1,024 <sup>3</sup> bytes
1 TB	1,024 GB or 1,024 <sup>4</sup> bytes
1 PB	1,024 TB or 1,024 <sup>5</sup> bytes
1 EB	1,024 PB or 1,024 <sup>6</sup> bytes

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## Comments

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Thank you!



# Installation Overview

This chapter describes installation overview for Red Hat Enterprise Linux.

- ☐ [Overview](#)
- ☐ [Before installation](#)
- ☐ [Restrictions](#)

## Overview

This section describes the OS installation flow as follows.

### About the target OS and driver

The following table shows the version of target OS.

**Table 1-1 RHEL 6 versions supported by CB 2500 and CB 500**

Model name	Supported OS versions and OS kernels					
	6.5	6.6	6.7	6.8	6.9	6.10
CB 540A A1/B1	x86 x86_64	x86 x86_64	--	--	--	x86 x86_64
CB 520X B1 <sup>1</sup>	x86_64	x86_64	x86_64	x86_64	x86_64	x86_64
CB 520X B2 <sup>1</sup>	--	x86_64	x86_64	x86_64	x86_64	x86_64
CB 520X B3 <sup>1</sup>	--	--	--	x86_64	x86_64	x86_64
CB 520A A1	x86 x86_64	x86 x86_64	--	--	--	x86 x86_64
CB 520H A1/B1	x86 x86_64	x86 x86_64	x86 x86_64	x86 x86_64	--	x86 x86_64
CB 520H B2	x86 x86_64	x86 x86_64	x86 x86_64	x86_64	--	x86 x86_64
CB 520H B3 <sup>1</sup>	x86_64	x86_64	x86_64	x86_64	x86_64	x86_64
CB 520H B4 <sup>1</sup>	--	--	x86_64	x86_64	x86_64	x86_64
<p>Legend</p> <p>x86: This server blade model supports 32-bit OS kernels.</p> <p>x86_64: This server blade model supports 64-bit OS kernels.</p> <p>--: This server blade model does not support this version of the OS.</p> <p>Notes:</p> <p>1. CB 520X B1/B2/B3 and CB 520H B3/B4 can boot only on EFI.</p>						



**Tip:** For details on how to set up RHEL versions earlier than version 6.5, see the applicable manual as follows:

- For CB 520H A1/B1/B2, CB 520A A1, and CB 540A A1/B1  
*Hitachi Compute Blade 500 Series OS Installation Guide for Red Hat Enterprise Linux*  
The other server blade model does not support RHEL versions earlier than version 6.5.

**Table 1-2 RHEL 7 versions supported by CB 2500 and CB 500**

Model name	Supported OS versions and OS kernels						
	7.1	7.2	7.3	7.4	7.5	7.6	7.7
CB 540A A1/B1	--	--	--	--	--	--	--
CB 520X B1 <sup>1</sup>	x86_64	x86_64	x86_64 <sup>2</sup>	x86_64	--	x86_64	x86_64
CB 520X B2 <sup>1</sup>	x86_64	x86_64	x86_64	x86_64	x86_64	x86_64	x86_64
CB 520X B3 <sup>1</sup>	--	x86_64	x86_64	x86_64	x86_64	x86_64	x86_64
CB 520A A1	--	--	--	--	--	--	--
CB 520H A1/B1	x86_64	x86_64	--	--	--	--	--
CB 520H B2	x86_64	x86_64	x86_64	--	--	--	--
CB 520H B3 <sup>1</sup>	x86_64	x86_64	x86_64	x86_64	x86_64	x86_64	x86_64
CB 520H B4 <sup>1</sup>	--	x86_64	x86_64	x86_64	x86_64	x86_64	x86_64
<b>Legend</b> x86_64: This server blade model supports 64-bit OS kernels. --: This server blade model does not support this version of the OS. <b>Notes:</b> 1. CB 520X B1/B2/B3 and CB 520H B3/B4 can boot only on EFI. 2. Not supported 2-blade SMP and 4-blade SMP configuration.							

**Table 1-3 RHEL 8 versions supported by CB 2500 and CB 500**

Model name	Supported OS versions and OS kernels	
	8.1	
CB 540A A1/B1	--	
CB 520X B1	--	
CB 520X B2 <sup>1</sup>	x86_64	
CB 520X B3 <sup>1</sup>	x86_64	
CB 520A A1	--	
CB 520H A1/B1	--	
CB 520H B2	--	

Model name	Supported OS versions and OS kernels
	8.1
CB 520H B3 <sup>1</sup>	x86_64
CB 520H B4 <sup>1</sup>	x86_64
Legend x86_64: This server blade model supports 64-bit OS kernels. --: This server blade model does not support this version of the OS.	
Notes: 1. CB 520X B2/B3 and CB 520H B3/B4 can boot only on EFI.	

**Table 1-4 RHEL versions supported by CB 2000**

Model name	Supported OS versions and OS kernels	
	6.6	6.10
CB 2000 X57 A1	x86, x86_64	x86, x86_64
CB 2000 X57 A2	x86, x86_64	x86, x86_64
CB 2000 X55 A1	x86, x86_64	x86, x86_64
CB 2000 X55 A2	x86, x86_64	x86, x86_64
CB 2000 X55 R3/S3	x86, x86_64	x86, x86_64
CB 2000 X55 R4	x86, x86_64	x86, x86_64
Legend x86: This server blade model supports 32-bit OS kernels. x86_64: This server blade model supports 64-bit OS kernels. --: This server blade model does not support this version of the OS.		



**Note:** If you want to run a server blade in the LPAR manager mode, note that different OS versions are supported in the LPAR manager mode. For details, see the following manuals:

- *Hitachi Compute Blade 2500 Series Logical partitioning manager User Guide*
- *Hitachi Compute Blade 500 Series Logical partitioning manager User's Guide*
- *Hitachi Compute Blade 2000 Series USER'S GUIDE*



**Tip:** For details on how to set up RHEL versions earlier than version 6.5, see the applicable manual as follows:

- *Hitachi Compute Blade 2000 Series SOFTWARE GUIDE*

**Table 1-5 OS version and driver (CB 2500/CB 500/CB 2000)**

OS version	Driver & Utility CD
RHEL 6.5	Driver & Utility CD for Red Hat Enterprise Linux 6.5
RHEL 6.6	Driver & Utility CD for Red Hat Enterprise Linux 6.6
RHEL 6.7	Driver & Utility CD for Red Hat Enterprise Linux 6.7
RHEL 6.8	Driver & Utility CD for Red Hat Enterprise Linux 6.8
RHEL 6.9	Driver & Utility CD for Red Hat Enterprise Linux 6.9
RHEL 6.10	Driver & Utility CD for Red Hat Enterprise Linux 6.10
RHEL 7.1	Driver & Utility CD for Red Hat Enterprise Linux 7.1
RHEL 7.2	Driver & Utility CD for Red Hat Enterprise Linux 7.2
RHEL 7.3	Driver & Utility CD for Red Hat Enterprise Linux 7.3
RHEL 7.4	Driver & Utility CD for Red Hat Enterprise Linux 7.4
RHEL 7.5	Driver & Utility CD for Red Hat Enterprise Linux 7.5
RHEL 7.6	Driver & Utility CD for Red Hat Enterprise Linux 7.6
RHEL 7.7	Driver & Utility CD for Red Hat Enterprise Linux 7.7
RHEL 8.1	Driver & Utility CD for Red Hat Enterprise Linux 8.1
Notes: The Driver & Utility CD includes drivers for each of the supported OS versions (32-bit and 64-bit).	

## Supported kernel

The following table shows supported kernel.

**Table 1-6 Supported kernel**

Supported OS	Supported kernel	
	32-bit x86	64-bit x86_64
RHEL 6.5	2.6.32-431.29.2.el6.i686	2.6.32-431.29.2.el6.x86_64
RHEL 6.6	2.6.32-504.30.3.el6.i686	2.6.32-504.30.3.el6.x86_64
RHEL 6.7	2.6.32-573.el6.i686	2.6.32-573.el6.x86_64
RHEL 6.8	2.6.32-642.15.1.el6.i686	2.6.32-642.15.1.el6.x86_64
RHEL 6.9	Not applicable	2.6.32-696.18.7.el6.x86_64
RHEL 6.10	2.6.32-754.el6.i686	2.6.32-754.el6.x86_64
RHEL 7.1	Not applicable	3.10.0-229.20.1.el7.x86_64
RHEL 7.2	Not applicable	3.10.0-327.el7.x86_64
RHEL 7.3	Not applicable	3.10.0-514.16.1.el7.x86_64

Supported OS	Supported kernel	
	32-bit x86	64-bit x86_64
RHEL 7.4	Not applicable	3.10.0-693.11.6.el7.x86_64
RHEL 7.5	Not applicable	3.10.0-862.3.2.el7.x86_64
RHEL 7.6	Not applicable	Basic mode: 3.10.0-957.el7.x86_64 LPAR manager mode: 3.10.0-957.12.2.el7.x86_64
RHEL 7.7	Not applicable	3.10.0-1062.1.1.el7.x86_64
RHEL 8.1	Not applicable	4.18.0-147.el8.x86_64



#### Note:

- If a security update kernel exists in a supported RHEL version, the kernel is also supported.  
For details on the latest OS version and kernels supported by each server blade, see the following [Table 1-1 RHEL 6 versions supported by CB 2500 and CB 500 on page 1-2](#) , [Table 1-2 RHEL 7 versions supported by CB 2500 and CB 500 on page 1-3](#) , [Table 1-3 RHEL 8 versions supported by CB 2500 and CB 500 on page 1-3](#) or [Table 1-4 RHEL versions supported by CB 2000 on page 1-4](#):
- For details on the OS and kernels, see the following web page:  
<https://rhn.redhat.com/>

Servers that are purchased from HDS or its distribution partners may support a subset of these OS releases. To know which specific 6.x versions are supported, contact your server vendor's sales or support organizations.

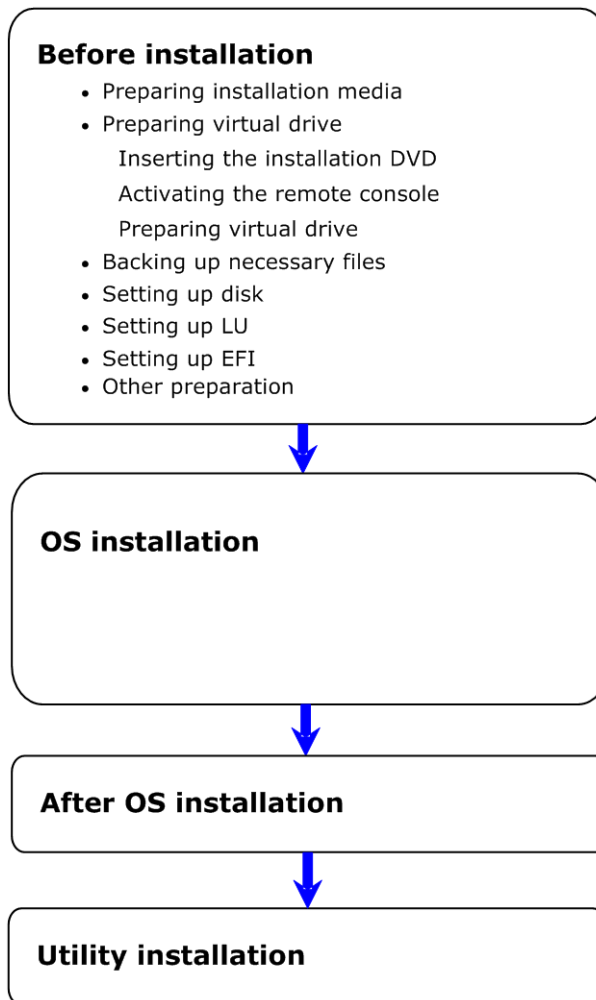
When using RHEL 6 on an LPAR, see the [Setting up after RHEL 6 installation on LPAR manager mode on page 2-19](#). When using RHEL 7 on an LPAR, see the [Setting up after RHEL 7 installation on LPAR manager mode on page 3-18](#).

For how to install drivers for Emulex devices, see *Hitachi Compute Blade Emulex Adapter User's Guide for Driver*.

## Installation general flow

The following flow shows the installation flow.





**Figure 1-1 Installation general flow**

## Before installation

This section describes prerequisites for installation.

### Preparing installation media

Prepare the installation media for the OS.



**Note:** Use an ISO image file if you want to install RHEL 7.1 on CB 520X B1/B2 or CB 520H B2/B3. The installation might fail if you use physical media.

### Preparing virtual drive for CB 2500 or CB 500

#### Inserting the installation DVD

Insert the Installation DVD into the CD/DVD drive of the system console.

## Activating the remote console

Activate the console in the following steps:

1. Connect to the web console.
  - **Using the web console from the web browser**  
Start a browser on the system console, and enter the URL of the management module web console (enter "https://192.168.0.1/" when factory default setting) into the address bar of the browser.

**Table 1-7 Factory default settings**

Item	Factory default
IP address of management module	192.168.0.1
URL of Web console	https://192.168.0.1



**Tip:**

- The above URL indicates the default IP address of management module, and port number is not entered since using default number. If you changed the IP address of management module, and the port number of web console, enter the corresponding URL for your environment.
  - The URL is configured in the following form:  
http://< IP address>:< port number> or  
https://< IP address>:< port number>
  - The default port number:
    - http: 80
    - https: 443
- 
- **Using the Web Console Client**  
Start a Web Console Client on the system console, and enter the IP address of the management module and the port number to connect with https, and click the connect button.

**Table 1-8 Factory default settings**

Item	Factory default
IP address of the management module	192.168.0.1
Port number to connect with https	443

2. Log in the Web console of the management module.
3. The following table describes the factory default account settings for the system administrator.

**Table 1-9 Factory default account settings for the system administrator**

Item	Factory default
User ID	administrator
Password	password

- Click **Resources** tab on the menu screen; then, click a server blade, on which to install the OS.
- Click the **Condition** tab; then, click **Server Blade Action** then, click **Start remote console**. This opens the **Logon** screen.
- The following remote console screen opens.



**Note:** When Logical partitioning is enabled on a server blade, power operation with remote console is disabled. Remote console is not available for powering on, forcibly powering off, and reset. With Logical partitioning enabled, use the Web console to powering on or off the server blade and starting LPARs.



**Tip:** When you use the Web Console Client and click **Start Remote Console**, the login window of server blade Web console is displayed. For login procedure, see *Hitachi Compute Blade 500 Series Remote Console User's Guide*, or *Hitachi Compute Blade 2500 Series Getting Started Guide*.

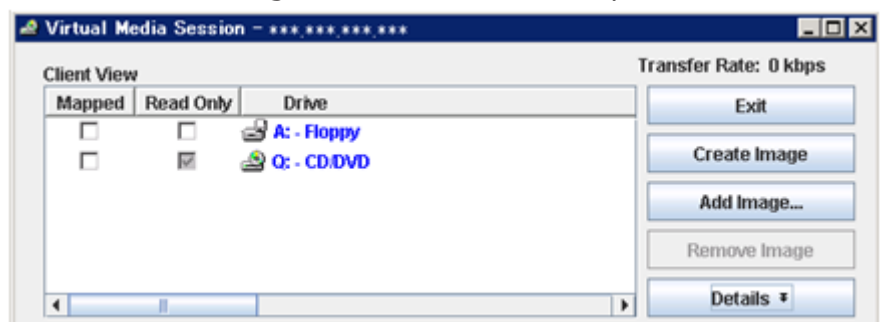


**Tip:** A warning message may appear when the remote console is started. The message varies with the Java VM version. For details, see *Hitachi Compute Blade 500 Series Remote Console User's Guide*, or *Hitachi Compute Blade 2500 Series Getting Started Guide*.

## Setting up virtual drive

Set up a virtual drive, with which to read the installation DVD, in the following steps:

- On the remote console screen, click **Tools**. Then, click **Launch Virtual Media**.
- Confirm that the following virtual media screen opens.



3. Click the box in the **Mapped** column for the CD/DVD to use for installation.



**Tip:** While using the virtual drive, do not close the screen by clicking the **Exit**, by clicking the **x** button. Closing the virtual media console selection screen closes the virtual media session. This ends up in the disconnection of the drive from the server blade, eventually making it unable to recognize the drive.

## Preparing virtual drive for CB 2000

Perform "Remote CD/DVD" from the remote console, or connect a USB CD-ROM drive or USB DVD-ROM drive directly to the server blade.



**Tip:** See Chapter 3: Connecting the System Equipment and Powering on, in *Hitachi Compute Blade 2000 User's Guide* for details about the remote console.

## Backing up necessary files

The data in the HDD or SSD is deleted when you re-install the OS. Back up data that you need in advance.

## Setting up disk

Configure disks, such as RAID, referring to manuals for internal disk arrays or external disk arrays to install the OS as necessary.

## Setting up LU

Note the following when installing the OS on an LU:

- The OS can be installed on an LU whose LU number is "0".
- During installation of the OS, we recommend that the system and LU be connected in a single-path configuration.
- If you want to install the OS on an LU while keeping a multi-path configuration, specify the following settings before installation:
  - a. Use the LUN security function of the storage system to configure settings so that the destination LU and the system can communicate by using a single path only.
  - b. Block the ports on the paths for which communication was disabled in step a.

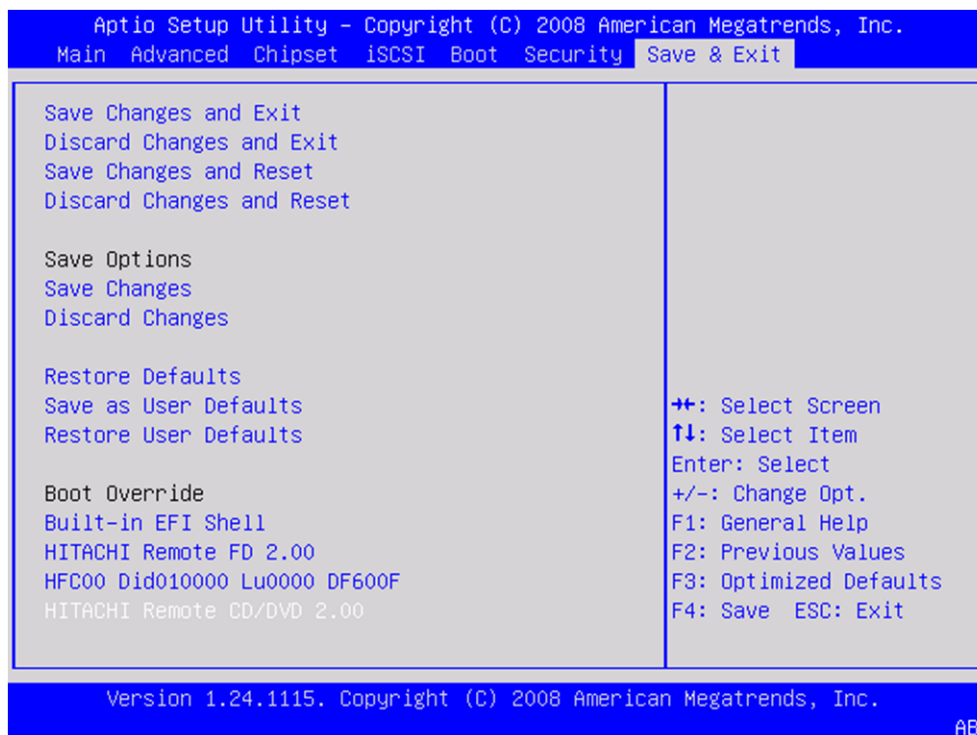
## Setting up EFI for CB 2500 or CB 500

Set the boot device configuration as the EFI initial setting. See *Hitachi Compute Blade 500 Series EFI User's Guide*, or *Hitachi Compute Blade 2500 Series UEFI Setup Guide* that you need.

## Setting up EFI for CB 2000

On the EFI starting screen, press the **F2** key or **Delete** key to enter the EFI Setup menu. Click Save & Exit tab, find Boot Override to select the CD/DVD drive, and press the **Enter** key.

Do not select a device that starts from UEFI.



