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Hitachi Compute Blade 500 Series
OS Installation Guide
for Red Hat Enterprise Linux

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MK-91CB500025-10

Contents

Preface

This document describes how to use the Compute Blade 500 series.

This preface includes the following information:

- ☐ Intended Audience
- ☐ Product version
- ☐ Release Notes
- ☐ Document Organization
- ☐ Referenced Documents
- ☐ Document Conventions
- ☐ Convention for storage capacity values
- ☐ Getting Help
- ☐ Comments

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

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 adds notes on setting up an OS on an LU.

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
Chapter 1, Installation Overview	Describes installation overview for Red Hat Enterprise Linux.
Chapter 2, Red Hat Enterprise Linux 6	Describes installation procedure for Red Hat Enterprise Linux 6.
Chapter 3, Red Hat Enterprise Linux 5.9/5.7	Describes installation procedure for Red Hat Enterprise Linux 5.9/5.7.
Chapter 4, Utilities	Describes installation procedures of utilities for Red Hat Enterprise Linux.
Chapter 5, LAN Connection	Describes LAN connections.

Referenced Documents

- CB 500 User's 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

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
Regular text bold	In text: keyboard key, parameter name, property name, hardware labels, hardware button, hardware switch. In a procedure: user interface item
Italic	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
< > (angled brackets)	Variable (used when italic is not enough to identify variable).
[ ] (square bracket)	Optional values
{ } braces	Required or expected value
| vertical bar	Choice between two or more options or arguments
_(underline)	Default value, for example, [a | b]

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

Icon	Meaning	Description
	WARNING	This indicates the presence of a potential risk that might cause death or severe injury.
	CAUTION	This indicates the presence of a potential risk that might cause relatively mild or moderate injury.
NOTICE	NOTICE	This indicates the presence of a potential risk that might cause severe damage to the equipment and/or damage to surrounding properties.
	Note	This indicates notes not directly related to injury or severe damage to equipment.
	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
1 exabyte (EB)	1,000 PB or $1{,}000^6$ 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^{10}) bytes
1 MB	1,024 KB or $1{,}024^2$ bytes
1 GB	1,024 MB or $1{,}024^3$ bytes
1 TB	1,024 GB or $1{,}024^4$ bytes
1 PB	1,024 TB or $1{,}024^5$ bytes
1 EB	1,024 PB or $1{,}024^6$ bytes

Getting Help

The Hitachi Data Systems customer support staff is available 24 hours a day, seven days a week. If you need technical support, log on to the Hitachi Data Systems Portal for contact information: https://portal.hds.com.

Comments

Please send us your comments on this document: doc.comments@hds.com. Include the document title and number including the revision level (for example, -07), and refer to specific sections and paragraphs whenever possible. All comments become the property of Hitachi Data Systems Corporation.

Thank you!

1

Installation Overview

This chapter describes installation overview for Red Hat Enterprise Linux.

Overview

This section describes the OS installation flow as follows.

Installation general flow

The following flow shows the installation flow.