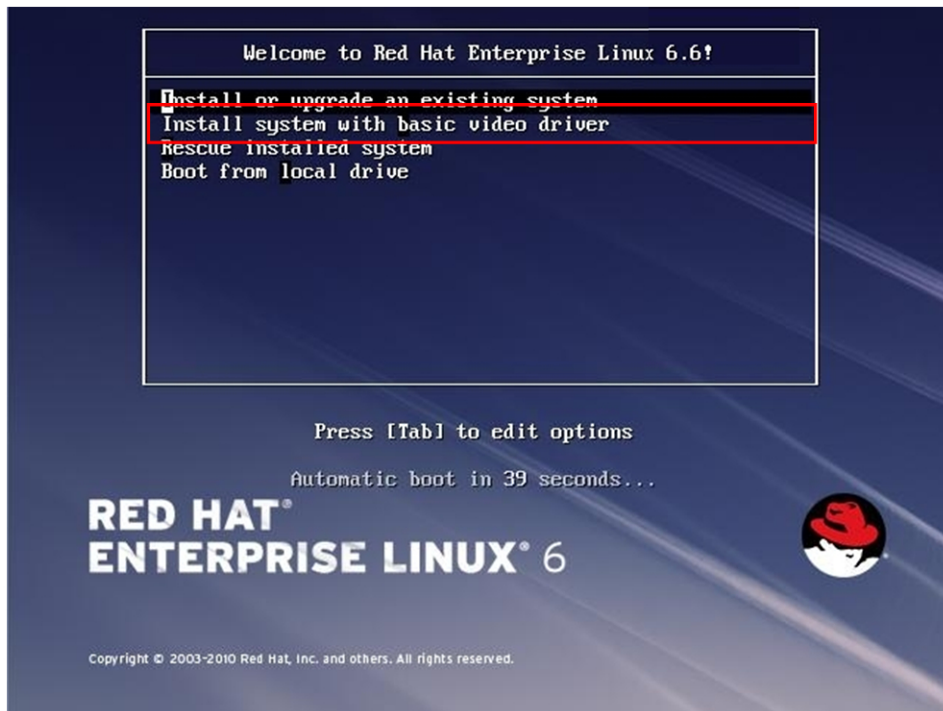
## Other preparations

Start the server blade.



**Note:** For LPAR manager environment, see [Other preparations for Logical partitioning enabled on page 1-12](#) to perform the procedure.

1. Click **Power > Power On** in the tool bar of the remote console.
2. **Press the <ENTER> key to begin the installation process** is displayed.  
Do not press any key. The window immediately changes to that in step 3.
3. The countdown window will be displayed, and then press the arrow key within a minute.



The window above is an example of Red Hat Enterprise Linux 6.6.

Jump to [OS Installation on page 2-2](#) for Red Hat Enterprise Linux 6.

## Other preparations for Logical partitioning enabled

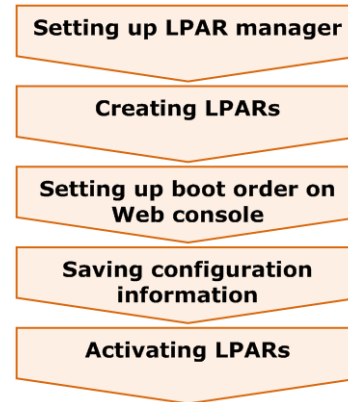
The following is the operation flow when Logical partitioning is enabled.

Set boot order on Web console

You can set boot order using Web console, when all of the following firmware version are met:

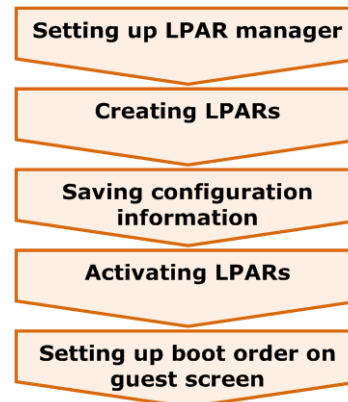
Model		Management module	LPAR manager
CB 2500	CB 520X B1	The firmware version A0105 or later	The version 02-0x or later
	CB 520X B2	The firmware version A0120 or later	The version 02-10 or later
	CB 520X B3	The firmware version A0155 or later	The version 02-46 or later
	CB 520H B3	The firmware version A0110 or later	The version 02-05 or later
	CB 520H B4	The firmware version A0160 or later	The version 02-50 or later
CB 500	CB 520H A1/B1	The firmware version A0125 or later	The version 01-0x or later
	CB 520H B2		The version 01-6x or later
	CB 520H B3	The firmware version A0235 or later	The version 02-05 or later
	CB 520H B4	The firmware version A0305 or later	The version 02-50 or later
	CB 520A A1	The firmware version A0125 or later	The version 01-1x or later
	CB 540A A1/B1		The version 01-2x or later

Model	Management module	LPAR manager
CB 520X B1	The firmware version A0235 or later	The version 02-0x or later
CB 520X B2	The firmware version A0250 or later	The version 02-10 or later
CB 520X B3	The firmware version A0320 or later	The version 02-56 or later



Set boot order on guest screen

When other than above and CB 2000, set boot order using guest screen. The following is operation flow.



- **Setting up LPAR manager**  
Select an LPAR manager firmware, initialize LPAR manager, activate LPAR manager, and then, save the LPAR creation and configuration data. For details, see *Hitachi Compute Blade 500 Series Server Blade Setup Guide*, or *Hitachi Compute Blade 2500 Series Logical partitioning manager User Guide* or *Hitachi Compute Blade 2000 User's Guide*.
- **Creating LPARs**  
Create LPARs. For details, see *Hitachi Compute Blade 500 Series Server Blade Setup Guide*, or *Hitachi Compute Blade 2500 Series Logical partitioning manager User Guide* or *Hitachi Compute Blade 2000 User's Guide*.



**Tip:**

For installing and using Red Hat Enterprise Linux 6, the following LPAR configuration is recommended:

Item	Recommended value
Processor	2 or more <sup>1</sup>
Memory	2.0 GB or larger <sup>2</sup>
Disk	The LPAR on which to install OS requires 40 GB or larger capacity. <sup>3</sup>
Network	1 or more NICs
Notes:	
1. Required to be no less than 1.	
2. Required to be no less than 1.0 GB of memory per processor.	
3. Required to be no less than 23 GB.	

- Saving configuration information  
Save the configuration information. For details, see *Hitachi Compute Blade 500 Series Server Blade Setup Guide*, or *Hitachi Compute Blade 2500 Series Logical partitioning manager User Guide* or *Hitachi Compute Blade 2000 User's Guide*.
- Activating LPARs  
Activate the LPAR. For details, see *Hitachi Compute Blade 500 Series Server Blade Setup Guide*, or *Hitachi Compute Blade 2500 Series Logical partitioning manager User Guide* or *Hitachi Compute Blade 2000 User's Guide*.
- Setting up boot order  
Set up boot order for the LPAR; then, create boot option. You can also change the boot order.

[Used on Web console]

For details, see *Hitachi Compute Blade 500 Series Web Console User's Guide*, or *Hitachi Compute Blade 2500 Series Logical partitioning manager User Guide*.

[Used on guest screen]

For details, see *Hitachi Compute Blade 500 Series Logical partitioning manager User's Guide*, or *Hitachi Compute Blade 2500 Series Logical partitioning manager User Guide* or *Hitachi Compute Blade 2000 User's Guide*.



**Note:** You can use only a fibre channel mezzanine card or a fibre channel adapter as the boot device. For precautions about the use of FC, see *Hitachi Gigabit Fibre Channel Adapter User's Guide (BIOS/EFI)* in advance.



**Tip:** If you use a shared fibre channel as a boot device, boot may not complete depending on the number of LPARs assigned to the shared fibre channel. To solve this problem, you can set a longer time for the LOGIN DELAY TIME, which is the parameter that controls the operation of the



## Restrictions

This section describes notes and restrictions when you use Red Hat Enterprise Linux.

### CPU degradation

EFI firmware will suppress CPU degradation for the CPUs under the conditions shown in [Table 1-10 CPU conditions to suppress CPU degradation on page 1-15](#), to prevent network function of compute blade may not work properly.

This restriction applies to all supported OSs.

**Table 1-10 CPU conditions to suppress CPU degradation**

Compute Blade	CPU conditions
CB 520A A1	After CPU degradation, the available logical core will be reduced below 12 cores.
CB 540A A1/B1	After CPU degradation, the available logical core will be reduced below 24 cores.
CB 520H A1/B1/B2/B3/B4	After CPU degradation, the available logical core will be reduced below 12 cores.
CB 520X B1/B2/B3	After CPU degradation, the available logical core will be reduced below 12 cores per blade.

### Intake temperature

Compute blades with CPU SKU shown in [Table 1-11 Configuration restricted on intake temperature on page 1-15](#), must be used at intake temperature shown the table to avoid performance degradation and reduced lifetime of CPUs.

**Table 1-11 Configuration restricted on intake temperature**

Compute Blade	CPU SKU	Intake temperature conditions
CB 520H B2	E5-2637v2, E5-2643v2	Must be used below 30 degrees C.
CB 520H B3	E5-2637v3, E5-2643v3, E5-2667v3, E5-2697v3, E5-2699v3	Must be used below 35 degrees C.
CB 520H B4	E5-2637v4, E5-2643v4, E5-2667v4, E5-2697v4, E5-2697Av4, E5-2699v4	Must be used below 35 degrees C.

## USB 3.0 disabled on CB 520H B3/B4

In the case of CB 520H B3/B4 with Red Hat Enterprise Linux, USB 3.0 must be disabled by changing settings of "XHCI" in USB Configuration in EFI menu to avoid OS boot failure.

### Procedure of changing XHCI mode on EFI settings

1. Click **Resources** > **Modules** > target server blade, then click **EFI** tab and **Edit** button on Web Console. In SMP(Symmetric Multi Processor) configuration, select the primary server blade when selecting target server blade.
2. Click **Devices and I/O Ports**.
3. In **Devices and I/O Ports setting** dialog box, select **Disabled** on **XHCI Mode**. And click **Confirm** button.



## Using Red Hat Enterprise Linux on SMP

When you use Red Hat Enterprise Linux 6.5, Red Hat Enterprise Linux 6.8, Red Hat Enterprise Linux 7.2, Red Hat Enterprise Linux 7.3, or Red Hat Enterprise Linux 7.4 on compute blade with both conditions shown in the following table, you must change EFI settings shown in the table to avoid kdump failure.

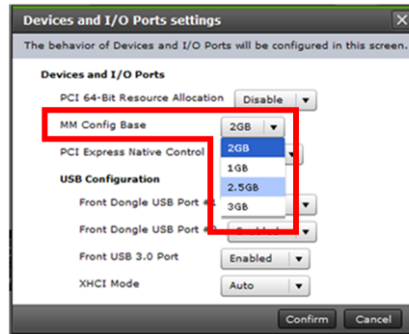
**Table 1-12 OS conditions restricted on using Red Hat Enterprise Linux**

Compute Blade	Condition	EFI settings	
		Item	setting
CB 520X B1 <sup>1</sup>	4-blades SMP	MM Config Base	3GB
Notes:			
1. This condition does not apply if CB 520X B1 is running in LPAR manager mode.			

### Procedure of changing MM Config Base on EFI settings

1. Click **Resources** > **Modules** > target server blade, then click **EFI** tab and **Edit** button on Web Console. In SMP(Symmetric Multi Processor) configuration, select the primary server blade when selecting target server blade.
2. Click **Devices and I/O Ports**.

3. In **Devices and I/O Ports setting** dialog box, select **3GB** on **MM Config Base**. And click **Confirm** button.



## Using the LPAR manager mode

Some items in LPAR manager are not be supported depending on the guest OS. For details, see the manual that corresponds to the model you are using.

For CB2500

*Hitachi Compute Blade 2500 Series Logical partitioning manager User Guide*

For CB500

*Hitachi Compute Blade 500 Series Logical partitioning manager User's Guide*



# Red Hat Enterprise Linux 6

This chapter describes installation procedure for Red Hat Enterprise Linux 6.

- ☐ [OS Installation](#)
- ☐ [Setting up after RHEL 6 installation on Basic mode](#)
- ☐ [Setting up after RHEL 6 installation on LPAR manager mode](#)

# OS Installation

This section describes how to install Red Hat Enterprise Linux 6 with the Driver & Utility CD.



## Tip:

- The installation procedure described in this guide is an example. See the following Red Hat website for more details.  
[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Linux/](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/)
- For example, Driver & Utility CD for RHEL 6 version 0650-xx, contains drivers and utilities for RHEL 6.5. It can be used for RHEL 6.5 setup.

## Precautions for OS installation on LPAR manager

Be aware of the following precautions for LPAR manager environment.

### Activating, resetting the LPAR

To activate or reset the LPAR, perform them through the LPAR manager management screen. Do not use the power button or the reset button for the operation. Also, do not use the dump command from the management module. It is because such operations are performed on the server blade, not on the LPAR; pressing the server blade buttons affect the server blade, and can damage the OS.

### Using remote console

Power operation by remote console is performed to a server blade. Power operation to a server blade, where Logical partitioning is enabled, affects all LPARs managed by LPAR manager. Thus, the remote console is not available for powering on or off and reset. Use the remote console only for OS installation.

If you cannot go the shell window automatically while rebooting LPAR, select Continue in the logical UEFI window.

### Using the USB port on the server blade connector

In an LPAR environment, you can use the USB port on the server blade connector when installing the OS. For CB520X B1/B2, however, if LPAR manager firmware whose version is 02-50 or earlier is running, you cannot use the USB port on the server blade connector when installing the OS. In this case, use a virtual drive on the remote console.

## Installation steps

Screenshots for Red Hat Enterprise Linux 6 are used in the following steps. A step may include different procedures for Legacy boot and EFI boot systems. In this section, use an example of screenshots to install the RHEL 6.6.

**Tip:**

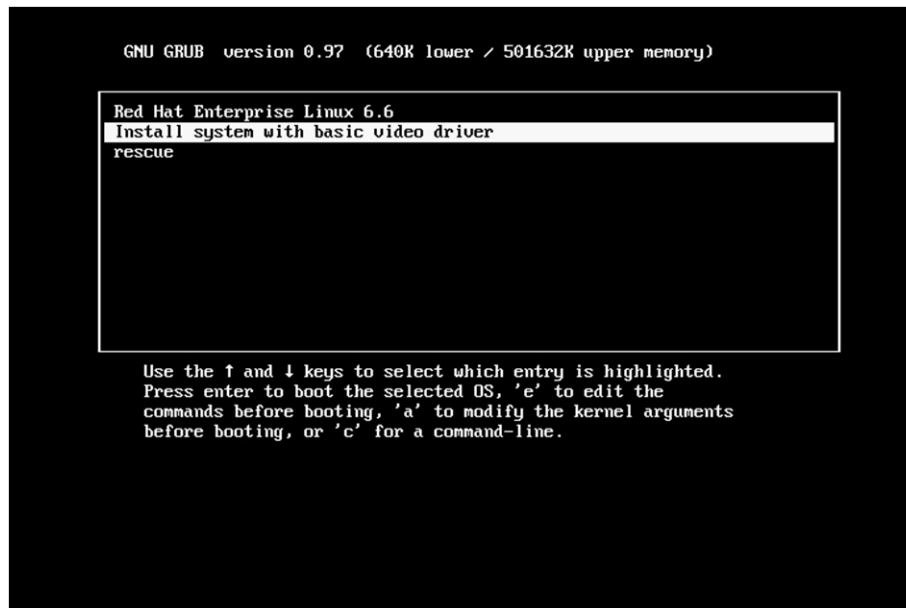
- For EFI boot, the following message appears before installation. Press any key before the countdown ends. If not, installation may fail.  
"Press any key to enter the menu"
  - Do not install tboot package. Click Base System > Base to show the Packages in Base dialog box, and make sure that tboot package is unchecked.
  - On the CB500 and CB2500 server blades, perform the work up to step 11 below within 20 minutes after the screen in step 1 is displayed.  
Otherwise, the server blades will determine that OS startup has failed and will reboot.
- 

Follow steps shown below to install the OS.

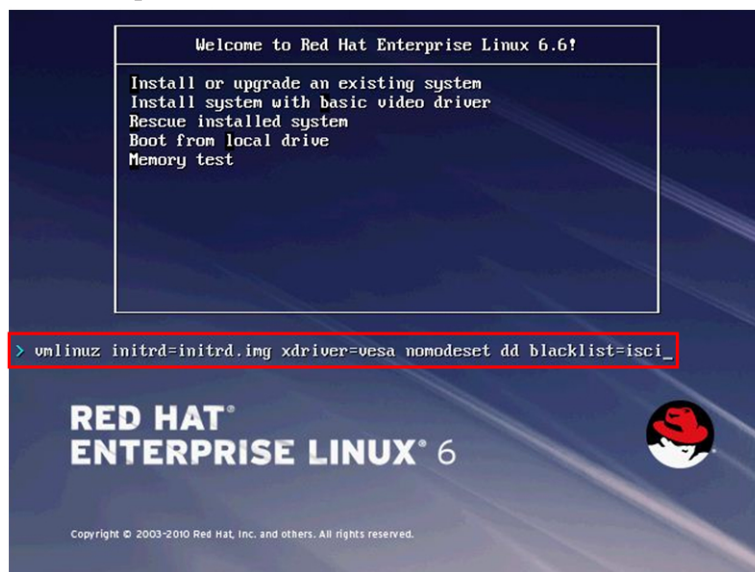
1. Click **Install system with basic video driver**, and press **Tab** on the Legacy boot system; press **a** key on the EFI boot system.  
[Legacy boot mode]



[EFI boot mode]



2. For CB 2500 or CB 500  
When the boot option appears, add `dd blacklist=isci` to the end.  
[Legacy boot mode]



[EFI boot mode]



```
[ Minimal BASH-like line editing is supported. For the first word, TAB
lists possible command completions. Anywhere else TAB lists the possible
completions of a device/filename. ESC at any time cancels. ENTER
at any time accepts your changes.]

grub append> xdriver=vesa nomodeset askmethod dd blacklist=iscsi
```

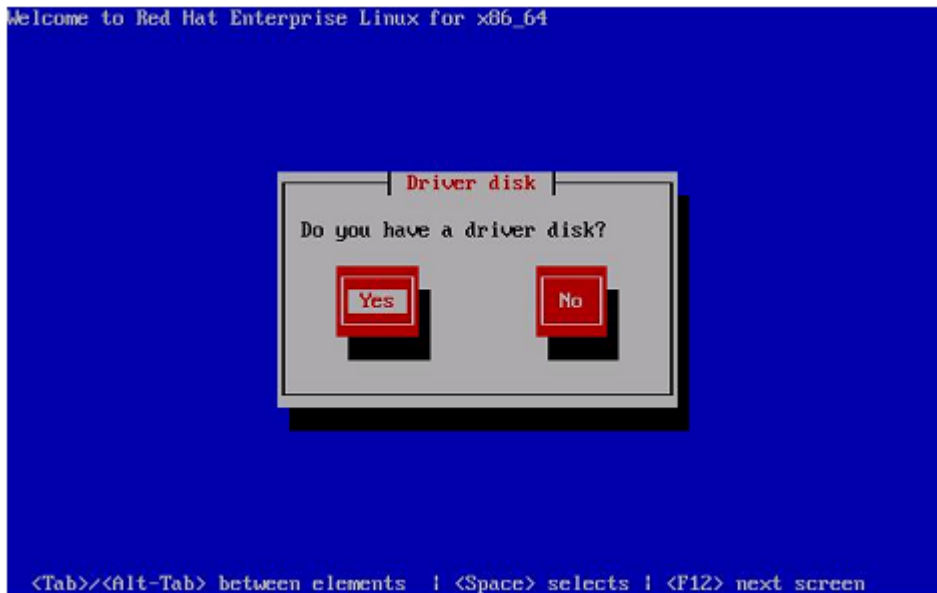
For CB 2000

Press the **Tab** key to display options, and type `dd`.