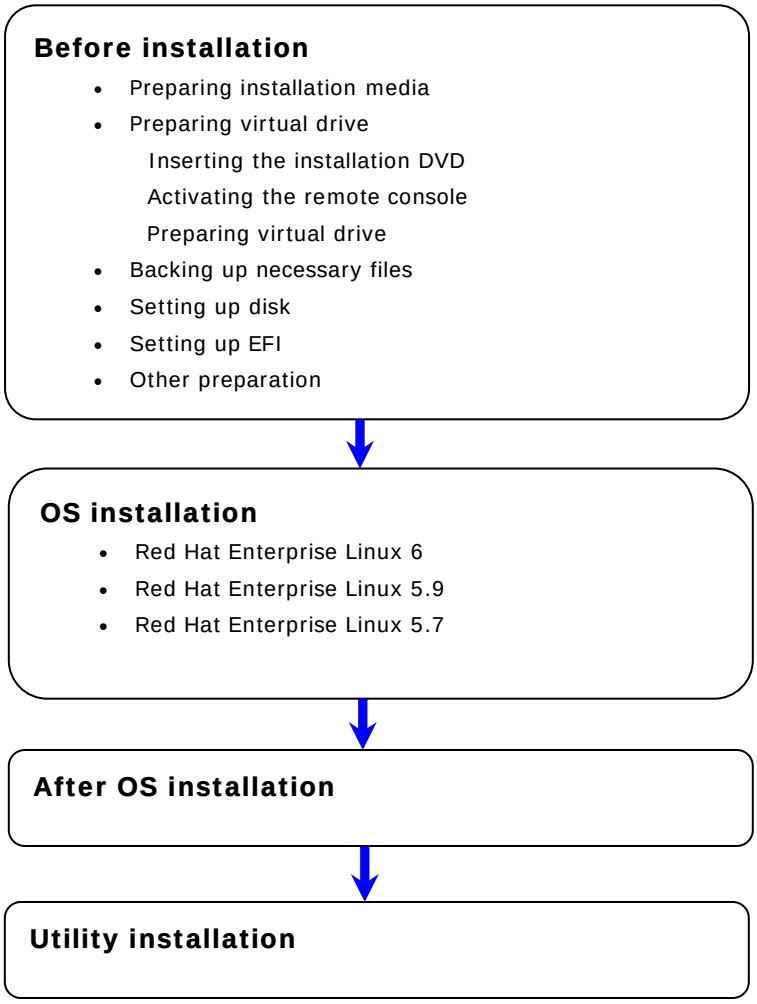


Figure 1-1 Installation general flow

Before installation

This section describes prerequisites for installation.

Preparing installation media

Prepare the installation media for the OS.

Preparing virtual drive

Inserting the installation DVD

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

Activating the remote console

Activate the console in the following steps:

1 Start a new web browser from the system console.

2 Enter the URL of management module web console (enter “https://192.168.0.1/” when factory default setting) into the address field box of the browser.

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

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

- 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

3 Log in the Web console of the management module.

4 The following table describes the factory default account settings for the system administrator.

Table 1-2 Factory default account settings for the system administrator

Item	Factory default
User ID	administrator
Password	password

5 Click **Resources** tab on the menu screen; then, click a server blade, on which to install the OS.

6 Click the **Condition** tab; then, click **Server Blade Action** then, click **Start remote console**. This opens the **Logon** screen.

7 The following remote console screen opens.

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.

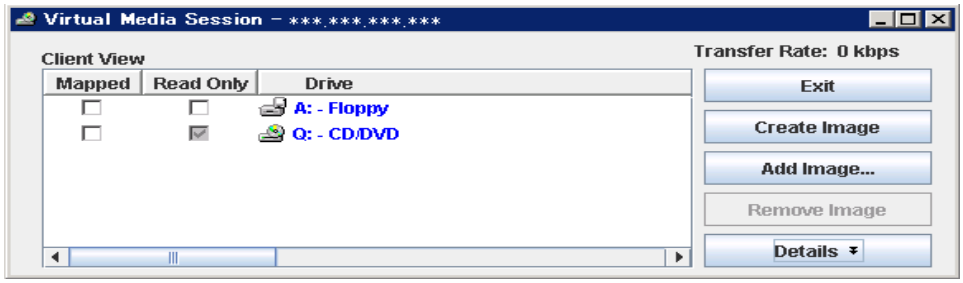
- A warning message may appear when the remote console is started. The message varies with the Java VM version. For details, see *Remote Console User's Guide*.
- CB 520H A1/B1 server blades with BMC 01-27 or earlier will display the login screen of Web console. For details, see *Remote Console User's Guide*.

Setting up virtual drive

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

1 On the remote console screen, click **Tools**. Then, click **Launch Virtual Media**.

2 Confirm that the following virtual media screen opens.



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

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.

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:
  1. 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.
  2. Block the ports on the paths for which communication was disabled in step 1. To block the ports, use the commands for that fibre channel switch.

Setting up EFI

Set the boot device configuration as the EFI initial setting. See *EFI User's Guide* that you need.

Other preparations

Start the server blade.

For LPAR manager environment, see Other preparations for Logical partitioning enabled to perform the procedure.

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1. Click **Power** > **Power On** in the tool bar of the remote console.

For Red Hat Enterprise Linux 6, go on to step 2.
For Red Hat Enterprise Linux 5.9/5.7, jump to OS installation.

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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 6.2.

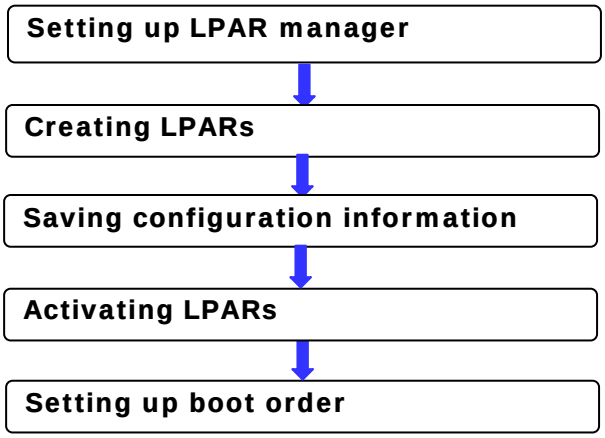
Jump to OS Installation for Red Hat Enterprise Linux 6.

Other preparations for Logical partitioning enabled

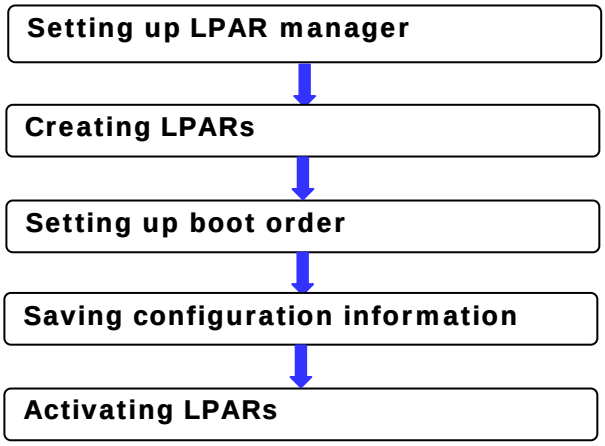
The following is the operation flow when Logical partitioning is enabled.

Other operation procedure is different according to the management module firmware version. Boot order setting procedure is also different according to version. See the procedure of your management module firmware version.

[Earlier than version A0125 and CB 520X]



[Version A0125 or later]



- Setting up LPAR manager

  Select a LPAR manager firmware, initialize LPAR manager, activate LPAR manager, and then, save the LPAR creation and configuration data. For details, see *Server Blade Setup Guide*.

- Creating LPARs

  Create LPARs. For details, see *Server Blade Setup Guide*.

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

Item	Recommended value
Processor	2 or more [1]
Memory	2.0GB or larger [2]
Disk	The LPAR on which to install OS requires 40GB or larger capacity. [3]
Network	1 or more NICs

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.

Tip For installing and using Red Hat Enterprise Linux 5.7/5.9, the following LPAR configuration is recommended:

Item	Recommended value
Processor	2 or more[1]
Memory	2.0GB or larger[2]
Disk	The LPAR on which to install OS requires 40GB or larger capacity.[3]
Network	1 or more NICs

1. Required to be no less than 1.
2. Required to be no less than 1.0 GB of memory per processor.
3. PAE (Physical Address Extension) is the expansion function of x86 processor to use the memory which is more than 4 Gb in the 32 bit system.
   LPAR manager supports only PAE kernel of Red Hat Enterprise Linux (x86), therefore, you need to apply PAE kernel even if the memory size that is allocated LPAR is less than 4 Gb.
   There are two ways to install PAE kernel as follows:
   - Allocate more than 4GB of memory to LPAR during OS installation. (You can change to allocate less than 4 Gb of memory after OS installation)
   - Install and apply PAE kernel after OS installation.
4. Required to be no less than 23 GB.

- Saving configuration information

  Save the configuration information. For details, see *Server Blade Setup Guide*.

- Activating LPARs

  Activate the LPAR. For details, see *Server Blade Setup Guide*.

- Setting up boot order

  Set up boot order for the LPAR; then, create boot option. You can also change the boot order.

  [Earlier than version A0125 and CB 520X]: For details, see *Logical partitioning manager User's Guide*.

  [Version A0125 or later]: For details, see *Server Blade Setup Guide*.

You can use only an FC expansion card as the boot device. For precautions about the use of FC, see *Hitachi Gigabit Fibre Channel Adapter User's Guide (BIOS/EFI)* in advance.

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 FC-SW module, although it may not work in some cases. For details, see *Hitachi Gigabit Fibre Channel Adapter User's Guide (BIOS/EFI)*.

2

Red Hat Enterprise Linux 6

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

- ☐ OS installation
- ☐ Setting up after installation

The following table shows supported kernel.

Supported OS	Supported kernel	
	32-bit x86	64-bit x86_64
Red Hat Enterprise Linux 6.5	2.6.32-431.el6	
Red Hat Enterprise Linux 6.4	2.6.32-358.23.2.el6*	
Red Hat Enterprise Linux 6.2	2.6.32-220.45.1.el6*	
* Supported kernels are security update kernels.		

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 13. Updating kernel in Setting up after installation on LPAR.

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

OS Installation

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

The following table shows the version of supported OS and driver.