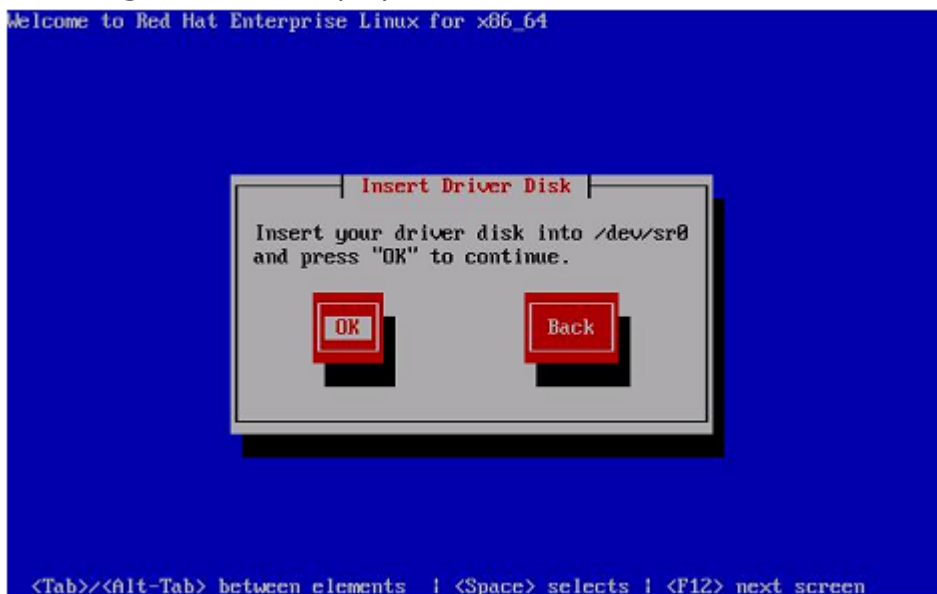


**Note:** Make sure to type the correct command. If you proceed with an incorrect command, the installation may fail.

3. The message, **Do you have a driver disk?** is displayed, and then click **Yes**.



4. The following window is displayed.

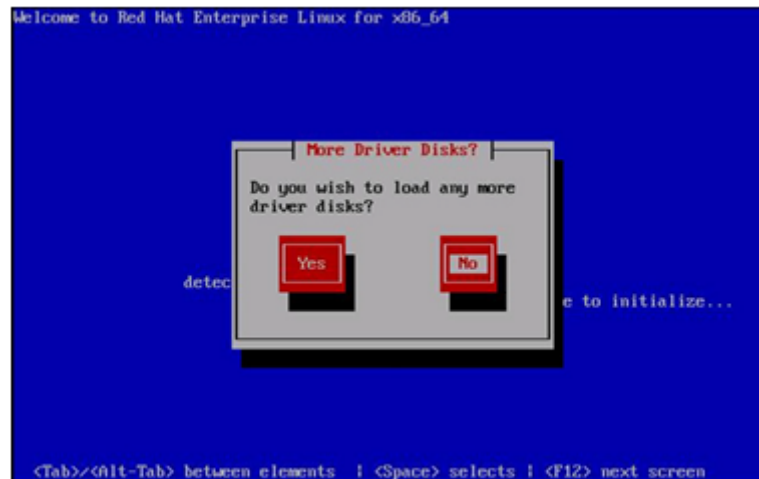


5. Uncheck **Mapped** in the virtual media console dialog box, and then remove the Installation DVD from the DVD drive.



**Tip:** For how to use the remote CD/DVD on CB 2000, see chapter of "Connecting the System Equipment and Powering On" in *Hitachi Compute Blade 2000 USER'S GUIDE*.

6. Insert the Driver and Utility CD in the DVD drive. Check **Mapped** in the virtual media console dialog box.
7. Click **OK** on the window shown in step 4.
8. The following window is displayed.



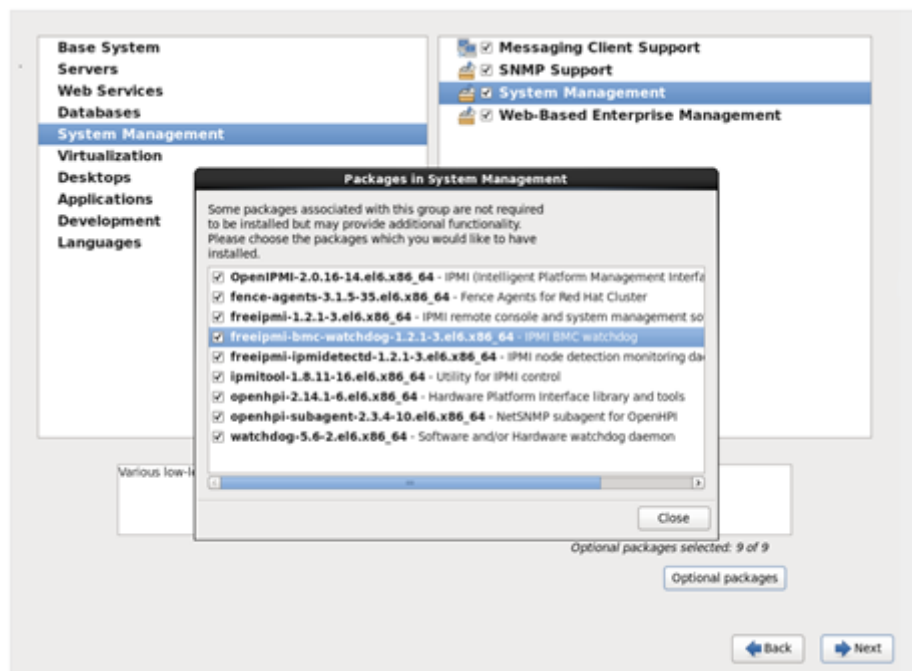
9. Uncheck **Mapped** in the virtual media console dialog box, and then remove the Driver and Utility CD from the DVD drive.
10. Insert the Installation DVD in the DVD drive. Check **Mapped** in the virtual media console dialog box.
11. Click **No** on the window in step 8.

Follow the wizard to continue the installation.



**Note:**

- Do not install the "freeipmi-bmc-watchdog" package. If this package is installed to RHEL 6.x, the system will auto restart periodically.  
System Management > System Management > Optional packages > freeipmi-bmc-watchdog-x.x.x-x.xx.xx



For CB 520X B1/B2/B3, CB 520H B3/B4, do not install tboot package (tboot-x.xx-x.el6.x86\_64.rpm/ tboot-x.xx-x.el6.i686.rpm). Click Base

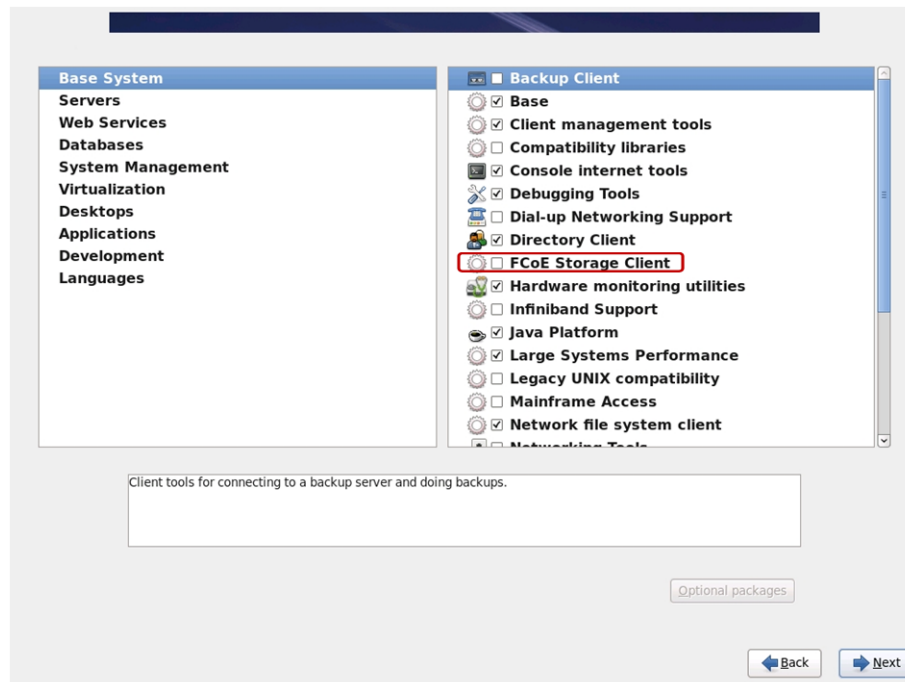
System > Base to show the Packages in Base dialog box, and make sure that tboot package is unchecked.

- For CB 2000, do not configure network settings for a device using the e1000e driver\* which requires to be disabled after the installation.

\*: Intel Corporation 82567LF-2

The device with the last one of the three consecutive MAC addresses.

- For CB 2000, the device on this system does not support FCoE Storage Client. Do not check FCoE Storage Client on the following window in installation. If you continue to install the OS with FCoE Storage Client checked, the installation may not be completed.



**Tip:** When a message "Please select the nearest city in your time zone" is displayed, select a time zone, uncheck "System clock uses UTC", and click Next.

## Restrictions

### Common restrictions

#### About Call Trace

When you installed Red Hat Enterprise Linux 6.5/6.6/6.7, there are cases where Call Trace is taken. However, this will not affect system operation.

```
Call Trace:
[<ffffffff81071e27>] ? warn_slowpath_common+0x87/0xc0
[<ffffffff81071f16>] ? warn_slowpath_fmt+0x46/0x50
[<ffffffff81205f18>] ? sysfs_add_one+0xb8/0xd0
[<ffffffff812063ab>] ? sysfs_do_create_link+0x12b/0x170
[<ffffffff81206423>] ? sysfs_create_link+0x13/0x20
```

```
[<fffffffff8136c99d>] ? bus_add_device+0xed/0x1d0
[<fffffffff8136aaee>] ? device_add+0x4ce/0x650
[<fffffffff81369821>] ? dev_set_name+0x41/0x50
[<fffffffff8136f685>] ? platform_device_add+0x125/0x200
[<fffffffffa030a1c8>] ? mfd_add_devices+0x188/0x22c [mfd_core]
[<fffffffff8129c879>] ? pci_bus_write_config_byte+0x69/0x90
[<fffffffffa030e4b8>] ? lpc_ich_probe+0x3a1/0x417 [lpc_ich]
[<fffffffff810951c0>] ? do_work_for_cpu+0x0/0x30
[<fffffffff812a4db7>] ? local_pci_probe+0x17/0x20
[<fffffffff810951d8>] ? do_work_for_cpu+0x18/0x30
[<fffffffff8109aef6>] ? kthread+0x96/0xa0
[<fffffffff8100c20a>] ? child_rip+0xa/0x20
[<fffffffff8109ae60>] ? kthread+0x0/0xa0
[<fffffffff8100c200>] ? child_rip+0x0/0x20
---[ end trace c27dcfa06e243478 ]---
```

## Using to kdump function

If you cannot use kdump with RHEL 6.x, cope with the problem according to the following information being published by Red Hat, Inc.

<https://access.redhat.com/solutions/917933>

## Enable to fcoe service, and lldpad Service

When you start up the operation system with activating the fcoe service and the lldpad service, the information below is recorded to the "/var/log/message" file. Ignore this information because it does not have an effect on the behavior.

```
lldpad: config file failed to load,
lldpad: create a new file.
lldpad: bound ctrl iface to /com/intel/lldpad
```

## CB 500 and CB 2500 restrictions

### Internal RAID controllers

This section describes restrictions for the following RAID controller and the systems.

Target RAID controller and systems

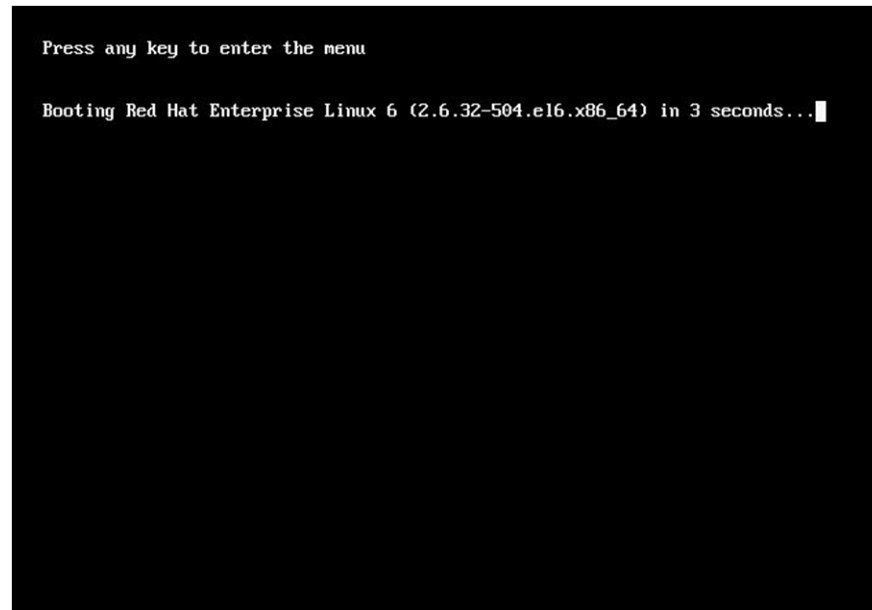
- LSI SAS2008 RAID board (Internal SAS RAID controller)
- Internal SATA RAID controller for CB 520A A1
- CB 520X B1/B2/B3
- CB 520H B3/B4
- PCI path-through function in KVM guest environment  
PCI path-through function in KVM guest environment (SR-IOV) is not supported. Do not use this function.
- tboot package

Do not install tboot package (tboot-x.xx-x.el6.x86\_64.rpm/ tboot-x.xx-x.el6.i686.rpm). Click Base System > Base to show the Packages in Base dialog box, and make sure that tboot package is unchecked.

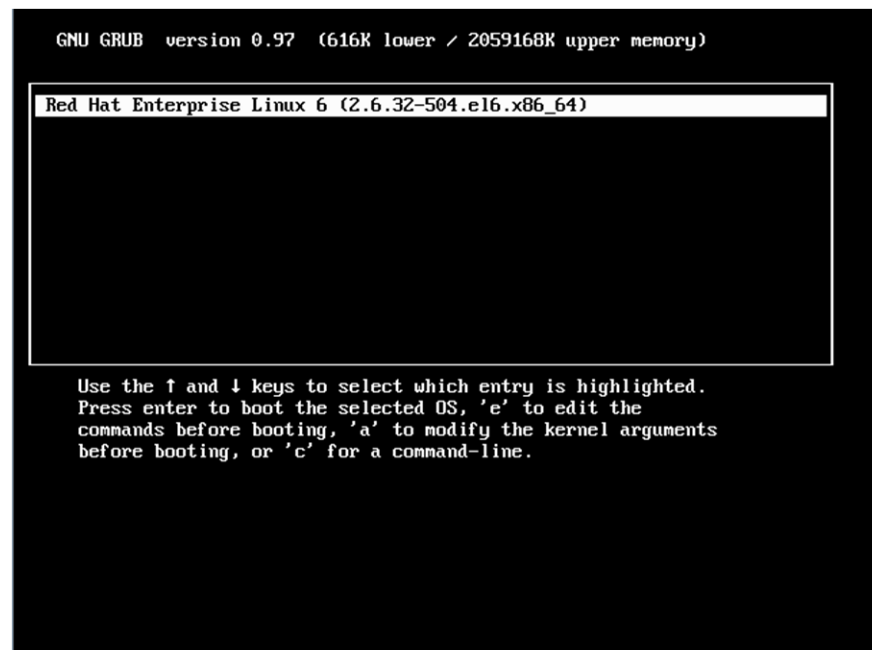
When installing tboot package (tboot-x.xx-x.el6.x86\_64.rpm/ tboot-x.xx-x.el6.i686.rpm) by mistake, change the setting for /boot/grub/grub.conf referring to 4. Customizing /boot/grub/grub.conf, [Setting up after RHEL 6 installation on Basic mode on page 2-15](#).

Deleting boot options:

1. Press any key when the following boot loader message appears.



2. Press **E** key when the following window appears.



3. Select the underscored line and press **E** key.

```
GNU GRUB version 0.97 (616K lower / 2059168K upper memory)

root (hd0,0)
kernel /vmlinuz-2.6.32-504.el6.x86_64 ro root=/dev/mapper/VolGroup-lv-
initrd /initramfs-2.6.32-504.el6.x86_64.img

Use the ↑ and ↓ keys to select which entry is highlighted.
Press 'b' to boot, 'e' to edit the selected command in the
boot sequence, 'c' for a command-line, 'o' to open a new line
after ('O' for before) the selected line, 'd' to remove the
selected line, or escape to go back to the main menu.
```

4. Boot option setting menu appears.  
Delete "intel\_iommu=on" and "amd\_iommu=on" from the boot option,  
and press **Enter**.
5. Enter **B** key when the following window appears.

```
GNU GRUB version 0.97 (616K lower / 2059168K upper memory)

root (hd0,0)
kernel /vmlinuz-2.6.32-504.el6.x86_64 ro root=/dev/mapper/VolGroup-lv-
initrd /initramfs-2.6.32-504.el6.x86_64.img

Use the ↑ and ↓ keys to select which entry is highlighted.
Press 'b' to boot, 'e' to edit the selected command in the
boot sequence, 'c' for a command-line, 'o' to open a new line
after ('O' for before) the selected line, 'd' to remove the
selected line, or escape to go back to the main menu.
```

6. OS starts up.  
Change the setting for /boot/grub/grub.conf referring to 4.  
Customizing /boot/grub/grub.conf, [Setting up after RHEL 6 installation on Basic mode on page 2-15](#).

## System log messages

The following messages may be returned to the `dmesg` command and the system log (`/var/log/messages`), but the errors do not have an effect on the behavior.

Messages
device descriptor read/64, error -71
unable to enumerate USB device on port X
Setup ERROR: setup context command for slot X

## Install OS to the built-in RAID of CB 520X B1/B2/B3

To install an operation system to the built-in RAID of CB 520X B1/B2/B3, make sure to install the operation system to Virtual Drive 0.

## Multichannel function of Emulex devices

When using Multichannel function of the Emulex devices, be sure to add "`udevchilids=1`" to the kernel boot parameter in the `grub.conf` file. Otherwise, the OS boot will fail with the following message.

```
udev[d[X]: worker [Y] unexpectedly returned with status 0x0100
```

The following explains the procedure of adding "`udevchilids=1`".

1. Execute `vi` command to edit the `grub.conf`.

[Legacy boot]

```
#vi /boot/grub/grub.conf
```

[UEFI boot]

```
#vi /boot/efi/EFI/redhat/grub.conf
```

2. Add "`udevchilids=1`" to the kernel boot parameter.

Move the cursor to the end of the kernel parameter line and add "`udevchilids=1`". To move the cursor in edit mode, the following keys will be available.

up: **K** key, down: **J** key, left: **H** key, right: **L** key

```
title Red Hat Enterprise Linux (2.6.32-431.el6.x86_64)
    root (hd0,1)
    kernel /vmlinuz-2.6.32-431.el6.x86_64 ro root=/dev/mapper/VolGroup00-
lv_root rd_NO_LUKS rd_NO_MD nodmraid rd_LVM_LV=VolGroup00/lv_root
crashkernel=128M KEYBOARDTYPE=pc KEYTABLE=jp106 LANG=ja_JP.UTF-8
rd_LVM_LV=VolGroup00/lv_swap rd_NO_DM nmiwatchdog=0 pci=noaer
scsi_mod.scan=sync edd=off udevchilids=1
    initrd /initramfs-2.6.32-431.el6.x86_64.img
```

3. Execute `":wq"` command to save the new `grub.conf` and quit `vi`.
4. Reboot the OS to enable the new `grub.conf`.
5. After the OS reboot is complete, check the kernel boot parameter again.