Table 2-1 OS and driver versions

Model Name	OS version		Driver & Utility CD to use
CB 520H A1/B1 CB 520A A1 CB 540A A1/B1	RHEL 6.5 RHEL 6.4 RHEL 6.2	32bit: X86 64bit: X86_64	Driver & Utility CD for Red Hat Enterprise Linux 6.4 Driver & Utility CD for Red Hat Enterprise Linux 6.2
CB 520H B2	RHEL 6.5 RHEL 6.4	32bit: X86 64bit: X86_64	Specific to CB 520H B2: Driver & Utility CD for Red Hat Enterprise Linux 6.4
CB 520X B1	RHEL 6.5*	64bit: X86_64	Driver & Utility CD for Red Hat Enterprise Linux 6
* RHEL 6.5 X86_64 can boot only on EFI.			

To know which specific 6.x versions are supported for servers that are purchased from HDS or its distribution partners, contact your server vendor's sales or support organizations.

- The installation procedure described in this guide is an example. See the following Red Hat website for more details.
  http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/index.html
- 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.
- Driver & Utility CD for RHEL 6, version 0640-xx, contains drivers and utilities for RHEL 6.4. It can be used for RHEL 6.4 setup.

  iso image for Driver & Utility CD 0640-xx depends on the model. Volume label indicates a model for which you can use the iso image as the following examples.
  - For CB 500 A1/B1 model when the volume label shows **-00-DUX-0640-xx
  - For CB 500 B2 model when the volume label shows **-01-DUX-0640-xx
- Driver & Utility CD 0620-xx contains drivers and utilities for Red Hat Enterprise Linux 6.2. You can use it to set up Red Hat Enterprise Linux 6.2.

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.

For CB 520X, install the OS on a virtual drive on the remote console. The USB port on the front panel is not available.

Before installation

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”

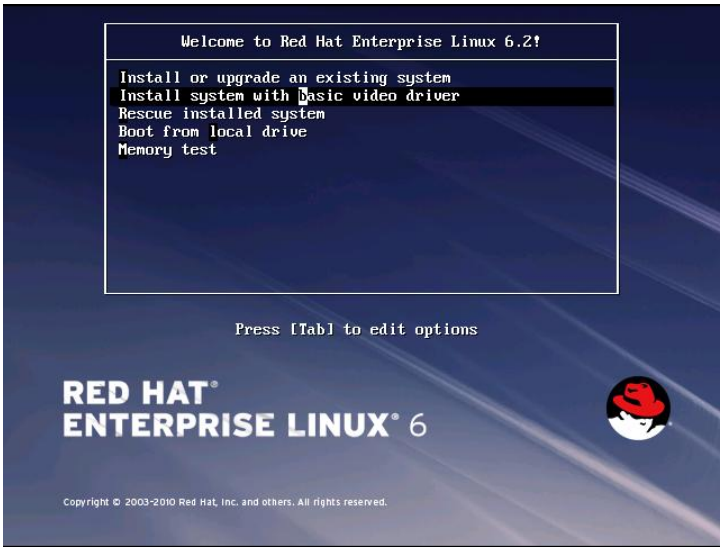
For EFI boot, do not install tboot package. Click Base System > Base to show the Packages in Base dialog box, and make sure that tboot package is unchecked.

Installation steps

Screenshots for Red Hat Linux Enterprise 6.2 are used in the following steps. A step may include different procedures for Legacy boot and EFI boot systems.

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.