Execute the following command, and confirm that "udevchilds=1" has been added as shown in the example below.

```
#cat /proc/cmdline
```

```
ro root=/dev/mapper/VolGroup00-lv_root rd_NO_LUKS rd_NO_MD nodmraid  
rd_LVM_LV=VolGroup00/lv_root crashkernel=128M KEYBOARDTYPE=pc  
KEYTABLE=jp106 LANG=ja_JP.UTF-8 rd_LVM_LV=VolGroup00/lv_swap rd_NO_DM  
nmiwatchdog=0 pci=noaer scsi_mod.scan=sync edd=off udevchilds=1
```

## CB 2000 server blade

- Time Required for X Logout  
With X logout, it may take about 5 to 10 minutes to complete the logout which has no effect on the system behavior.
- MTU Setting for ixgbe driver on 32-bit x86 kernel  
When using ixgbe driver on 32-bit x86 kernel, use the default value: 1500 for MTU (maximum transmission unit). If MTU is more than 1500, a kernel panic may occur.
- System Log Messages related to mcelog  
The following messages may be dumped in the system log (/var/log/messages). They do not affect the behavior.
  - mcelog: failed to prefill DIMM database from DMI data
  - mcelog: mcelog read: No such device
- ACPI Warning shown in the dmesg file  
The following message may be dumped by the dmesg command and in the system log (/var/log/dmesg). They do not affect the behavior.  
"ACPI Warning: FADT (revision 5) is longer than ACPI 2.0 version, truncating length 0x10C to 0xF4 (20090903/tbfadt-288)"
- Intel® I/OAT shown in the dmesg file  
The following message may be dumped by the dmesg command depending on the system configuration.  
"Intel(R) I/OAT DMA Engine init failed"  
To avoid this problem, add the following kernel option to /boot/grub/grub.conf.

```
apic=bigsm
```

## LPAR manager environment

If you use Red Hat Enterprise Linux 6 in an LPAR manager environment, check the following restrictions in addition to the previously described restrictions for server blades:

### Restrictions when using RHEL 6

Some items in LPAR manager are not supported depending on the guest OS. For details, see the manual that corresponds to the model you are using.

For CB2500

*Hitachi Compute Blade 2500 Series Logical partitioning manager User Guide*

For CB500

*Hitachi Compute Blade 500 Series Logical partitioning manager User's Guide*

## **Basic operation on and changing settings for Red Hat Enterprise Linux 6**

After starting Red Hat Enterprise Linux 6 on the LPAR manager LPAR, perform basic operations and change settings for the OS, when needed, by using SSH or terminal software or by using the remote console.

### **Shared NICs/virtual NICs**

If the shared NICs/virtual NICs are not recognized as network devices after starting the OS first time, retry restarting the OS.

### **Network**

You cannot bond virtual NICs and physical NICs with hbonding/bonding.

### **Tag VLAN**

If you use Tag VLAN, the communication performance may not improve even if you enable the TCP segmentation off load function.

### **Pasting character strings on the guest screen**

Attempting to paste a long character string onto the guest screen may not paste the intended length of the string, or it may cause Linux hang-up, or it may result in an unexpected screen operation. The maximum length of a string that can be pasted without fail is 16. To paste strings longer than that, use the virtual COM console or a terminal connected to the server blade.

### **System log messages**

The system log below may be found, but it does not affect the operation.

Message
warning: many lost ticks.
mtrr: type mismatch for ef200000,100000 old: write-back new: write-combining

### **Message at OS boot**

The following message may be displayed at OS boot, but operation is not affected.

Message
microcode: CPUX update to revision 0xXX failed.
ACPI: \_PR_.PM**: failed to get CPU physical ID.

## Message for physical processor shortage

When the total number of logical processors, which are assigned to LPARs, are more than that of physical processors on the server blade, the following message may be displayed. Operation is not affected. When the processor is assigned as dedicated, rarely but the following message may be displayed. This will not affect the operation.

Message
hrtimer: interrupt took XXXXXXX ns

## Message at TPM error

When tboot package is installed on Red Hat Enterprise Linux 6, the following message may be displayed at OS boot. Operation is not affected.

Message
TBOOT: Error: write TPM error: 0xX

## MTU value

When Jumbo Frame is used in the virtual NIC and shared NIC, the following MTU (maximum transfer unit) sizes are supported by LPAR manager.

- Up to 9000 bytes

# Setting up after RHEL 6 installation on Basic mode

This section describes the settings on Basic mode, after Red Hat Enterprise Linux 6 is installed.



**Note:** When having installed tboot package (tboot-x.xx-x.el6.x86\_64.rpm/tboot-x.xx-x.el6.i686.rpm) with LSI SAS 2008 RAID board (Internal SAS RAID controller) or Internal SATA RAID controller for CB 520A A1 or CB 520X B1/B2/B3 or CB 520H B3/B4 change the setting for `/boot/grub/grub.conf` referring to [Restrictions on page 2-8](#).

Follow steps shown below to set up the OS after installation.

1. Disabling TCP Checksum Offload function  
TCP Checksum Offload is a function that checks TCP packets in the LAN controller. If TCP Checksum Offload is enabled, packet data may be destroyed when the LAN controller fails.

## Targeted drivers

- tg3 driver
- igb driver

Values: off or on (off: disabled; on: enabled)

Perform the `ethtool` command to disabling TCP Checksum Offload for both receive and transmit.

Add as same number of `ethtool` command lines as the number of LAN controllers to `/sbin/ifup-pre-local` file as shown below, and reboot the OS. The new settings are automatically configured at the OS boot.

Example: To disabling two LAN controllers

Add the following line to `/sbin/ifup-pre-local` file on condition that the OS recognizes them as network devices `eth0` and `eth1`.

```
if [ "${1}" == "ifcfg-eth0" ]; then
/sbin/ethtool -K eth0 rx off
/sbin/ethtool -K eth0 tx off
fi
if [ "${1}" == "ifcfg-eth1" ]; then
/sbin/ethtool -K eth1 rx off
/sbin/ethtool -K eth1 tx off
fi
```

If there is no `/sbin/ifup-pre-local` file, create a new file with the file privilege 755 and add the setting above. When the file exists, add the command lines above to the file. Then reboot the OS or the network device with the new setting, which the new setting takes an effect.

When you are enabling TCP Checksum Offload, replace each value off with on for tx/rx parameter in the above example.



**Note:** Do not use NetworkManager service. When NetworkManager service is started, it has been shown that the following problem occurred. DNS server information registered in `/etc/resolv.conf` may be deleted.

---

### 2. Setting NetworkManager service to off

Perform the following commands to set NetworkManager service to off.

- Perform the following command to stop NetworkManager service.  
`# service NetworkManager stop`
- Perform the following command to set NetworkManager service to off.  
`# chkconfig NetworkManager off`
- Perform the following command to check that NetworkManager service is off.  
`# chkconfig | grep NetworkManager`

The following message is shown.

NetworkManager 0:off 1:off 2:off 3:off 4:off 5:off 6:off

### 3. Customizing `/etc/sysctl.conf`

Validate the magic **SysRq** key to collect information when a problem occurs. Edit or add the following line.

```
kernel.sysrq = 1
```

Add a setting to induce kernel panic when NMI occurs, with which you can quickly detect a failure in hardware and drivers. Edit or add the following lines.

```
kernel.unknown_nmi_panic = 0
kernel.panic_on_unrecovered_nmi = 1
kernel.panic_on_io_nmi = 1
```

Add or edit the following line to set the console log level to 3. By changing the level, you can avoid the console overload, which can result in significant deterioration of applications or in Linux hang-up.

```
kernel.printk = 3 4 1 7
```

#### 4. For CB 2500 or CB 500

Customizing `/boot/grub/grub.conf`

(For EFI boot, `/boot/efi/EFI/redhat/grub.conf`)

Edit `/boot/grub/grub.conf` on a text editor to add an appropriate kernel option and delete inappropriate one.

For Red hat Enterprise Linux 6 (x86, x86\_64):

```
nmi_watchdog=0 pci=noaer
```

Adding the kernel option above configures the following settings.

- Disabling nmi watchdog to use a parameter that stops the system when hardware fails. (`nmi_watchdog=0`)
- A setting for avoiding Aero from working (`pci=noaer`)

Kernel option parameters to delete (only when tboot package is installed)

- Delete the following parameters:

```
intel_iommu=on
amd_iommu=on
```

For CB 2000

Add the following kernel option.

```
nmi_watchdog=0 mce=0 pci=noaer
```

Adding the kernel option above configures the following settings.

- Disabling nmi\_watchdog to use a parameter that stops the system when hardware fails
- A setting of kernel panic for avoiding the OS malfunction when MCA interrupts occur
- A setting for avoiding Aero from working

If selecting tboot package in RHEL installation, delete the following option to disable the TXT function.

```
intel_iommu=on
```

#### 5. Changing the crashkernel setting

If you use kdump or LTD (Linux Tough Dump), change the crashkernel setting in the `/boot/grub/grub.conf` Kernel line as follows. (For EFI boot, `/boot/efi/EFI/redhat/grub.conf`)

`crashkernel=[appropriate-value]M@[appropriate-value]M`

(Example: `crashkernel=256M@48M`)

The value differs depending on the memory installed and the number of ports on the FC expansion card.

See the following Red Hat website for more details.

[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Linux/](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/)

## 6. Installing LSI Software RAID

When using LSI Software RAID, make sure to install LSI Software RAID following the steps in [Installing Utilities on page 5-2](#).



**Note:** When using LSI Software RAID, make sure to execute this setting. If you don't, the RAID setting is incomplete and the utility may not work properly.

Menu items for LSI Software RAID setting utility:

- LSI S/W RAID setting - 01 (Set the RAID setting)
- LSI S/W RAID setting - 02 (Set the blacklist file)

## 7. Customizing `/etc/modprobe.d/blacklist.conf`

For CB 2000, add the following to the last line.

This setting blocks loading drivers to prevent unnecessary devices from being detected.

```
blacklist e1000e
```

## 8. Disabling the EDAC function

Execute the command `lsmod | grep edac` to check the settings of the EDAC function. If the applicable module does not appear in command execution results, the EDAC function is already disabled. Proceed to the next step.

```
# lsmod | grep edac
sb_edac          32167  0
edac_core        57973  1 sb_edac
```

If the applicable module is displayed, create a `edac_disable.conf` file (note that you can specify any name as the file name) under the `/etc/modprobe.d` directory to disable the EDAC function. Include the following text in the file.

```
install *_edac /bin/true
install edac_* /bin/true
```

## 9. Reflecting the new settings

To apply the settings above, restart the OS.

## 10. Adding/Updating Hitachi drivers

Installing RHEL 6.x using the Driver & Utility CD will add or update some drivers.

If with the following condition, install the driver to load tools required for operation.

Connected to the Hitachi disk array system with the hfcldd driver:

Reinstall the driver contained in the Driver & Utility CD attached to the HITACHI Gigabit Fibre Channel Adapter.

#### 11. Updating drivers

You can confirm the driver version using the following command.

```
# modinfo driver-name
```

Download and utilize the latest driver.

#### 12. Updating kernel

When using Red Hat Enterprise Linux 6, download the kernel security update from the Red Hat web page referring to [Table 1-6 Supported kernel on page 1-5](#), and then apply the kernel security update.

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The setting up after installation is completed. Perform [Installing Utilities on page 5-2](#).

## Setting up after RHEL 6 installation on LPAR manager mode

This section describes the further settings and driver update required for running Red Hat Enterprise Linux 6 on the LPAR. If the settings are already made, setting repetition is not required. If the setting values are different from those shown in the following table, the guest OS may not work properly.

**Table 2-1 Setting items and values after OS installation (for RHEL 6)**

Item (file)	Value (required)
/etc/inittab	Change it to id:3:initdefault:
Offload option settings	See <a href="#">Table 2-4 Offload option settings (for RHEL 6) on page 2-23</a> .
/etc/sysctl.conf	Add the following: kernel.printk=3 4 1 7 kernel.sysrq=1 kernel.unknown_nmi_panic=0 kernel.panic_on_unrecovered_nmi=1
	Add the following: kernel.panic_on_io_nmi=1
Kernel line in /boot/grub/grub.conf (For EFI boot, /boot/efi/EFI/redhat/ grub.conf)	Add the following: nmi_watchdog=0 vga=792 <sup>1</sup>
	Delete the following: quiet rhgb

Item (file)	Value (required)
	<p>Add the following:</p> <pre>nmi_watchdog=0 mce=0 pci=noaer no_timer_check</pre> <p>When using kdump, change to the following:</p> <pre>crashkernel=[appropriate-value]M@[appropriate-value]M</pre>
<p>Notes:</p> <ol style="list-style-type: none"> <li>1. Add this parameter if LPAR manager version is 59-41/79-41 or later for CB 2000. Add this parameter if LPAR manager version is 01-60 or later for CB 2500 or CB 500.</li> </ol>	

**Table 2-2 Setting items and values after OS installation (for Serial console)**

Item (file)	Value (required)
<pre>/boot/grub/grub.conf</pre> <p>(For EFI boot, /boot/efi/EFI/redhat/grub.conf)</p>	<p>Comment out the following line in <code>splashimage=(hd0,0)/grub/splash.xpm.gz</code>:</p> <p>(Before)</p> <pre>splashimage=(hd0,0)/grub/splash.xpm.gz</pre> <p>(After)</p> <pre>#splashimage=(hd0,0)/grub/splash.xpm.gz</pre> <p>Add the following two lines between hiddenmenu line and the title line:</p> <p>For CB 2000</p> <pre>serial --unit=0 --speed=115200 terminal --timeout=10 serial console</pre> <p>For CB 2500, CB 500</p> <pre>serial --unit=1 --speed=115200 terminal --timeout=10 serial console</pre> <p>Add the following at the end of the kernel line:</p> <p>For CB 2000</p> <pre>console=ttyS0,115200</pre> <p>For CB 2500, CB 500</p> <pre>console=ttyS1,115200</pre>
<pre>/etc/sysconfig/init</pre>	<p>Change BOOTUP as follows:</p> <p>(Before)</p> <pre>BOOTUP=color</pre> <p>(After)</p> <pre>BOOTUP=serial</pre>



**Table 2-3 NIC device name and type of LAN drivers (for RHEL 6)**

NIC scheduling mode	Device name	LAN driver <sup>1</sup>
Shared NIC and virtual NIC	Intel ® 1 Gbps Ethernet	igb LAN driver
Dedicated NIC <sup>2</sup>	Intel ® 1 Gbps Ethernet	igb LAN driver
	Broadcom 1 Gbps Ethernet	tg3 LAN driver
	Intel ® 10 Gbps Ethernet	ixgbe LAN driver
	Emulex 10 Gbps Ethernet	be2net LAN driver
VF NIC <sup>2</sup>	Intel ® 10Gbps Ethernet	ixgbevfn LAN driver
	Emulex 10 Gbps Ethernet	be2net LAN driver
Notes: 1. When using RHEL 6.7, use the inbox driver. 2. Supported device and LAN driver depend on the NIC installed in a server blade.		

To set up files and update drivers, follow these steps:

1. Customizing `/etc/inittab`

Open the `/etc/inittab` file, and change the value in the file from `id:5:initdefault:` to `id:3:initdefault:` and save it.

```
# Default runlevel. The runlevels used by RHS are:
# 0 - halt (Do NOT set initdefault to this)
# 1 - Single user mode
# 2 - Multiuser, without NFS (The same as 3, if you do not have networking)
# 3 - Full multiuser mode
# 4 - unused
# 5 - X11
# 6 - reboot (Do NOT set initdefault to this)
#
id:5:initdefault:      --> Change to "id:3:initdefault:"
```

2. Customizing offload option

For the value of offload option settings, see [Table 2-4 Offload option settings \(for RHEL 6\) on page 2-23](#).

o Customizing `/sbin/ifup-pre-local` file

Setting the following in the file sets the use of offload option for guest OS boot. If you enable the TCP Checksum Offload function in the LAN controller, it can cause a LAN controller failure, which eventually damage packets.

Be sure to configure offload settings according to the procedure in Case a, b, or c.

In the following cases, only the items that need to be changed are set:

a. Using shared NIC and virtual NIC

Add ethtool commands (of the number of target NIC ports) in [/sbin/ifup-pre-local] by adding the following; then, restart the OS. (Automatically setting when OS restart.)

Example. To disable two target NIC ports, add the following just beneath [/sbin/ifup-pre-local]. (Note that the example assumes Linux recognizes eth0 and eth1as network devices.)

```
if [ "${1}" == "ifcfg-eth0" ]; then
/sbin/ethtool -K eth0 rx off
fi
if [ "${1}" == "ifcfg-eth1" ]; then
/sbin/ethtool -K eth1 rx off
fi
```

If there is no /sbin/ifup-pre-local file, make new file by file authority 755 and add above setting. If already exists, add above setting. After that, Setting is available when OS reboot or restart the network device that is set to.

- b. Using Intel® 1 Gbps Ethernet or Broadcom 1 Gbps Ethernet as dedicated NIC

Add ethtool commands (of the number of target NIC ports) in [/sbin/ifup-pre-local] by adding the following; then, restart the OS. (Automatically setting when OS restart.)

Example. To disable two target NIC ports, add the following just beneath [/sbin/ifup-pre-local]. (Note that the example assumes Linux recognizes eth0 and eth1as network devices.)

```
if [ "${1}" == "ifcfg-eth0" ]; then
/sbin/ethtool -K eth0 rx off
/sbin/ethtool -K eth0 tx off
fi
if [ "${1}" == "ifcfg-eth1" ]; then
/sbin/ethtool -K eth1 rx off
/sbin/ethtool -K eth1 tx off
fi
```

If there is no /sbin/ifup-pre-local file, make new file by file authority 755 and add above setting. If already exists, add above setting. After that, Setting is available when OS reboot or restart the network device that is set to.

- c. Using Intel® 10 Gbps Ethernet as a dedicated NIC and as a VF NIC

Add ethtool commands (of the number of target NIC ports) in [/sbin/ifup-pre-local] by adding the following; then, restart the OS. (Automatically setting when OS restart.)

Example. To disable two target NIC ports, add the following just beneath [/sbin/ifup-pre-local]. (Note that the example assumes Linux recognizes eth0 and eth1as network devices.)

```
if [ "${1}" == "ifcfg-eth0" ]; then
/sbin/ethtool -K eth0 gro off
fi
if [ "${1}" == "ifcfg-eth1" ]; then
```

```
/sbin/ethtool -K eth1 gro off
fi
```

If there is no `/sbin/ifup-pre-local` file, make new file by file authority 755 and add above setting. If already exists, add above setting. After that, Setting is available when OS reboot or restart the network device that is set to.

Confirm that the offload settings configured according to the procedure in Case a, b, or c are the same as the values in the following table.

**Table 2-4 Offload option settings (for RHEL 6)**

LAN driver	Offload value							
	rx	tx	tso	sg	ufo	gso	gro	lro
igb LAN driver(Shared NIC and virtual NIC)	off	on	on	on	off	on	on <sup>1</sup>	off
igb LAN driver(Dedicated NIC)		off	off	on <sup>1</sup>				
tg3 LAN driver								
ixgbe LAN driver	on	on	on	on	off	on	off	off
ixgbevf LAN driver								
be2net LAN driver							on	
Notes:								
1. The default value is "on", but "off" might be automatically set depending on the environment. However, even if this value remains "off", no problems exist with operations.								



**Note:** Do not use NetworkManager service. When NetworkManager service is started, it has been shown that the following problem occurred.

DNS server information registered in `/etc/resolv.conf` may be deleted.

3. Setting NetworkManager service to off  
Perform the following commands to set NetworkManager service to off.
  - a. Perform the following command to stop NetworkManager service.  
# `service NetworkManager stop`
  - b. Perform the following command to set NetworkManager service to off.  
# `chkconfig NetworkManager off`
  - c. Perform the following command to check that NetworkManager service is off.  
# `chkconfig | grep NetworkManager`  
The following message is shown.  
NetworkManager 0:off 1:off 2:off 3:off 4:off 5:off 6:off
4. Customizing `etc/sysctl.conf`

Set the following three:

- a. Changing the console log level to 3.

This parameter sets the console log level to 3. By changing the level, you can avoid guest screen overload, which can result in significant deterioration of applications or in Linux hang-up.

Add the following line:

```
kernel.printk = 3 4 1 7
```

- b. Enabling the Magic **SysRq** key  
Edit or add the following.

```
kernel.sysrq = 1
```

Set this command to gather information when problem occurs.

- c. Setting the NMI interrupt  
Edit or add the following.

```
kernel.unknown_nmi_panic=0  
kernel.panic_on_unrecovered_nmi=1  
kernel.panic_on_io_nmi=1
```

For early detection of device or driver failure, this command brings the Kernel into a panic state in the event of NMI.