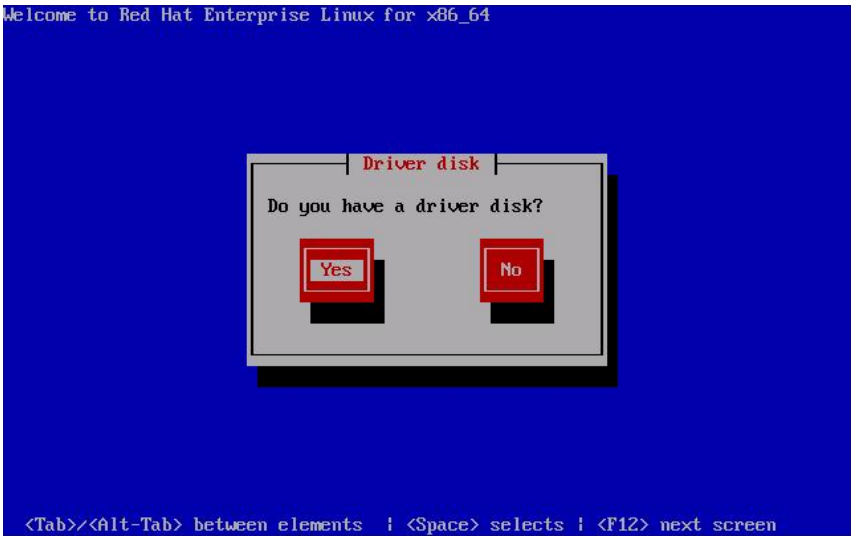


2 When the boot option appears, add `dd blacklist=isci` to the end.

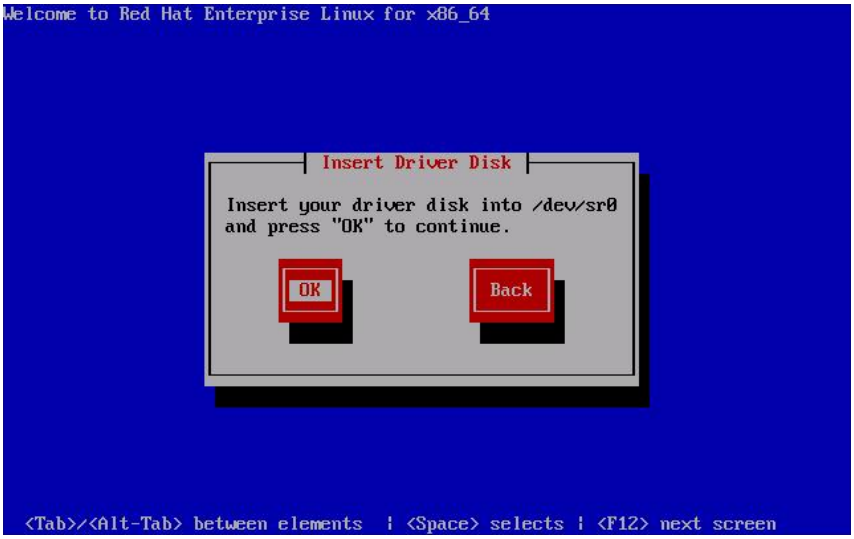
Note

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.

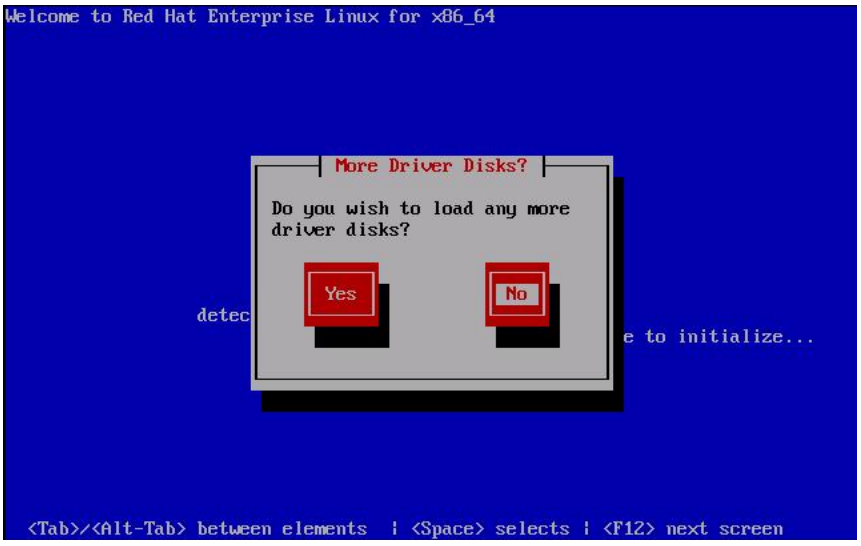


5 Uncheck **Mapped** in the **virtual media console** dialog box, and then remove the Installation DVD from the DVD drive.

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.

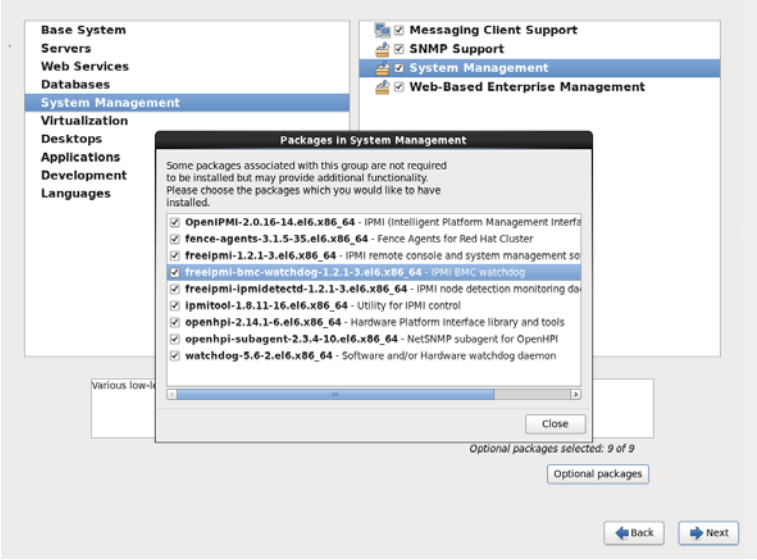
10 Insert the Installation DVD in the DVD drive. Check **Mapped** in the **virtual media console** dialog box.