5. Customizing `/boot/grub/grub.conf`  
(For EFI boot, `/boot/efi/EFI/redhat/grub.conf`)  
Set the following in `grub.conf`:

- o Comment out `"splashimage=(hd0,0)/grub/splash.xpm.gz"`.  
When `"splashimage=(hd0,0)/grub/splash.xpm.gz"` is commented out for EFI boot in RHEL 6.5, however, the login prompt will not appear on the remote console. If you use the remote console, move the string before the line `"title Red Hat Enterprise Linux (2.6.32-220.el6.x86_64)"` without commenting out the string. In this case, perform the grub menu on the remote console because the grub menu is not displayed at the Linux boot.

Example:

```
serial --unit=1 --speed=115200  
terminal --timeout=10 serial console  
splashimage=(hd0,0)/grub/splash.xpm.gz  
title Red Hat Enterprise Linux (2.6.32-504.el6.x86_64)
```

- o For CB 2000, add `"serial --unit=0 --speed=115200"`.  
For CB 2500 or CB 500, add `"serial --unit=1 --speed=115200"`.
- o Add `"terminal --timeout=10 serial console"`.
- o Delete `"quiet rhgb"` from the Kernel line.
- o For CB 2000, add the ending of the Kernel line as follow:  
`nmi_watchdog=0 mce=0 pci=noaer no_timer_check  
console=ttyS0,115200`

For CB 2500 or CB 500, add the ending of the Kernel line as follow:  
nmi\_watchdog=0 mce=0 pci=noaer no\_timer\_check  
console=ttyS1,115200

- For CB 2000, add "vga=792" as well if LPAR manager version is 59-41/79-41 or later.  
For CB 2500 or CB 500, add "vga=792" as well if LPAR manager version is 01-60 or later.

The following shows an example of `grub.conf` setting for Red Hat Enterprise Linux 6.6:

```
# grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE: You have a /boot partition. This means that
#         all kernel and initrd paths are relative to /boot/, eg.
#         root (hd0,0)
#         kernel /vmlinuz-version ro root=/dev/mapper/VolGroup-lv_root
#         initrd /initrd-[generic-]version.img
#boot=/dev/sdc
default=0
timeout=5
#splashimage=(hd0,0)/grub/splash.xpm.gz      <-- The comment out the line
hiddenmenu
serial --unit=1 --speed=115200                <-- Additional line of 'serial'
terminal --timeout=10 serial console           <-- Additional line of 'terminal'
title Red Hat Enterprise Linux (2.6.32-504.el6.x86_64)
    root (hd0,0)
    kernel /vmlinuz- 2.6.32-504.el6.x86_64 ro root=/dev/mapper/VolGroup-lv_root
rd_LVM_LV=VolGroup/lv_root rd_LVM_LV=VolGroup/lv_swap rd_NO_LUKS rd_NO_MD
rd_NO_DM LANG=ja_JP.UTF-8 KEYBOARDTYPE=pc KEYTABLE=jp106 crashkernel=auto
nmi_watchdog=0 mce=0 pci=noaer no_timer_check console=ttyS1,115200 vga=792      <-- Additional
line of 'nmi'
    initrd /initramfs- 2.6.32-504.el6.x86_64.img
```

Installing tboot package is not recommendable because TPM is not available. If you install tboot package on your environment, set the following in `grub.conf`.

- Comment out "kernel /tboot.gz logging=vga,serial,memory".
- Change the first "module" to "kernel" in the line starting with "module /vmlinuz".
- Delete "intel\_iommu=on amd\_iommu=on".
- Change the first "module" to "kernel" in the line starting with "module /initramfs".

The following text contains settings above.

```
title Red Hat Enterprise Linux (2.6.32-504.el6.x86_64)
    root (hd0,0)
    # kernel /tboot.gz logging=vga,serial,memory
    kernel /vmlinuz-2.6.32-504.el6.x86_64 ro
root=/dev/mapper/VolGroup00-lv_root rd_NO_LUKS rd_NO_MD nodmraid
rd_LVM_LV=VolGroup00/lv_root crashkernel=auto KEYBOARDTYPE=pc
KEYTABLE=jp106 nompath LANG=ja_JP.UTF-8 rd_LVM_LV=VolGroup00/lv_swap
rd_NO_DM nmi_watchdog=0 pci=noaer scsi_mod.scan=sync pcie_aspm=off
edd=off mce=0 no_timer_check console=ttyS1,115200 vga=792
    initrd /initramfs-2.6.32-504.el6.x86_64.img
```



**Note:** Do not use "hashdist=1 mem=mem=1024G" command in the Kernel parameter because using the option can cause the Red Hat Enterprise Linux 6.2 boot fail.

6. Changing the crashkernel setting

If you use kdump or LTD (Linux Tough Dump), change the crashkernel setting in the `/boot/grub/grub.conf` Kernel line as follows. (For EFI boot, `/boot/efi/EFI/redhat/grub.conf`)

```
crashkernel=[appropriate-value]M@[appropriate-value]M
```

(Example: `crashkernel=256M@48M`)

The value differs depending on the memory installed and the number of ports on the FC expansion card.

7. Customizing `/etc/sysconfig/init`

Change `BOOTUP=color` to the following:

```
BOOTUP=serial
```

8. Restarting the system

Type in the following and press **Enter**.

```
# reboot
```

9. Checking the console log level

After starting the system, type in the following and press **Enter**.

```
# cat /proc/sys/kernel/printk    <- Command entered.
3 4 1 7                          <- Console log levels returned.
```

10. Checking the NMI interrupt setting

After starting the system, type in the following and press **Enter**.

```
# /sbin/sysctl -n kernel.unknown_nmi_panic
0                                <- Returned value.
# /sbin/sysctl -n kernel.panic_on_unrecovered_nmi
1                                <- Returned value.
# /sbin/sysctl -n kernel.panic_on_io_nmi
1                                <- Returned value.
```

11. Updating the Hitachi driver

Installation using the Driver & Utility CD adds and updates some drivers. The following case, however, requires installing additional drivers. To connect Hitachi disk array subsystem using the `hfcldd` driver, reinstall the driver in the Driver & Utility CD attached to the HITACHI Gigabit Fibre Channel Adapter.

12. Updating drivers

Installation using the Driver & Utility CD adds and updates some drivers.

13. Updating kernel

Download the kernel security update from the Red Hat web page by referring to [Table 1-6 Supported kernel on page 1-5](#), and then apply the kernel security update.

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14. Using onboard CNA/CNA mezzanine card as iSCSI boot device, or using iSCSI as data device

Kernel panic rarely occurs while shutting down after getting a memory dump by kdump. If a kernel panic occurs, select **Hard Reset** from the remote console menu to reboot the server blade. You can get memory dump even if a kernel panic occurs.

For details of Hard Reset, see *Hitachi Compute Blade 500 Series Remote Console User's Guide*, or *Hitachi Compute Blade 2500 Series Getting Started Guide*.





# Red Hat Enterprise Linux 7

This chapter describes installation procedure for Red Hat Enterprise Linux 7.

- ☐ [OS Installation](#)
- ☐ [Setting up after RHEL 7 installation on Basic mode](#)
- ☐ [Setting up after RHEL 7 installation on LPAR manager mode](#)

# OS Installation

This section describes how to install Red Hat Enterprise Linux 7 with the Driver & Utility CD.



## Tip:

- The installation procedure described in this guide is an example. See the following Red Hat website for more details.  
[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Linux/](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/)
- For example, Driver & Utility CD for RHEL 7 version 0710-xx, contains drivers and utilities for RHEL 7.1. It can be used for RHEL 7.1 setup.

## Precautions for OS installation

- Using the USB port on the server blade connector  
In an LPAR environment, you can use the USB port on the server blade connector when installing the OS. For CB520X B1/B2, however, if LPAR manager firmware whose version is 02-50 or earlier is running, you cannot use the USB port on the server blade connector when installing the OS. In this case, use a virtual drive on the remote console.
- Error during a driver update  
During RHEL 7.2, or RHEL 7.3 setup, the following message might be displayed while the driver is being installed. Ignore this information because it does not affect the installation processing.

```
# rpm -ivh --force hfcldd-4.7.18.3156-1.el7.x86_64.rpm
Preparing... ##### [100%]
Updating / installing...
 1:hfcldd-4.7.18.3156-1.el7 ##### [100%]
/sbin/weak-modules: line 174:
/tmp/weak-modules.EKsIMo/old_initramfs/./usr/lib/modules/
3.10.0-229.el7.x86_64/extra/hfcldd/hfcldd.ko: Permission denied#####
[100%]
```

## When using RHEL 7 in an LPAR manager environment

- When LPAR manager is running, do not press the power button or the reset button on the front of the server blade, and do not execute the dump command from the management module. To perform such an operation, make sure to perform the operation from the management screen of LPAR manager.  
Pressing the power button or the reset button will affect all of the LPARs that are running on the server blade, and the OS on the LPAR might be damaged.
- You cannot perform the following operations from the remote console on a server blade running in LPAR manager mode because the system is protected:
  - Turning on the power
  - Turning off the power

- Resetting

Use the remote console only for operations such as installing the OS.

In addition, if the shell window is not automatically displayed after you restart LPAR, select **Continue** in the logical UEFI window.

## Installation steps

Screenshots for Red Hat Enterprise Linux 7 are used in the following steps. A step may include different procedures for Legacy boot and EFI boot systems. In this section, use an example of screenshots to install the RHEL 7.1.



### Tip:

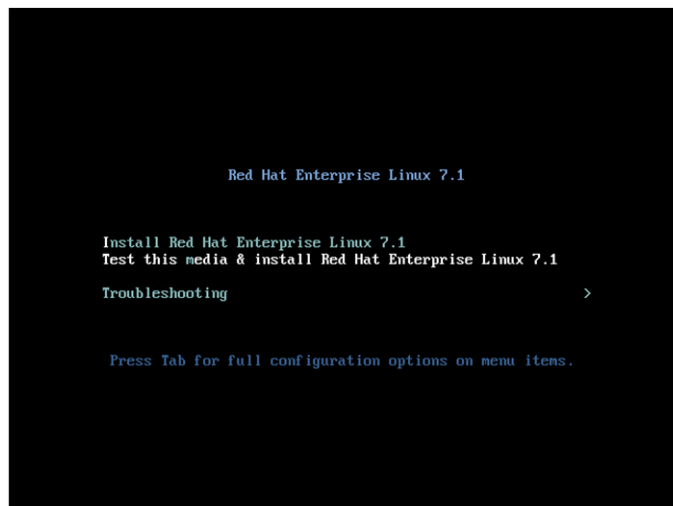
- On the CB500 and CB2500 server blades, perform the work up to step 12 below within 20 minutes after the screen in step 1 is displayed. Also, perform the work up to step 14 within 20 minutes after the screen in step 13 is displayed. Otherwise, the server blades will determine that OS startup has failed and will reboot.
- Red Hat Enterprise Linux 7 works on the assumption of that system time is adjusted to UTC time, so before installing OS, adjust the system time to UTC time. After the installation, set the time zone of OS then the OS time is adjusted to the local time. About how to adjust the system time, refer "Date and Time" section for each blade at *Hitachi Compute Blade 500 Series EFI User's Guide* or *Hitachi Compute Blade 2500 Series UEFI Setup Guide*.

Follow steps shown below to install the OS.

1. Select the menu.

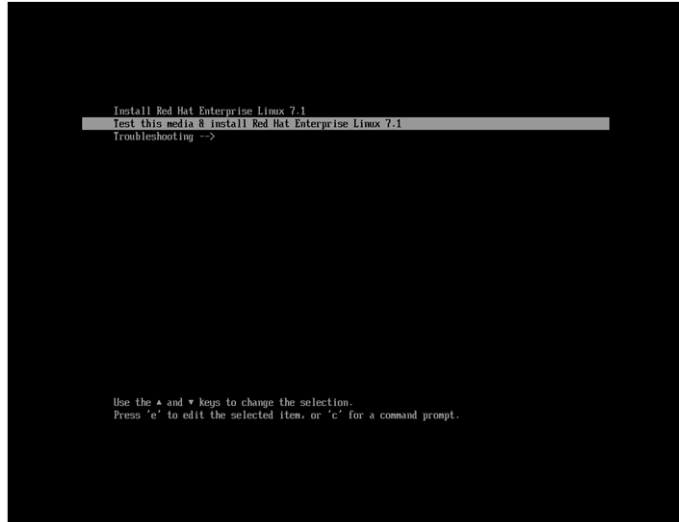
[Legacy boot mode]

When the boot option appears at Legacy boot mode, select **Test this media & install Red Hat Enterprise Linux 7**, and press **Tab** key.



[EFI boot mode]

When the boot option appears at EFI boot mode, select **Test this media & install Red Hat Enterprise Linux 7** and press **e** key.



## 2. Set the boot option.

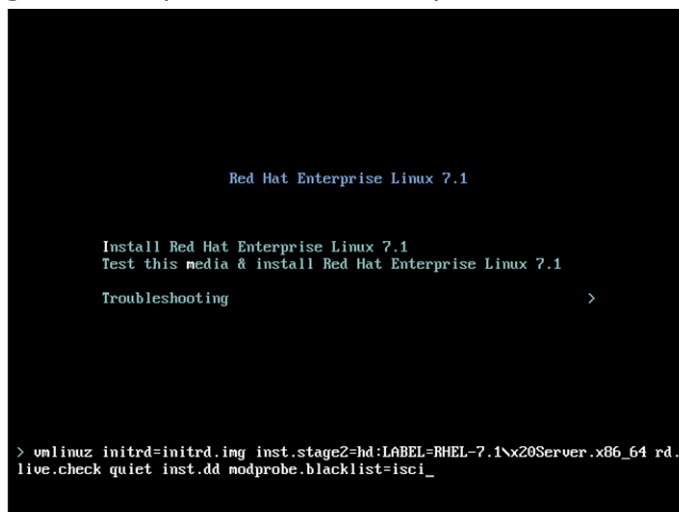
### [Legacy boot mode]

When the boot option appears at Legacy boot mode, add `inst.dd modprobe.blacklist=iscsi` to the end of `vmlinuz` commands.

If all of the following conditions are met for RHEL 7.3, a kernel panic might occur. If the conditions are met, add `nr_cpus=1` to the end of the preceding text.

- The version of RHEL to be installed is 7.3, and the kernel version is 3.10.0-514.el7 or later and earlier than 3.10.0-514.6.1.el7.
- For EFI and UEFI of a server blade, the value specified for "Cores in CPU Package" is not "All".
- Virtual machines of LPAR manager, KVM, VMware, or Hyper-V environments are not used.

After adding the text, press the **Enter** key.



For LPAR manager mode, when inputting the wrong key, the same character string might be displayed in two lines, or the screen display might be disordered. In this case, there is no problem concerning settings or operation. To clear disorder of screen display, reset the LPAR once.

#### [EFI boot mode]

When the boot option appears at EFI boot mode, add `inst.dd modprobe.blacklist=iscsi` to the end of `linuxefi` commands.

If all of the following conditions are met for RHEL 7.3, a kernel panic might occur. If the conditions are met, add `nr_cpus=1` to the end of the preceding text.

- The version of RHEL to be installed is 7.3, and the kernel version is 3.10.0-514.el7 or later and earlier than 3.10.0-514.6.1.el7.
- For EFI and UEFI of a server blade, the value specified for "Cores in CPU Package" is not "All".
- Virtual machines of LPAR manager, KVM, VMware, or Hyper-V environments are not used.

If all of the following conditions are met for RHEL 7.4, a kernel panic might occur. If the conditions are met, add `possible_cpus=maximum-number-of-threads` to the end of the preceding text. For details on the maximum number of threads, see [About the maximum number of threads on page 3-9](#).

- The version of RHEL to be installed is 7.4.
- For EFI and UEFI of a server blade, the value specified for "Cores in CPU Package" is not "All".
- Virtual machines of LPAR manager, KVM, VMware, or Hyper-V environments are not used.

If all of the following conditions are met for RHEL 7.5, a kernel panic might occur. If the conditions are met, add `nr_cpus=1` to the end of the preceding text.

- The version of RHEL to be installed is 7.5, and the kernel version is 3.10.0-862.el7 or later and earlier than 3.10.0-862.3.2.el7.
- Virtual machines of LPAR manager, KVM, VMware, or Hyper-V environments are not used.

After adding the text, press **Ctrl-x**.

```
setparams "Test this media & install Red Hat Enterprise Linux 7.1"

linuxefi /images/pxehboot/mlinuz inst.stage2=hd:LABEL=RHEL-7.1-x20Server.x86_64 rd.live.ch\
eck quiet inst.dd nodprobe.blacklist=iscsi_
initrddefi /images/pxehboot/initrd.img

Press Ctrl-x to start, Ctrl-c for a command prompt or Escape to discard edits and
return to the menu. Pressing Tab lists possible completions.
```

3. The message **Driver disk device selection** is displayed, and then uncheck **Mapped** in the virtual media console dialog box, and then remove the Installation DVD from the DVD drive.

```
3.4161591 pcichip 0000:86:00:0:pci24: Power fault on slot 289
3.4271971 pcichip 0000:86:00:0:pci24: Power fault on slot 290
3.4627141 EHCI: Can not request iohub region 0x b1ee0000-0x
4.6311291 i8042: No controller found
5.0421641 tpm_tis 00:0c:0:0:TPM error (7) occurred attempting to read a pcr
5.0659511 megasas:IOC init cmd success
10.0015721 be2net 0000:09:00:0: opcode 30-1 failed:status 60-0
10.0035941 megasas: INIT adapter done
10.4059451 be2net 0000:09:00:1: opcode 30-1 failed:status 60-0
10.4099961 be2net 0000:09:00:2: opcode 30-1 failed:status 60-0
11.2139131 be2net 0000:09:00:3: opcode 30-1 failed:status 60-0
00: Checking devices
Page 1 of 1
Driver disk device selection
DEVICE TYPE LABEL UUID
1) sr0 iso9660 RHEL-7.1 Server.x86_64 2015-02-19-11-11-02-00
to select, 'r'-refresh, 'n'-next page, 'p'-previous page or 'c'-continue:
```

4. Insert the Driver & Utility CD in the DVD drive. Check **Mapped** in the virtual media console dialog.
5. Press **r** key and press **Enter** key, and then Driver & Utility CD information is displayed.

```

( 3.416159) pciehp 0000:86:00.0:pcie24: Power fault on slot 289
( 3.427197) pciehp 0000:86:09.0:pcie24: Power fault on slot 290
( 3.462744) EHCI: Can not request iomem region 0x b1ee0000-0x
( 4.431197) H042: No controller found
( 5.042164) tpm_tis 00:0c: A TPM error (7) occurred attempting to read a PCR
( 9.009261) megasas: IOC: Init cmd success
( 10.403223) be2net 0000:09:00.0: opcode 36-1 failed:status 68-0
( 10.003294) megasas: INIT adapter done
( 10.405945) be2net 0000:09:00.1: opcode 36-1 failed:status 68-0
( 10.409981) be2net 0000:09:00.2: opcode 36-1 failed:status 68-0
( 11.213913) be2net 0000:09:00.3: opcode 36-1 failed:status 68-0
DD: Checking devices

Page 1 of 1
Driver disk device selection
  DEVICE TYPE LABEL UUID
  1) sr0 iso9660 RHEL-7.1 Server.x86_64 2015-02-19-11-11-02-00
# to select, 'r'-refresh, 'n'-next page, 'p'-previous page or 'c'-continue: r

Page 1 of 1
Driver disk device selection
  DEVICE TYPE LABEL UUID
  1) sr0 iso9660 CS-00-070101-00 2015-04-02-15-33-49-00
# to select, 'r'-refresh, 'n'-next page, 'p'-previous page or 'c'-continue:

```

6. Input the number of Driver & Utility CD and then press **Enter** Key.
7. Enter the number of list you want to install and press **Enter** key. Repeat this for all driver number.

```

  DEVICE TYPE LABEL UUID
  1) sr0 iso9660 CS-00-070101-00 2015-04-02-15-33-49-00
# to select, 'r'-refresh, 'n'-next page, 'p'-previous page or 'c'-continue: 1
DD: Checking device /dev/sr0
DD: Processing DD repo /media/DB/rpms/x86_64 on /dev/sr0

Page 1 of 1
Select drivers to install
  1) [ ] /media/DB/rpms/x86_64/kmod-hfc1dd-4.7.10.3086-1.el7.x86_64.rpm
  2) [ ] /media/DB/rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
  3) [ ] /media/DB/rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm
# to toggle selection, 'n'-next page, 'p'-previous page or 'c'-continue: 1

Page 1 of 1
Select drivers to install
  1) [x] /media/DB/rpms/x86_64/kmod-hfc1dd-4.7.10.3086-1.el7.x86_64.rpm
  2) [ ] /media/DB/rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
  3) [ ] /media/DB/rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm
# to toggle selection, 'n'-next page, 'p'-previous page or 'c'-continue: 2

Page 1 of 1
Select drivers to install
  1) [x] /media/DB/rpms/x86_64/kmod-hfc1dd-4.7.10.3086-1.el7.x86_64.rpm
  2) [x] /media/DB/rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
  3) [ ] /media/DB/rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm
# to toggle selection, 'n'-next page, 'p'-previous page or 'c'-continue: 3

Page 1 of 1
Select drivers to install
  1) [x] /media/DB/rpms/x86_64/kmod-hfc1dd-4.7.10.3086-1.el7.x86_64.rpm
  2) [x] /media/DB/rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
  3) [x] /media/DB/rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm
# to toggle selection, 'n'-next page, 'p'-previous page or 'c'-continue: c
DD: Extracting files from /media/DB/rpms/x86_64/kmod-hfc1dd-4.7.10.3086-1.el7.x86_64.rpm
DD: Extracting files from /media/DB/rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
DD: Extracting files from /media/DB/rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm

Page 1 of 1
Driver disk device selection
  DEVICE TYPE LABEL UUID
  1) sr0 iso9660 CS-00-070101-00 2015-04-02-15-33-49-00
# to select, 'r'-refresh, 'n'-next page, 'p'-previous page or 'c'-continue:

```

8. Press **c** key and press **Enter** key, and then the driver is installed.

```

DEVICE TYPE LABEL UUID
1) sr0 iso9660 CS-00-070101-00 2015-04-02-15-33-49-00

# to select, 'r'-refresh, 'n'-next page, 'p'-previous page or 'c'-continue: 1
DD: Checking device /dev/sr0
DD: Processing DD repo /media/BD//rpms/x86_64 on /dev/sr0

Page 1 of 1
Select drivers to install
1) [ ] /media/BD//rpms/x86_64/kmod-hfcldd-4.7.10.3086-1.el7.x86_64.rpm
2) [ ] /media/BD//rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
3) [ ] /media/BD//rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm

# to toggle selection, 'n'-next page, 'p'-previous page or 'c'-continue: 1

Page 1 of 1
Select drivers to install
1) [x] /media/BD//rpms/x86_64/kmod-hfcldd-4.7.10.3086-1.el7.x86_64.rpm
2) [ ] /media/BD//rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
3) [ ] /media/BD//rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm

# to toggle selection, 'n'-next page, 'p'-previous page or 'c'-continue: 2

Page 1 of 1
Select drivers to install
1) [x] /media/BD//rpms/x86_64/kmod-hfcldd-4.7.10.3086-1.el7.x86_64.rpm
2) [x] /media/BD//rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
3) [ ] /media/BD//rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm

# to toggle selection, 'n'-next page, 'p'-previous page or 'c'-continue: 3

Page 1 of 1
Select drivers to install
1) [x] /media/BD//rpms/x86_64/kmod-hfcldd-4.7.10.3086-1.el7.x86_64.rpm
2) [x] /media/BD//rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
3) [x] /media/BD//rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm

# to toggle selection, 'n'-next page, 'p'-previous page or 'c'-continue: c
DD: Extracting files from /media/BD//rpms/x86_64/kmod-hfcldd-4.7.10.3086-1.el7.x86_64.rpm
DD: Extracting files from /media/BD//rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
DD: Extracting files from /media/BD//rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm

Page 1 of 1
Driver disk device selection
DEVICE TYPE LABEL UUID
1) sr0 iso9660 CS-00-070101-00 2015-04-02-15-33-49-00

# to select, 'r'-refresh, 'n'-next page, 'p'-previous page or 'c'-continue: _

```

9. Uncheck **Mapped** in the virtual media console dialog box, and then remove the Driver & Utility CD from the DVD drive.
10. Insert the OS Installation DVD in the DVD drive. Check **Mapped** in the virtual media console dialog.
11. Press **r** key and press **Enter** key, and OS Installation DVD information is displayed.

```

Page 1 of 1
Select drivers to install
1) [ ] /media/BD//rpms/x86_64/kmod-hfcldd-4.7.10.3086-1.el7.x86_64.rpm
2) [ ] /media/BD//rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
3) [ ] /media/BD//rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm

# to toggle selection, 'n'-next page, 'p'-previous page or 'c'-continue: 1

Page 1 of 1
Select drivers to install
1) [x] /media/BD//rpms/x86_64/kmod-hfcldd-4.7.10.3086-1.el7.x86_64.rpm
2) [ ] /media/BD//rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
3) [ ] /media/BD//rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm

# to toggle selection, 'n'-next page, 'p'-previous page or 'c'-continue: 2

Page 1 of 1
Select drivers to install
1) [x] /media/BD//rpms/x86_64/kmod-hfcldd-4.7.10.3086-1.el7.x86_64.rpm
2) [x] /media/BD//rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
3) [ ] /media/BD//rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm

# to toggle selection, 'n'-next page, 'p'-previous page or 'c'-continue: 3

Page 1 of 1
Select drivers to install
1) [x] /media/BD//rpms/x86_64/kmod-hfcldd-4.7.10.3086-1.el7.x86_64.rpm
2) [x] /media/BD//rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
3) [x] /media/BD//rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm

# to toggle selection, 'n'-next page, 'p'-previous page or 'c'-continue: c
DD: Extracting files from /media/BD//rpms/x86_64/kmod-hfcldd-4.7.10.3086-1.el7.x86_64.rpm
DD: Extracting files from /media/BD//rpms/x86_64/kmod-igb-5.2.17-h1.el7.x86_64.rpm
DD: Extracting files from /media/BD//rpms/x86_64/kmod-tg3-3.137h-1.el7.x86_64.rpm

Page 1 of 1
Driver disk device selection
DEVICE TYPE LABEL UUID
1) sr0 iso9660 CS-00-070101-00 2015-04-02-15-33-49-00

# to select, 'r'-refresh, 'n'-next page, 'p'-previous page or 'c'-continue: r

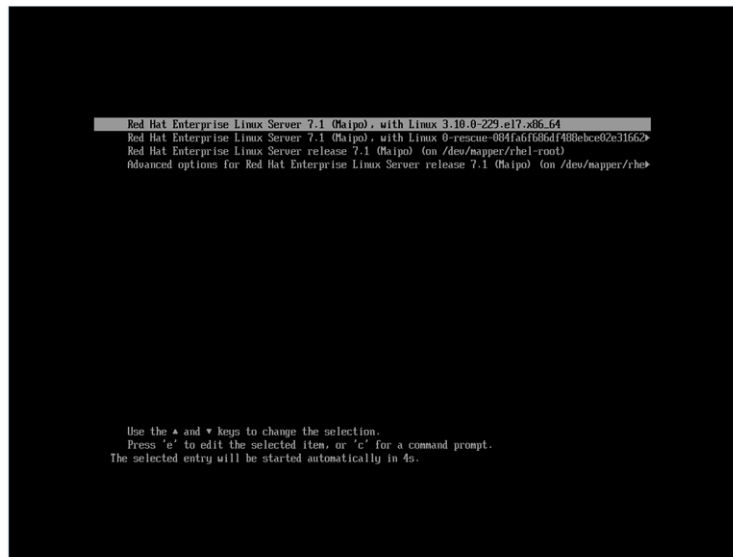
Page 1 of 1
Driver disk device selection
DEVICE TYPE LABEL UUID
1) sr0 iso9660 RHEL-7.1 Server.x86_64 2015-02-19-11-11-02-00

# to select, 'r'-refresh, 'n'-next page, 'p'-previous page or 'c'-continue:

```

12. Press **c** key and press **Enter** key. Follow the wizard to continue the installation.
13. After installation of RHEL 7.x is complete, in the initial startup window, select **Red Hat Enterprise Linux Server 7.1 (Maipo) , with Linux 3.10.0-229.el7.x86\_64**, and then press the **e** key.





#### 14. Edit a kernel parameter of the Grub loader.

Add `rd.udev.event-timeout=180` at the end of the line `linuxefi /vmlinuz-3.10.....`

If you add `nr_cpus=1` or `possible_cpus=maximum-number-of-threads` in step 2, you must also specify it for the kernel parameter of this Grub loader. Add `nr_cpus=1` or `possible_cpus=maximum-number-of-threads`. Press **Ctrl-x**.



After the OS starts, perform the operations described in [Setting up after RHEL 7 installation on Basic mode on page 3-14](#).

### About the maximum number of threads

Use the following formula to calculate the maximum number of threads according to the model you are using, or specify the maximum number of threads as indicated in [Table 3-1 Maximum number of threads in the largest possible configurations on page 3-10](#).

### Calculation method:

*number-of-processors-installed-on-the-system x number-of-cores-for-each-processor<sup>1,2</sup> x 2*

### Notes:

1. Please refer to the documentation, such as catalogs, of the equipment.
2. Use the total number of CPU cores (including disabled cores) in the system even if some of the cores are disabled by using the firmware settings.

### Calculation example:

For CB 520X B3, with an Intel® Xeon ® processor E7-8890 v4 and a 4-blade SMP configuration

- Number of processors installed on the system: 8
- Number of cores for each processor: 24

$8 \times 24 \times 2 = 384$

**Table 3-1 Maximum number of threads in the largest possible configurations**

Model		Maximum number of threads
CB2500	CB 520X	384
CB500	CB 520H	88

## Restrictions

### Common restrictions

#### About Call Trace

When you installed Red Hat Enterprise Linux 7, there are cases where Call Trace is taken. However, this will not affect system operation.

```
Call Trace:
[<ffffffff81603f36>] dump_stack+0x19/0x1b
[<ffffffff8106e28b>] warn_slowpath_common+0x6b/0xb0
[<ffffffff8106e32c>] warn_slowpath_fmt+0x5c/0x80
[<ffffffff8123df95>] sysfs_add_one+0xa5/0xd0
[<ffffffff8123ece5>] sysfs_do_create_link_sd+0x125/0x210
[<ffffffff8123edf1>] sysfs_create_link+0x21/0x40
[<ffffffff813d1c49>] bus_add_device+0x119/0x200
[<ffffffff813cf7f8>] device_add+0x468/0x7a0
[<ffffffff81078456>] ? __insert_resource+0x26/0x150
[<ffffffff813d4971>] platform_device_add+0xd1/0x2d0
[<ffffffffffa023f3b7>] mfd_add_device+0x247/0x2d0 [mfd_core]
[<ffffffffffa023f672>] mfd_add_devices+0xa2/0xa30 [mfd_core]
[<ffffffffffa01f554c>] lpc_ich_probe+0x3bc/0x5dc [lpc_ich]
[<ffffffffff81308385>] local_pci_probe+0x45/0xa0
[<ffffffffff813097f5>] ? pci_match_device+0xc5/0xd0
[<ffffffffff81309939>] pci_device_probe+0xf9/0x150
```

```
[<fffffffff813d2bc7>] driver_probe_device+0x87/0x390
[<fffffffff813d2fa3>] __driver_attach+0x93/0xa0
[<fffffffff813d2f10>] ? __device_attach+0x40/0x40
[<fffffffff813d0933>] bus_for_each_dev+0x73/0xc0
[<fffffffff813d261e>] driver_attach+0x1e/0x20
[<fffffffff813d2170>] bus_add_driver+0x200/0x2d0
[<fffffffff813d3624>] driver_register+0x64/0xf0
[<fffffffff813093f5>] __pci_register_driver+0xa5/0xc0
[<ffffffffffa02ba000>] ? 0xfffffffffa02b9fff
[<ffffffffffa02ba01e>] lpc_ich_init+0x1e/0x1000 [lpc_ich]
[<fffffffff810020b8>] do_one_initcall+0xb8/0x230
[<fffffffff810dcf4e>] load_module+0x131e/0x1b20
[<fffffffff812f7940>] ? ddebug_proc_write+0xf0/0xf0
[<fffffffff810d94d3>] ? copy_module_from_fd.isra.43+0x53/0x150
[<fffffffff810dd906>] Sys_finit_module+0xa6/0xd0
[<fffffffff81613da9>] system_call_fastpath+0x16/0x1b
---[ end trace 2e25011b2c0f7356 ]---
```

## Using to kdump function

If you cannot use kdump with RHEL 7.x, cope with the problem according to the following information being published by Red Hat, Inc.

<https://access.redhat.com/solutions/917933>

## Enable to fcoe service, and lldpad Service

When you start up the operation system with activating the fcoe service and the lldpad service, the information below is recorded to the "/var/log/message" file. Ignore this information because it does not have an effect on the behavior.

```
lldpad: config file failed to load,
lldpad: create a new file.
lldpad: bound ctrl iface to /com/intel/lldpad
```

## CB 500 and CB 2500 restrictions

The restrictions described here do not apply to the server blades that operate in LPAR manager mode.

## Internal RAID controllers

This section describes restrictions for the following RAID controller and the systems.

Target RAID controller and systems

- LSI SAS2008 RAID board (Internal SAS RAID controller)
- CB 520X B1/B2/B3
- CB 520H B3/B4
- PCI path-through function in KVM guest environment

The kernel parameter "intel\_iommu=on" to use PCI path-through function in KVM guest environment (SR-IOV) is not supported. Do not use the "intel\_iommu=on" parameter.

## System log messages

The following messages may be returned to the dmesg command and the system log (/var/log/messages), but the errors do not have an effect on the behavior.

Messages
device descriptor read/64, error -71
unable to enumerate USB device on port X
Setup ERROR: setup context command for slot X

## Install OS to the built-in RAID of CB 520X B1/B2/B3

To install an operation system to the built-in RAID of CB 520X B1/B2/B3, make sure to install the operation system to Virtual Drive 0.

## Restrictions when using RHEL 7 in an LPAR manager environment

If you use Red Hat Enterprise Linux 7 in an LPAR manager environment, check the following restrictions in addition to the previously described restrictions for server blades:

- Restrictions when using RHEL 7  
Some items in LPAR manager are not be supported depending on the guest OS. For details, see the manual that corresponds to the model you are using.  
  
For CB2500  
*Hitachi Compute Blade 2500 Series Logical partitioning manager User Guide*  
  
For CB500  
*Hitachi Compute Blade 500 Series Logical partitioning manager User's Guide*
- Performing basic operations on and changing settings for RHEL 7  
After starting RHEL 7 on LPAR, to perform basic operations or to change the OS settings, use the remote console that uses SSH or terminal software.
- Shared NICs and virtual NICs  
When you start the OS for the first time after setting up the OS, the shared NICs or virtual NICs might not be recognized as network devices. In such a case, restart the OS.
- Network  
You cannot use hbonding or bonding to bond virtual NICs and physical NICs.

- Tags and VLANs  
When Tags or VLANs are used, communication performance might not be improved by enabling or disabling the TCP segmentation off load function.
- Pasting characters on the guest screen  
If you attempt to paste a large number of characters onto the guest screen, some of the characters might not be pasted. In addition, the OS might hang up, and an unexpected screen operation might occur.  
Paste no more than approximately 16 characters in one operation. Also, paste characters from a virtual COM console or a remote terminal that is connected to the server blade.
- Messages to be output when the OS boots up  
The messages below might be output when the OS boots up, but note that operation is not affected.

**Table 3-2 Messages output when the OS boots up**

Messages
microcode: CPUX update to revision 0xXX failed.
Failed to set MokListRT:Invalid Parameter
ACPI: \_PR_.PM**: failed to get CPU physical ID.

- MTU settings  
When Jumbo Frame is used in shared NICs and virtual NICs, the maximum supported MTU size is 9,000 bytes.
- Restrictions when using RHEL 7.6  
There is a known issue that a kernel panic occurs when kernel 3.10.9-957 of RHEL 7.6 is booted. Due to this phenomenon, the following need to be done.
  - When setting up the RHEL 7.6 environment, upgrade kernel from any older version of RHEL 7.x to RHEL 7.6 (3.10.0-957.12.2 or later).
  - When booting in rescue mode from installation media, boot from the pre-upgrade kernel version of RHEL 7.x installation media.

About kernel upgrade procedure, please refer to the documentation provided by the OS vendor.

After upgrading the kernel, update the following drivers and a utility. These are contained in the Driver & Utility CD for Red Hat Enterprise Linux 7.6.

  - hfcldd driver
  - igb driver
  - ixgbe driver (If you are using Intel® 10Gbps Ethernet as a dedicated NIC)
  - ixgbev driver (If you are using Intel® 10Gbps Ethernet as a VF NIC)
  - hfctool (Hitachi Fibre Channel Utility)

If Emulex 10Gbps CNA as a dedicated NIC or a VF NIC is used on RHEL 7.1 or RHEL 7.2, please change the NIC settings to Shared NIC before

upgrading to RHEL 7.6. Because Emulex 10G CNA as a dedicated NIC or a VF NIC is not supported on RHEL 7.3 or later.

## Setting up after RHEL 7 installation on Basic mode

This section describes the settings on Basic mode, after Red Hat Enterprise Linux 7 is installed.

### 1. Disabling TCP Checksum Offload function

TCP Checksum Offload is a function that checks TCP packets in the LAN controller. If TCP Checksum Offload is enabled, packet data may be destroyed when the LAN controller fails.

Targeted drivers

- tg3 driver
- igb driver

You create the `/etc/udev/rules.d/80-hitachi-net-dev.rules` rule file that correct following the contents.

```
ACTION=="add", SUBSYSTEM=="net", DRIVERS=="name-of-target-device-driver",  
RUN="/usr/sbin/ethtool -K %k rx off tx off"
```

### 2. Customizing `/etc/sysctl.d/60-xxx.conf`

Validate the magic **SysRq** key to collect information when a problem occurs. Edit or add the following line.

```
kernel.sysrq = 1
```

Add a setting to induce kernel panic when NMI occurs, with which you can quickly detect a failure in hardware and drivers. Edit or add the following lines.

```
kernel.unknown_nmi_panic = 0  
kernel.panic_on_unrecovered_nmi = 1  
kernel.panic_on_io_nmi = 1
```

Add or edit the following line to set the console log level to 3. By changing the level, you can avoid the console overload, which can result in significant deterioration of applications or in Linux hang-up.

```
kernel.printk = 3 4 1 7
```

### 3. Customizing `/etc/default/grub`

For CB 2500 or CB 500

Edit `/etc/default/grub` on a text editor to add an appropriate kernel option and delete inappropriate one for the `"GRUB_CMDLINE_LINUX="` line.

```
nmi_watchdog=0 pci=noaer rd.udev.event-timeout=180
```

Adding the kernel option above configures the following settings.

- Disables `nmi_watchdog` so that a parameter that stops the system is used when a hardware failure occurs. (`nmi_watchdog=0`)
- Adds a setting that prevents AER from working. (`pci=noaer`)
- Extends the timeout period for device recognition, to prevent such a timeout from occurring during device recognition because there are too many installed devices. (`rd.udev.event-timeout=180`)
- If both the following conditions are met, a kernel panic might occur.

- The version of RHEL to be installed is 7.3, and the kernel version is 3.10.0-514.el7 or later and earlier than 3.10.0-514.6.1.el7.
- For EFI and UEFI of a server blade, the value specified for "Cores in CPU Package" is not "All".
- Virtual machines of LPAR manager, KVM, VMware, or Hyper-V environments are not used.

If both the above conditions are met, edit the `/etc/default/grub` file to add the kernel option `nr_cpus=1`.

- If both the following conditions are met, a kernel panic might occur.
- The version of RHEL to be installed is 7.4.
- For EFI and UEFI of a server blade, the value specified for "Cores in CPU Package" is not "All".
- Virtual machines of LPAR manager, KVM, VMware, or Hyper-V environments are not used.

If both the above conditions are met, edit the `/etc/default/grub` file to add the kernel option `possible_cpus=maximum-number-of-threads`. For details on the maximum number of threads, see [About the maximum number of threads on page 3-9](#).

- If both the following conditions are met, a kernel panic might occur.
- The version of RHEL to be installed is 7.5, and the kernel version is 3.10.0-862.el7 or later and earlier than 3.10.0-862.3.2.el7.
- Virtual machines of LPAR manager, KVM, VMware, or Hyper-V environments are not used.

If both the above conditions are met, edit the `/etc/default/grub` file to add the kernel option `nr_cpus=1`.



**Note:** The kernel parameter "intel\_iommu=on" is not supported. Do not add the "intel\_iommu=on" parameter to kernel option.

---

#### 4. Changing the crashkernel setting

If you use `kdump`, change the crashkernel setting in the `/etc/default/grub` "GRUB\_CMDLINE\_LINUX=" line as follows.

```
crashkernel=[appropriate-value]
```

(Example: `crashkernel=512M`)

The setting value varies depending on the amount of memory and the number of ports on the fibre channel adapters, the appropriate value should be set after confirming the environment configuration being used.

See the following Red Hat website for more details.

[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Linux/](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/)

5. Reflecting to `grub.cfg`

After editing `/etc/default/grub`, execute below command to reflect the changes to `grub.cfg`.

a. for Legacy boot

```
# grub2-mkconfig -o /boot/grub2/grub.cfg
```

b. for EFI boot

```
# grub2-mkconfig -o /boot/efi/EFI/redhat/grub.cfg
```

6. Disabling the EDAC function

Execute the command `lsmod | grep edac` to check the settings of the EDAC function. If the applicable module does not appear in command execution results, the EDAC function is already disabled. Proceed to the next step.

```
# lsmod | grep edac
sb_edac          32167  0
edac_core        57973  1 sb_edac
```

If the applicable module is displayed, create a `edac_disable.conf` file (note that you can specify any name as the file name) under the `/etc/modprobe.d` directory to disable the EDAC function. Include the following text in the file.

```
install *_edac /bin/true
install edac_* /bin/true
```

7. Persist the network interface names

For CB2500, when using N+M cold standby and using the NIC devices on I/O board module, persist the network interface names of the standby blade to same as the active blade.

If not applicable, this setting is not required.

Make new file `/etc/udev/rules.d/70-persistent-net.rules` by file permission 755 and add following setting.

Example:

Persist both the MAC address `"00:00:00:00:00:00"` of the active blade and the MAC address `"00:00:00:0a:00:00"` of the standby blade to `ens273f0`.

In addition, persist both the MAC address `"00:00:00:00:00:01"` of the active blade and the MAC address `"00:00:00:0a:00:01"` of the standby blade to `ens273f1`.

(Note that the example assumes that Linux recognizes `ens273f0` and `ens273f1` as network interface names of the active blade.)

```
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*",
ATTR{address}=="00:00:00:00:00:00", ATTR{type}=="1", NAME="ens273f0"
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*",
ATTR{address}=="00:00:00:00:00:01", ATTR{type}=="1", NAME="ens273f1"
```



```
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="*",
ATTR{address}=="00:00:00:0a:00:00", ATTR{type}=="1", NAME="ens273f0"
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="*",
ATTR{address}=="00:00:00:0a:00:01", ATTR{type}=="1", NAME="ens273f1"
```

**Note:**

- When there are more than one standby blade in the same N+M group, MAC addresses of the all standby blades must be written in the file of `/etc/udev/rules.d/70-persistent-net.rules`.
- The alphabet of the MAC address must be written in small letter.

---

**8. Customizing `/etc/modprobe.d/blacklist.conf`**

When the `ioatdma` driver is enabled, an unexpected system reset might occur.

Add the following to the last line. This setting blocks loading the `ioatdma` driver.

```
blacklist ioatdma
```

**9. Reflecting the new settings**

To apply the settings above, restart the OS.

**10. Adding/Updating Hitachi drivers**

Installing RHEL 7.x using the Driver & Utility CD will add or update some drivers.

If with the following condition, install the driver to load tools required for operation.

Connected to the Hitachi disk array system with the `hfcldd` driver:

Reinstall the driver contained in the Driver & Utility CD attached to the HITACHI Gigabit Fibre Channel Adapter.

**11. Updating drivers**

You can confirm the driver version using the following command.

```
# modinfo driver-name
```

Download and utilize the latest driver.

If you added the kernel option `nr_cpus=1` by editing the `/etc/default/grub` file in step 3, update the kernel to following version. Also, after the kernel is updated, delete the `nr_cpus=1` setting.

- for RHEL7.3  
3.10.0-514.16.1.el7 or later
- for RHEL7.5  
3.10.0-862.3.2.el7 or later

The setting up after installation is completed. Perform [Installing Utilities on page 5-2](#).

## Setting up after RHEL 7 installation on LPAR manager mode

The following describes the setting items, setting method, and driver update required for running RHEL 7 on LPAR.

If the settings are different from those shown in the table below, proper operation of the guest OS is not guaranteed.

The following table shows the settings after the OS is installed.

**Table 3-3 Items and values to set after the OS is installed (for RHEL 7)**

Item (setup file)	Value (required)
Changing the runlevel	Execute the following: # systemctl set-default multi-user.target
Setting the offload option	See <a href="#">Table 3-5 Items and values set for the offload option (for RHEL 7) on page 3-20</a> .
/etc/sysctl.d/60-sysctl-lpar.conf	<ul style="list-style-type: none"><li>Add the following: kernel.sysrq = 1 kernel.unknown_nmi_panic = 0 kernel.panic_on_unrecovered_nmi = 1 kernel.panic_on_io_nmi = 1 kernel.nmi_watchdog=0</li><li>Change the following setting: kernel.printk = 3 4 1 7</li></ul>
/etc/default/grub	<ul style="list-style-type: none"><li>Add the following: pci=noaer rd.udev.event-timeout=180 no_timer_check mce=0 transparent_hugepage=never console=ttyS1,115200 vga=792 net.ifnames=0</li><li>Add the following to use kdump: crashkernel=[appropriate-value]</li><li>Delete the following: quiet rhgb</li></ul>

**Table 3-4 NIC device names and types of LAN drivers (for RHEL 7)**

How to assign NICs	Device name	LAN driver
Shared NIC, and virtual NIC	Intel® 1Gbps Ethernet	igb LAN driver
Dedicate NIC <sup>1</sup>	Intel® 1Gbps Ethernet	igb LAN driver
	Intel® 10Gbps Ethernet	ixgbe LAN driver
	Emulex 10Gbps Ethernet	be2net LAN driver
VF NIC <sup>1</sup>	Intel® 10Gbps Ethernet	ixgbevfn LAN driver
	Emulex 10Gbps Ethernet	be2net LAN driver

How to assign NICs	Device name	LAN driver
Notes: 1. The supported devices and LAN drivers vary depending on the NIC installed on the server blade.		

To configure settings files and update drivers:

1. Changing the runlevel

To change the runlevel, enter the following:

```
# systemctl set-default multi-user.target
```

2. Customizing the settings of the offload option

Create a version of the file `/etc/udev/rules.d/80-hitachi-net-dev.rules` by setting the permission to 755, and add the items described below. By doing so, offload is set when the guest OS boots up. Note that when the TCP Checksum Offload, which checks the TCP packet, is enabled, a LAN controller failure might damage packet data.

In the following situations, be sure to configure the offload settings according to the situation:

If shared NICs and virtual NICs are mixed with dedicated NICs in an Intel® 1Gbps Ethernet, you need to configure the settings a and b shown below for the igb LAN driver.

In the following cases, only the items that need to be changed are set:

a. When using shared NICs and virtual NICs

Add the following line to `/etc/udev/rules.d/80-hitachi-net-dev.rules`, and then restart the OS. After the OS starts, the settings are automatically configured.

```
ACTION=="add", SUBSYSTEM=="net", DRIVERS=="igb",
ATTRS{device}=="0x10c9", RUN="/usr/sbin/ethtool -K %k rx off"
```

b. When using Intel® 10Gbps Ethernet as a dedicated NIC

Add the following line to `/etc/udev/rules.d/80-hitachi-net-dev.rules`, and then restart the OS. After the OS starts, the settings are automatically configured.

```
ACTION=="add", SUBSYSTEM=="net", DRIVERS=="igb",
ATTRS{device}=="0x1521", RUN="/usr/sbin/ethtool -K %k rx off tx off"
```

c. Using Intel® 10 Gbps Ethernet as a dedicated NIC and as a VF NIC

Add the following line to `/etc/udev/rules.d/80-hitachi-net-dev.rules`, and then restart the OS. After the OS starts, the settings are automatically configured.

```
ACTION=="add", SUBSYSTEM=="net", DRIVERS=="ixgbe", RUN="/usr/sbin/
ethtool -K %k gro off"
```

d. Using Intel® 10Gbps Ethernet as a VF NIC

Add the following line to `/etc/udev/rules.d/80-hitachi-net-dev.rules`, and then restart the OS. After the OS starts, the settings are automatically configured.

```
ACTION=="add", SUBSYSTEM=="net", DRIVERS=="ixgbevf", RUN="/usr/sbin/ethtool -K %k gro off"
```

After you perform the operations above, the settings are as shown below.

**Table 3-5 Items and values set for the offload option (for RHEL 7)**

LAN driver	Offload setting							
	rx	tx	tso	sg	ufo	gso	gro	lro
igb LAN driver(Shared NIC and virtual NIC)	off	on	on	on	off	on	on <sup>1</sup>	off
igb LAN driver(Dedicated NIC)		off	off	on <sup>1</sup>				
ixgbe LAN driver	on	on	on	on	off	on	off	off
ixgbevf LAN driver								
be2net LAN driver							on	
Notes:								
1. The default value is "on", but "off " might be automatically set, depending on the environment. Even if the value is "off", operation is not affected.								

### 3. Customizing `/etc/sysctl.d/60-sysctl-lpar.conf`

Validate the magic SysRq key so that information can be collected when a problem occurs. Use a text editor to add the following line to the file `/etc/sysctl.d/60-sysctl-lpar.conf`:

```
kernel.sysrq = 1
```

To immediately detect a hardware or driver failure, add a setting to induce kernel panic when NMI occurs. Use a text editor to add the following line to the file `/etc/sysctl.d/60-sysctl-lpar.conf`:

```
kernel.unknown_nmi_panic = 0
kernel.panic_on_unrecovered_nmi = 1
kernel.panic_on_io_nmi = 1
kernel.nmi_watchdog=0
```

Set the console log level to "3". Use a text editor to change the file `/etc/sysctl.d/60-sysctl-lpar.conf` as follows:

```
kernel.printk = 3 4 1 7
```

If you do not change the console log level, the load on the console will increase, which might result in deterioration of the performance or a hang-up.

### 4. Customizing `/etc/default/grub`

Add an appropriate kernel option to the line `GRUB_CMDLINE_LINUX=`, and delete any options that are not needed.

```
pci=noaer rd.udev.event-timeout=180 no_timer_check mce=0
transparent_hugepage=never console=ttyS1,115200 vga=792
crashkernel=[appropriate-value] net.ifnames=0
```

**Table 3-6 Items to be added to the kernel parameters (for RHEL 7)**

Items	Description
<code>pci=noaer</code>	Prevents AER from starting.
<code>rd.udev.event-timeout=180</code>	Extends the timeout time to prevent a timeout from occurring while identifying devices when multiple devices are installed.
<code>no_timer_check</code>	Avoids timer checks.
<code>mce=0</code>	Induces a kernel panic and stops the system when a machine check occurs.
<code>transparent_hugepage=never</code>	Disables the THP function.
<code>console=ttyS1,115200</code>	Sets the serial console.
<code>vga=792</code>	Displays the console in high resolution.
<code>crashkernel=[appropriate-value]</code>	<p>Sets a memory size for <code>kdump</code> operation.</p> <ul style="list-style-type: none"> <li>RHEL7.4 or earlier: <b><code>crashkernel=[appropriate-value]</code></b> (Example: <b><code>crashkernel=512 M</code></b>)</li> <li>RHEL7.5 or later: <b><code>crashkernel=[appropriate-value],high crashkernel=128M,low</code></b> (Example: <b><code>crashkernel=512M,high crashkernel=128M,low</code></b>)</li> </ul> <p>The setting value varies depending on the amount of memory and the number of ports on the fibre channel adapters, the appropriate value should be set after confirming the environment configuration being used.</p> <p>See the following Red Hat website for more details.  <a href="https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/">https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/</a></p>
<code>net.ifnames=0</code>	Suppresses the assignment of <code>eno*</code> to the NIC name.

**Table 3-7 Item to be deleted from the kernel parameter (for RHEL 7)**

Items	Description
<code>quiet</code> <code>rhgb</code>	Delete this item to display the console message at startup.



**Note:** The kernel parameter `intel_iommu=on` is not supported. Do not add `intel_iommu=on` to the kernel options.

5. Applying the changes to `grub.cfg`

After editing the file `/etc/default/grub`, execute one of the following commands to apply the changes to `grub.cfg`:

a. In legacy BIOS boot mode

```
# grub2-mkconfig -o /boot/grub2/grub.cfg
```

b. In EFI boot mode

```
# grub2-mkconfig -o /boot/efi/EFI/redhat/grub.cfg
```

6. Persist the network interface names

For CB2500, when using N+M cold standby or LPAR migration in shutdown mode, and using the NIC devices on I/O board module as dedicated NIC or VF NIC, persist the network interface names of the standby blade to same as the active blade.

If not applicable, this setting is not required.

Make new file `/etc/udev/rules.d/70-persistent-net.rules` by file permission 755 and add following setting.

Example:

Persist the MAC address `"00:00:00:00:00:00"` of the blade to `ens273f0`.

In addition, persist the MAC address `"00:00:00:00:00:01"` of the blade to `ens273f1`. In LPAR manager mode, virtual MAC address of guest OS will not change when operating N+M cold standby or performing migration in shutdown mode.

(Note that the example assumes that Linux recognizes `ens273f0` and `ens273f1` as network interface names of the blade.)

```
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*",
ATTR{address}=="00:00:00:00:00:00", ATTR{type}=="1", NAME="ens273f0"
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*",
ATTR{address}=="00:00:00:00:00:01", ATTR{type}=="1", NAME="ens273f1"
```



**Note:**

- The alphabet of the MAC address must be written in small letter.

7. Customizing `/etc/modprobe.d/blacklist.conf`

When the `ioatdma` driver is enabled, an unexpected system reset might occur.

Add the following to the last line. This setting blocks loading the `ioatdma` driver.

```
blacklist ioatdma
```

8. Applying the changed settings

To apply the settings above, restart the OS.

9. Checking the console log level

After the system starts, enter the following, and then press the **Enter** key to check the log level:

```
# cat /proc/sys/kernel/printk  
3 4 1 7
```

## 10. Updating and installing drivers

Installation using the Driver & Utility CD adds and updates some drivers.





# Red Hat Enterprise Linux 8

This chapter describes installation procedure for Red Hat Enterprise Linux 8.

- [OS Installation](#)
- [Setting up after RHEL 8 installation on Basic mode](#)

# OS Installation

This section describes how to install Red Hat Enterprise Linux 8 with the Driver & Utility CD.

---



## Tip:

- The installation procedure described in this guide is an example. See the following Red Hat website for more details.  
[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Linux/](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/)
  - For example, Driver & Utility CD for RHEL 8 version 0810-xx, contains drivers and utilities for RHEL 8.1. It can be used for RHEL 8.1 setup.
- 

## Installation steps

Screenshots for Red Hat Enterprise Linux 8 are used in the following steps. In this section, use an example of screenshots to install the RHEL 8.1.

---



## Tip:

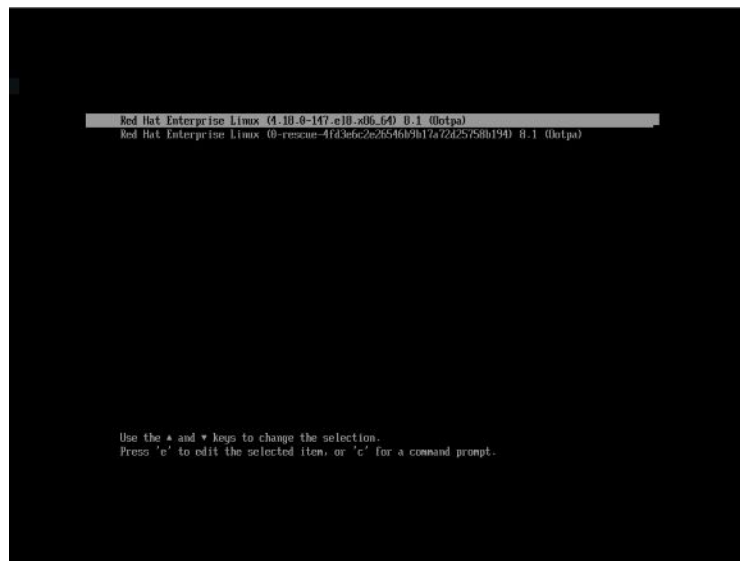
- On the CB500 and CB2500 server blades, perform the work up to step 12 below within 20 minutes after the screen in step 1 is displayed.  
Also, perform the work up to step 14 within 20 minutes after the screen in step 13 is displayed.  
Otherwise, the server blades will determine that OS startup has failed and will reboot.
  - Red Hat Enterprise Linux 8 works on the assumption of that system time is adjusted to UTC time, so before installing OS, adjust the system time to UTC time. After the installation, set the time zone of OS then the OS time is adjusted to the local time. About how to adjust the system time, refer "Date and Time" section for each blade at *Hitachi Compute Blade 500 Series EFI User's Guide* or *Hitachi Compute Blade 2500 Series UEFI Setup Guide*.
- 

Follow steps shown below to install the OS.

1. Select the menu.

[EFI boot mode]

When the boot option appears at EFI boot mode, select **Test this media & install Red Hat Enterprise Linux 8.1.0** and press **e** key.

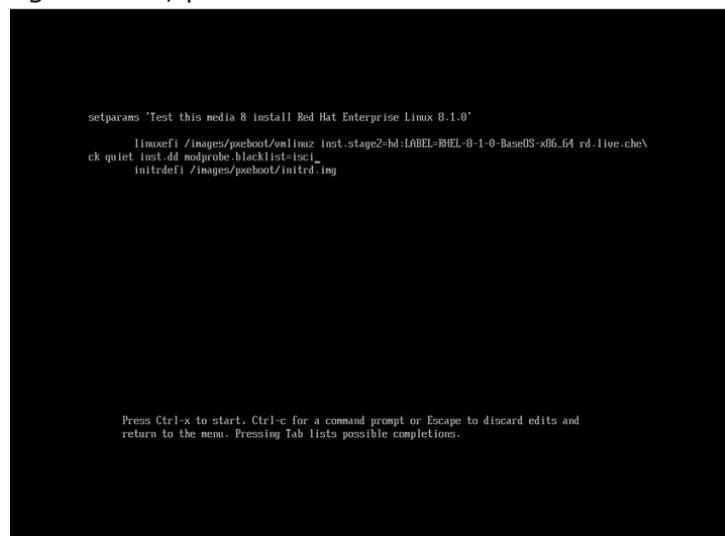


2. Set the boot option.

[EFI boot mode]

When the boot option appears at EFI boot mode, add `inst.dd modprobe.blacklist=iscsi` to the end of `linuxefi` commands.

After adding the text, press **Ctrl-x**.