11 Click **No** on the window in step 8.

Follow the wizard to continue the installation.

Do not install the “freeipmi-bmc-watchdog” package. If this package is installed to RHEL 6, the system will auto restart periodically.

System Management > System Management > Optional packages > freeipmi-bmc-watchdog-x.x.x-x.xx.xx



For LSI SAS2008 RAID board (Internal SAS RAID controller), Internal SATA RAID controller for CB 520A A1 server blade, CB 520X server blade, 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 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

Internal RAID controllers and CB 520X server blade

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

- LSI SAS2008 RAID board (Internal SAS RAID controller)
- Internal SATA RAID controller for CB 520A A1 server blade
- CB 520X server blade

Restrictions

- 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

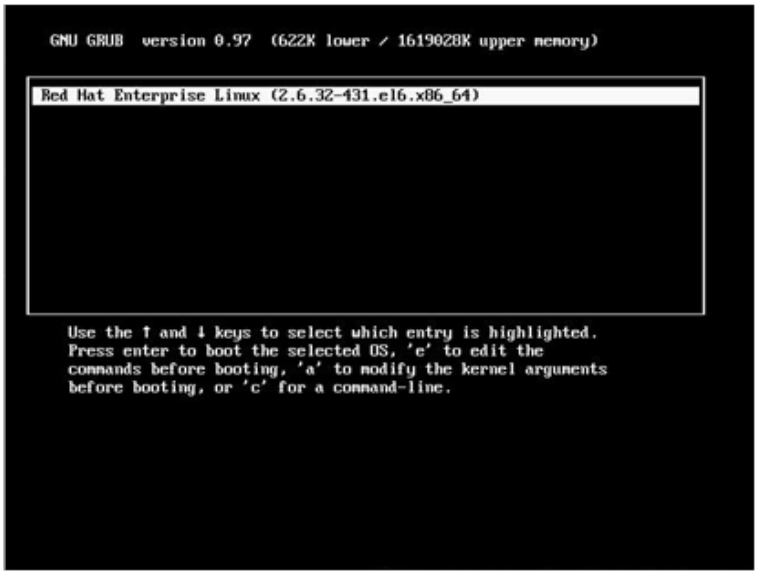
  When selecting tboot package (tboot-x.xx-x.el6.x86_64.rpm/ tboot-x.xx-x.el6.i686.rpm) in manual installation with the setup CD, change the setting for /boot/grub/grub.conf referring to 4. Customizing /boot/grub/grub.conf, Setup procedure, Setting up after installation.

  If a problem occurs such as OS boot failure before changing the setting, reset the system manually. Then, follow the steps below to delete “intel_iommu=on” and “amd_iommu=on” from the boot option, boot the system, and change the setting for /boot/grub/grub.conf.

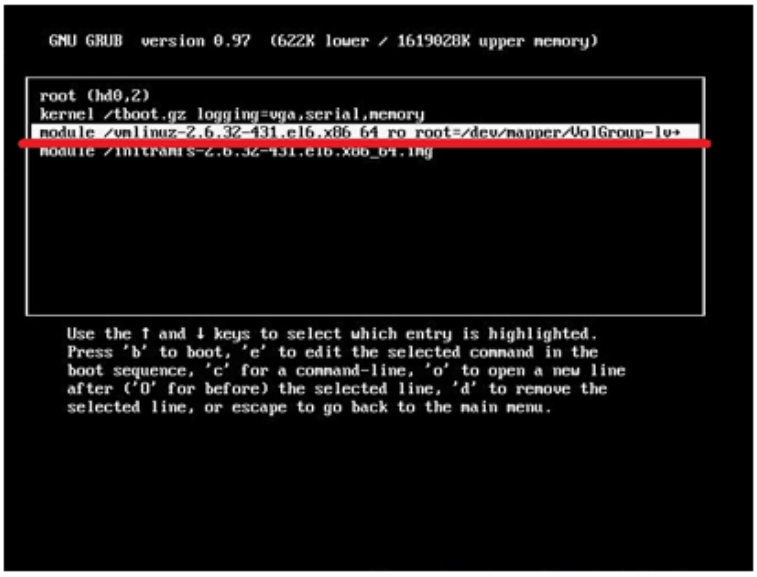
  Deleting boot options:

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

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



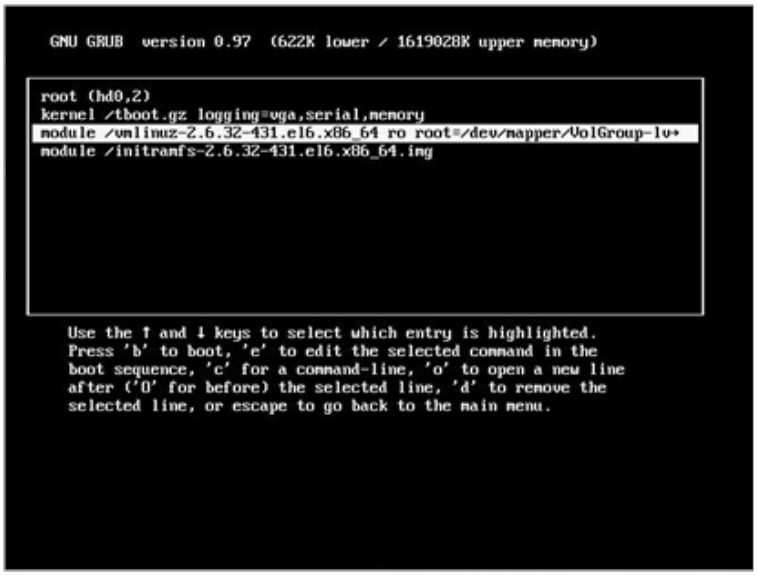
3. Select the underscored line and press **E** key



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.



6. OS starts up.

   Change the setting for /boot/grub/grub.conf referring to 4. Customizing /boot/grub/grub.conf, Setup procedure, Setting up after installation.

LPAR manager environment

Be aware of the following restrictions for LPAR manager environment.

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.

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

CB 520X

Install OS on the internal RAID in CB 520X where a single virtual drive is created. If creating multiple virtual drives, make sure to install the OS on virtual drive 0.

Setting up after installation

This section describes the settings after Red Hat Enterprise Linux 6 is installed.

For LPAR manager environment, see Setting up after installation on LPAR to perform the setup procedure.

Setup procedure

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 server blade or CB 520X server blade change the setting for /boot/grub/grub.conf referring to Restrictions.

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 eht0 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.

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.

   (1) Perform the following command to stop NetworkManager service.

   ```
   # service NetworkManager stop
   ```

   (2) Perform the following command to set NetworkManager service to off.

   ```
   # chkconfig NetworkManager off
   ```

   (3) 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. 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

5. Applying 8 Gb Fibre Channel board (GG-CC3M8G1X1-Y) driver

Make sure to apply this script even if GG-CC3M8G1X1-Y is not onboard when using Red Hat Enterprise Linux 6.2, which is not necessary for Red Hat Enterprise Linux 6.4. This script includes settings for NIC driver and iSCSI driver required to be executed before kernel update.

– Mount the Driver & Utility CD on a directory and copy “Hitachi_workaroud/elx/lpfc” folder to a folder. Grant execute permission for “elpfc_install.sh” in the copied folder. The following shows an example of mounting “/media/cdrom” folder and copying “/root” folder.

```
#cp –a /media/cdrom/Hitachi_workaroud/elx/lpfc /root/
#chmod 755 /root/lpfc/elpfc_install.sh
```

– Move to the directory where “elpfc_install.sh” exists, and then execute “elpfc_install.sh” script.

```
#cd /root/lpfc
#./elpfc_install.sh
```

– Delete the created folder.

```
#cd /root
#rm –rf /root/lpfc
```

6. Installing LSI Software RAID

   When using LSI Software RAID, make sure to install LSI Software RAID following the steps in Installing Utilities.

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. Reflecting the new settings

   Reboot the OS to reflect the settings configured from step 1 through step 6.

8. Adding/Updating Hitachi drivers

   Installing RHEL 6 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.

9. Updating drivers

   You can confirm the driver version using the following command.

   `#modinfo` *`driver name`*

   Download and utilize the latest driver.

10. Updating kernel

    When using Red Hat Enterprise Linux 6, download the kernel security update from the Red Hat web page referring to the following table, and then apply the kernel security update.

Table 2-2 Updating kernel

Model name	Supported OS	Supported kernel	
		32bit: X86	64bit: X86_64
CB 520X	Red Hat Enterprise Linux 6.5	2.6.32-431.5.1.el6	
CB 520H B2	Red Hat Enterprise Linux 6.5	2.6.32-431.5.1.el6	
	Red Hat Enterprise Linux 6.4	2.6.32-358.23.2.el6	
CB 520H A1/B1	Red Hat Enterprise Linux 6.5	2.6.32-431.5.1.el6	
CB 540A A1/B1	Red Hat Enterprise Linux 6.4	2.6.32-358.23.2.el6	
CB 520A A1	Red Hat Enterprise Linux 6.2	2.6.32-220.45.1.el6	

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The setting up after installation is completed. Perform Installing Utilities.