3. The message **Driver disk device selection** is displayed, and then uncheck **Mapped** in the virtual media console dialog box, and then remove the Installation DVD from the DVD drive.

```

[ 8.419619] dracut-pre-udev(1269): modprobe: FATAL: Module floppy not found i
[ 8.453641] dracut-pre-udev(1269): modprobe: ERROR: could not insert 'edd': N
[ OK ] Started Show Plymouth Boot Screen.
[ OK ] Started Forward Password Requests to Plymouth Directory Watch.
[ OK ] Reached target Local Encrypted Volumes.
[ OK ] Reached target Paths.
[ OK ] Started udev Wait for Complete Device Initialization.
[ OK ] Starting Device-Mapper Multipath Device Controller...
[ OK ] Started Device-Mapper Multipath Device Controller.
[ OK ] Starting Open-iscsi...
[ OK ] Reached target Local File Systems (Pre).
[ OK ] Reached target Local File Systems.
[ OK ] Starting Create Volatile Files and Directories...
[ OK ] Started Open-iscsi.
[ OK ] Starting dracut-initqueue hook...
[ OK ] Started Create Volatile Files and Directories.
[ OK ] Reached target System Initialization.
[ OK ] Reached target Basic System.
[ OK ] Starting Setup Virtual Console...
[ OK ] Created slice system-driver-x2updates.slice.
[ OK ] Started Setup Virtual Console.
[ OK ] Starting Drive Update Disk UI on tty1...
[ OK ] Started Show Plymouth Boot Screen.
[ OK ] Started Forward Password Requests to Plymouth Directory Watch.
[ OK ] Reached target Local Encrypted Volumes.
[ OK ] Reached target Paths.
[ OK ] Started udev Wait for Complete Device Initialization.
[ OK ] Starting Device-Mapper Multipath Device Controller...
[ OK ] Started Device-Mapper Multipath Device Controller.
[ OK ] Starting Open-iscsi...
[ OK ] Reached target Local File Systems (Pre).
[ OK ] Reached target Local File Systems.
[ OK ] Starting Create Volatile Files and Directories...
[ OK ] Started Open-iscsi.
[ OK ] Starting dracut-initqueue hook...
[ OK ] Started Create Volatile Files and Directories.
[ OK ] Reached target System Initialization.
[ OK ] Reached target Basic System.
[ OK ] Starting Setup Virtual Console...
[ OK ] Created slice system-driver-x2updates.slice.
[ OK ] Started Setup Virtual Console.
[ OK ] Starting Drive Update Disk UI on tty1...
DD: starting interactive mode

(Page 1 of 1) Driver disk device selection
#DEVICE TYPE LABEL UUID
1) sr0 iso9660 RHEL-0-1-0-BasedS-x8 2019-10-15-13-34-03-00
# to select, 'r'-refresh, or 'c'-continue:

```

4. Insert the Driver & Utility CD in the DVD drive. Check **Mapped** in the virtual media console dialog.
5. Press **r** key and press **Enter** key, and then Driver & Utility CD information is displayed.

```

[ OK ] Started Open-iscsi.
[ OK ] Starting dracut-initqueue hook...
[ OK ] Started Create Volatile Files and Directories.
[ OK ] Reached target System Initialization.
[ OK ] Reached target Basic System.
[ OK ] Starting Setup Virtual Console...
[ OK ] Created slice system-driver-x2updates.slice.
[ OK ] Started Setup Virtual Console.
[ OK ] Starting Drive Update Disk UI on tty1...
[ OK ] Started Show Plymouth Boot Screen.
[ OK ] Started Forward Password Requests to Plymouth Directory Watch.
[ OK ] Reached target Local Encrypted Volumes.
[ OK ] Reached target Paths.
[ OK ] Started udev Wait for Complete Device Initialization.
[ OK ] Starting Device-Mapper Multipath Device Controller...
[ OK ] Started Device-Mapper Multipath Device Controller.
[ OK ] Starting Open-iscsi...
[ OK ] Reached target Local File Systems (Pre).
[ OK ] Reached target Local File Systems.
[ OK ] Starting Create Volatile Files and Directories...
[ OK ] Started Open-iscsi.
[ OK ] Starting dracut-initqueue hook...
[ OK ] Started Create Volatile Files and Directories.
[ OK ] Reached target System Initialization.
[ OK ] Reached target Basic System.
[ OK ] Starting Setup Virtual Console...
[ OK ] Created slice system-driver-x2updates.slice.
[ OK ] Started Setup Virtual Console.
[ OK ] Starting Drive Update Disk UI on tty1...
DD: starting interactive mode

(Page 1 of 1) Driver disk device selection
#DEVICE TYPE LABEL UUID
1) sr0 iso9660 RHEL-0-1-0-BasedS-x8 2019-10-15-13-34-03-00
# to select, 'r'-refresh, or 'c'-continue: r

(Page 1 of 1) Driver disk device selection
#DEVICE TYPE LABEL UUID
1) sr0 iso9660 C2-00-BUX-0010-01 2020-02-19-12-32-12-00
# to select, 'r'-refresh, or 'c'-continue:

```

6. Input the number of Driver & Utility CD and then press **Enter** Key.
7. Enter the number of list you want to install and press **Enter** key. Repeat this for all driver number.

```

3) [ ] /media/BD-4/rpms/x86_64/kmod-ixgbe-5.6.5-h1.e18.x86_64.rpm
# to toggle selection, or 'c'-continue: c
DD: Extracting: kmod-hfcldd

(Page 1 of 1) Driver disk device selection
# /DEVICE TYPE LABEL UUID
1) sr0 iso9660 C7-00-DUX-0810-01 2020-02-19-12-32-12-00
# to select, 'r'-refresh, or 'c'-continue: 1
DD: Examining /dev/sr0
mount: /media/BD-5: WARNING: device write-protected, mounted read-only.

(Page 1 of 1) Select drivers to install
1) [ ] /media/BD-5/rpms/x86_64/kmod-hfcldd-4.8.22.4348-1.e18.x86_64.rpm
2) [ ] /media/BD-5/rpms/x86_64/kmod-igb-5.3.5.42-h1.e18.x86_64.rpm
3) [ ] /media/BD-5/rpms/x86_64/kmod-ixgbe-5.6.5-h1.e18.x86_64.rpm
# to toggle selection, or 'c'-continue: 2

(Page 1 of 1) Select drivers to install
1) [ ] /media/BD-5/rpms/x86_64/kmod-hfcldd-4.8.22.4348-1.e18.x86_64.rpm
2) [x] /media/BD-5/rpms/x86_64/kmod-igb-5.3.5.42-h1.e18.x86_64.rpm
3) [ ] /media/BD-5/rpms/x86_64/kmod-ixgbe-5.6.5-h1.e18.x86_64.rpm
# to toggle selection, or 'c'-continue: c
DD: Extracting: kmod-igb

(Page 1 of 1) Driver disk device selection
# /DEVICE TYPE LABEL UUID
1) sr0 iso9660 C7-00-DUX-0810-01 2020-02-19-12-32-12-00
# to select, 'r'-refresh, or 'c'-continue: 1
DD: Examining /dev/sr0
mount: /media/BD-6: WARNING: device write-protected, mounted read-only.

(Page 1 of 1) Select drivers to install
1) [ ] /media/BD-6/rpms/x86_64/kmod-hfcldd-4.8.22.4348-1.e18.x86_64.rpm
2) [ ] /media/BD-6/rpms/x86_64/kmod-igb-5.3.5.42-h1.e18.x86_64.rpm
3) [x] /media/BD-6/rpms/x86_64/kmod-ixgbe-5.6.5-h1.e18.x86_64.rpm
# to toggle selection, or 'c'-continue: 3

(Page 1 of 1) Select drivers to install
1) [ ] /media/BD-6/rpms/x86_64/kmod-hfcldd-4.8.22.4348-1.e18.x86_64.rpm
2) [ ] /media/BD-6/rpms/x86_64/kmod-igb-5.3.5.42-h1.e18.x86_64.rpm
3) [x] /media/BD-6/rpms/x86_64/kmod-ixgbe-5.6.5-h1.e18.x86_64.rpm
# to toggle selection, or 'c'-continue: c
DD: Extracting: kmod-ixgbe

(Page 1 of 1) Driver disk device selection
# /DEVICE TYPE LABEL UUID
1) sr0 iso9660 C7-00-DUX-0810-01 2020-02-19-12-32-12-00
# to select, 'r'-refresh, or 'c'-continue:

```

8. Press **c** key and press **Enter** key, and then the driver is installed.

```

3) [ ] /media/BD-4/rpms/x86_64/kmod-ixgbe-5.6.5-h1.e18.x86_64.rpm
# to toggle selection, or 'c'-continue: c
DD: Extracting: kmod-hfcldd

(Page 1 of 1) Driver disk device selection
# /DEVICE TYPE LABEL UUID
1) sr0 iso9660 C7-00-DUX-0810-01 2020-02-19-12-32-12-00
# to select, 'r'-refresh, or 'c'-continue: 1
DD: Examining /dev/sr0
mount: /media/BD-5: WARNING: device write-protected, mounted read-only.

(Page 1 of 1) Select drivers to install
1) [ ] /media/BD-5/rpms/x86_64/kmod-hfcldd-4.8.22.4348-1.e18.x86_64.rpm
2) [ ] /media/BD-5/rpms/x86_64/kmod-igb-5.3.5.42-h1.e18.x86_64.rpm
3) [ ] /media/BD-5/rpms/x86_64/kmod-ixgbe-5.6.5-h1.e18.x86_64.rpm
# to toggle selection, or 'c'-continue: 2

(Page 1 of 1) Select drivers to install
1) [ ] /media/BD-5/rpms/x86_64/kmod-hfcldd-4.8.22.4348-1.e18.x86_64.rpm
2) [x] /media/BD-5/rpms/x86_64/kmod-igb-5.3.5.42-h1.e18.x86_64.rpm
3) [ ] /media/BD-5/rpms/x86_64/kmod-ixgbe-5.6.5-h1.e18.x86_64.rpm
# to toggle selection, or 'c'-continue: c
DD: Extracting: kmod-igb

(Page 1 of 1) Driver disk device selection
# /DEVICE TYPE LABEL UUID
1) sr0 iso9660 C7-00-DUX-0810-01 2020-02-19-12-32-12-00
# to select, 'r'-refresh, or 'c'-continue: 1
DD: Examining /dev/sr0
mount: /media/BD-6: WARNING: device write-protected, mounted read-only.

(Page 1 of 1) Select drivers to install
1) [ ] /media/BD-6/rpms/x86_64/kmod-hfcldd-4.8.22.4348-1.e18.x86_64.rpm
2) [ ] /media/BD-6/rpms/x86_64/kmod-igb-5.3.5.42-h1.e18.x86_64.rpm
3) [ ] /media/BD-6/rpms/x86_64/kmod-ixgbe-5.6.5-h1.e18.x86_64.rpm
# to toggle selection, or 'c'-continue: 3

(Page 1 of 1) Select drivers to install
1) [ ] /media/BD-6/rpms/x86_64/kmod-hfcldd-4.8.22.4348-1.e18.x86_64.rpm
2) [ ] /media/BD-6/rpms/x86_64/kmod-igb-5.3.5.42-h1.e18.x86_64.rpm
3) [x] /media/BD-6/rpms/x86_64/kmod-ixgbe-5.6.5-h1.e18.x86_64.rpm
# to toggle selection, or 'c'-continue: c
DD: Extracting: kmod-ixgbe

(Page 1 of 1) Driver disk device selection
# /DEVICE TYPE LABEL UUID
1) sr0 iso9660 C7-00-DUX-0810-01 2020-02-19-12-32-12-00
# to select, 'r'-refresh, or 'c'-continue:

```

9. Uncheck **Mapped** in the virtual media console dialog box, and then remove the Driver & Utility CD from the DVD drive.
10. Insert the OS Installation DVD in the DVD drive. Check **Mapped** in the virtual media console dialog.
11. Press **r** key and press **Enter** key, and OS Installation DVD information is displayed.

```

(Page 1 of 1) Select drivers to install
1) [ ] /media/DD-6/rpms/x86_64/kmod-hfcldd-4.8.22.4348-1.el8.x86_64.rpm
2) [ ] /media/DD-6/rpms/x86_64/kmod-igb-5.3.5.42-h1.el8.x86_64.rpm
3) [ ] /media/DD-6/rpms/x86_64/kmod-ixgbe-5.6.5-h1.el8.x86_64.rpm
4) to toggle selection, or 'c'-continue: 3

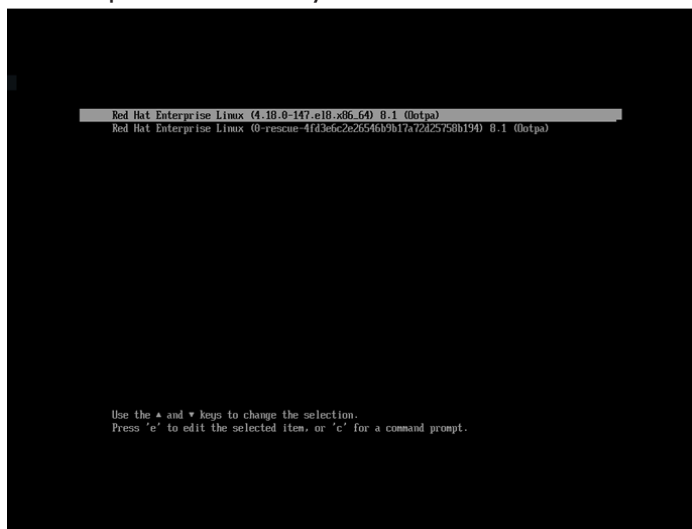
(Page 1 of 1) Select drivers to install
1) [ ] /media/DD-6/rpms/x86_64/kmod-hfcldd-4.8.22.4348-1.el8.x86_64.rpm
2) [ ] /media/DD-6/rpms/x86_64/kmod-igb-5.3.5.42-h1.el8.x86_64.rpm
3) [x] /media/DD-6/rpms/x86_64/kmod-ixgbe-5.6.5-h1.el8.x86_64.rpm
4) to toggle selection, or 'c'-continue: c
DD: Extracting: kmod-ixgbe

(Page 1 of 1) Driver disk device selection
/DEVICE TYPE LABEL UUID
1) sr0 iso9660 C7-00-DUX-0810-01 2020-02-19-12-32-12-00
4) to select, 'r'-refresh, or 'c'-continue: r

(Page 1 of 1) Driver disk device selection
/DEVICE TYPE LABEL UUID
1) sr0 iso9660 RHEL-8-1-0-BaseOS-x8 2019-10-15-13-34-03-00
4) to select, 'r'-refresh, or 'c'-continue: _

```

12. Press **c** key and press **Enter** key. Follow the wizard to continue the installation.
13. After installation of RHEL 8.x is complete, in the initial startup window, select **Red Hat Enterprise Linux(4.18.0-147.el8.x86\_64) 8.1 (Ootpa)**, and then press the **e** key.



14. Edit a kernel parameter of the Grub loader.  
Add `rd.udev.event-timeout=180` at the end of the line `linux ($root)/vmlinuz-4.18.....`  
Press **Ctrl-x**.

```
load_video
set gfx_payload=keep
insmod gzio
linux ($root)/vmlinuz-4.18.0-147.el8.x86_64 root=/dev/mapper/rhel-root ro crashkernel=auto resume=\
/dev/mapper/rhel-swap rd.lvm.lu=rhel/root rd.lvm.lu=rhel/swap rhgb quiet rd.uddev.event-timeout=180\
initrd ($root)/initramfs-4.18.0-147.el8.x86_64.img $tuned_initrd

Press Ctrl-x to start, Ctrl-c for a command prompt or Escape to discard edits and
return to the menu. Pressing Tab lists possible completions.
```

After the OS starts, perform the operations described in [Setting up after RHEL 8 installation on Basic mode on page 4-8](#).

## Restrictions

### CB 500 and CB 2500 restrictions

#### Internal RAID controllers

This section describes restrictions for the following RAID controller and the systems.

Target RAID controller and systems

- CB 520X B2/B3
- CB 520H B3/B4

#### System log messages

The following messages may be returned to the dmesg command and the system log (/var/log/messages), but the errors do not have an effect on the behavior.

Messages
device descriptor read/64, error -71
unable to enumerate USB device on port X
Setup ERROR: setup context command for slot X

#### Install OS to the built-in RAID of CB 520X B2/B3

To install an operation system to the built-in RAID of CB 520X B2/B3, make sure to install the operation system to Virtual Drive 0.

## Setting up after RHEL 8 installation on Basic mode

This section describes the settings on Basic mode, after Red Hat Enterprise Linux 8 is installed.

### 1. Disabling TCP Checksum Offload function

TCP Checksum Offload is a function that checks TCP packets in the LAN controller. If TCP Checksum Offload is enabled, packet data may be destroyed when the LAN controller fails.

Targeted drivers

- tg3 driver
- igb driver

You create the `/etc/udev/rules.d/80-hitachi-net-dev.rules` rule file that correct following the contents.

```
ACTION=="add", SUBSYSTEM=="net", DRIVERS=="name-of-target-device-driver",  
RUN="/usr/sbin/ethtool -K %k rx off tx off"
```

### 2. Customizing `/etc/sysctl.d/60-xxx.conf`

Validate the magic **SysRq** key to collect information when a problem occurs. Edit or add the following line.

```
kernel.sysrq = 1
```

Add a setting to induce kernel panic when NMI occurs, with which you can quickly detect a failure in hardware and drivers. Edit or add the following lines.

```
kernel.unknown_nmi_panic = 0  
kernel.panic_on_unrecovered_nmi = 1  
kernel.panic_on_io_nmi = 1
```

Add or edit the following line to set the console log level to 3. By changing the level, you can avoid the console overload, which can result in significant deterioration of applications or in Linux hang-up.

```
kernel.printk = 3 4 1 7
```

### 3. Customizing `/etc/default/grub`

For CB 2500 or CB 500

Edit `/etc/default/grub` on a text editor to add an appropriate kernel option and delete inappropriate one for the "GRUB\_CMDLINE\_LINUX=" line.

```
nmi_watchdog=0 pci=noaer rd.udev.event-timeout=180
```

Adding the kernel option above configures the following settings.

- Disables `nmi_watchdog` so that a parameter that stops the system is used when a hardware failure occurs. (`nmi_watchdog=0`)
- Adds a setting that prevents AER from working. (`pci=noaer`)



- Extends the timeout period for device recognition, to prevent such a timeout from occurring during device recognition because there are too many installed devices. (`rd.udev.event-timeout=180`)



**Note:** The kernel parameter "intel\_iommu=on" is not supported. Do not add the "intel\_iommu=on" parameter to kernel option.

4. Changing the crashkernel setting

If you use `kdump`, change the crashkernel setting in the `/etc/default/grub` "GRUB\_CMDLINE\_LINUX=" line as follows.

```
crashkernel=[appropriate-value]
```

(Example: `crashkernel=512M`)

The setting value varies depending on the amount of memory and the number of ports on the fibre channel adapters, the appropriate value should be set after confirming the environment configuration being used.

See the following Red Hat website for more details.

[https://access.redhat.com/documentation/en-US/Red\\_Hat\\_Enterprise\\_Linux/](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/)

5. Reflecting to `grub.cfg`

After editing `/etc/default/grub`, execute below command to reflect the changes to `grub.cfg`.

```
# grub2-mkconfig -o /boot/efi/EFI/redhat/grub.cfg
```

6. Disabling the EDAC function

Execute the command `lsmod | grep edac` to check the settings of the EDAC function. If the applicable module does not appear in command execution results, the EDAC function is already disabled. Proceed to the next step.

```
# lsmod | grep edac
sb_edac                24576  0
```

If the applicable module is displayed, create a `edac_disable.conf` file (note that you can specify any name as the file name) under the `/etc/modprobe.d` directory to disable the EDAC function. Include the following text in the file.

```
install *_edac /bin/true
install edac_* /bin/true
```

7. Customizing `/etc/modprobe.d/blacklist.conf`

When the `ioatdma` driver is enabled, an unexpected system reset might occur.

Add the following to the last line. This setting blocks loading the `ioatdma` driver.

```
blacklist ioatdma
```

8. Reflecting the new settings

To apply the settings above, restart the OS.

#### 9. Adding/Updating Hitachi drivers

Installing RHEL 8.x using the Driver & Utility CD will add or update some drivers.

If with the following condition, install the driver to load tools required for operation.

Connected to the Hitachi disk array system with the hfcldd driver:

Reinstall the driver contained in the Driver & Utility CD attached to the HITACHI Gigabit Fibre Channel Adapter.

#### 10. Updating drivers

You can confirm the driver version using the following command.

```
# modinfo driver-name
```

Download and utilize the latest driver.

The setting up after installation is completed. Perform [Installing Utilities on page 5-2](#).

## Utilities

This section describes installation procedures of utilities for Red Hat Enterprise Linux.

- [Installing Utilities](#)

## Installing Utilities

Install Utilities referring to Support\_EN.html contained in "Driver & Utility CD".

For the detail of installation, see the manual of each utility in the Flash Memory in the server chassis.



**Note:** Install packages (library) required for each utility before installing the utility by referring to the each manual.

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