Setting up after installation on LPAR

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 2-3 Setting items and values after OS installation (1/2)

<table>
<tr><th colspan="2">Item (file)</th><th colspan="3">Value (required)</th></tr>
<tr><th></th><th>Guest OS</th><th colspan="2">Red Hat Enterprise Linux 5</th><th>Red Hat Enterprise Linux 6</th></tr>
<tr><th></th><th>Architecture</th><th>X86</th><th>AMD/Intel64</th><th>32bit: X86 / 64bit: X86_64</th></tr>
<tr><td colspan="2">/etc/inittab</td><td colspan="3">Change it to id:3:initdefault:</td></tr>
<tr><td colspan="2">Offload option settings</td><td colspan="3">See Table 2-5 Offload option settings.</td></tr>
<tr><td colspan="2" rowspan="2">/etc/sysctl.conf</td><td colspan="3">Add the following:
kernel.printk=3 4 1 7
kernel.sysrq=1
kernel.unknown_nmi_panic=0
kernel.panic_on_unrecovered_nmi=1</td></tr>
<tr><td colspan="2">N/A</td><td>Add the following:
kernel.panic_on_io_nmi=1</td></tr>
<tr><td colspan="2" rowspan="5">Kernel line in /boot/grub/grub.conf
(For CB 520X, /boot/efi/EFI/redhat/grub.conf)</td><td colspan="3">Add the following:
nmi_watchdog=0
vga=792[1]</td></tr>
<tr><td colspan="3">Delete the following:
quiet
rhgb</td></tr>
<tr><td colspan="2">Add the following:
Lpj=[processor frequency][2]</td><td rowspan="2">Add the following:
nmi_watchdog=0
mce=0
pci=noaer
no_timer_check</td></tr>
<tr><td>N/A</td><td>Add the following:
clock=tsccount</td></tr>
<tr><td colspan="3">When using Kdump, change to the following:
crashkernel=[arbitrary value]M@[arbitrary value]M</td></tr>
<tr><td colspan="2">/etc/sysconfig/syslog</td><td colspan="2">Change KLOGD_OPTIONS as follows:
(Before) KLOGD_OPTIONS="-x"
(After) KLOGD_OPTIONS="-x -c 3"</td><td>N/A</td></tr>
<tr><td colspan="2">/etc/sysconfig/clock</td><td colspan="2">Add the following:
CLOCKFLAGS
="--directisa"</td><td>N/A</td></tr>
</table>

Table 2-3 Setting items and values after OS installation (2/2)

Item (file)	Value (required)		
Guest OS	Red Hat Enterprise Linux 5		Red Hat Enterprise Linux 6
Architecture	X86	AMD/Intel64	32bit: X86 / 64bit: X86_64
Serial console			
/boot/grub/grub.conf (For CB 520X, /boot/efi/EFI/redhat/grub.conf)	Comment out the following line in splashimage=(hd0,0)/grub/splash.xpm.gz: (Before) splashimage=(hd0,0)/grub/splash.xpm.gz (After) #splashimage=(hd0,0)/grub/splash.xpm.gz		
	Add the following two lines between hiddenmenu line and the title line: serial --unit=1 --speed=115200 terminal --timeout=10 serial console		
	Add the following at the end of the kernel line: console=tty0 console=ttyS1,115200		Add the following at the end of the kernel line: console=ttyS1,115200
/etc/sysconfig/init	Change BOOTUP as follows: (Before) BOOTUP=color (After) BOOTUP=serial		
/etc/sysconfig/kudzu	Change SAFE as follows: (Before) SAFE=no (After) SAFE=yes		N/A
/etc/inittab	Add the following at the last line: co:2345:respawn:/sbin/agetty 115200 ttyS1 vt100		N/A
/etc/securetty	Add the following at the last line: ttyS1		N/A

1 Add this parameter if LPAR manager version is 01-60 or later.

2 For example, if the processor frequency is “2.53 GHz” in the running system, enter “lpj=2530000”.

Table 2-4 NIC device name and type of LAN drivers

NIC scheduling mode	Device name	LAN driver
Shared NIC and virtual NIC	Intel ® 82576 Ethernet	igb LAN driver
Dedicated NIC*	Broadcom 1 Gbps Ethernet	tg3 LAN driver
	Emulex 10 Gbps Ethernet	be2net LAN driver
VF NIC*	Emulex 10Gbps Ethernet	be2net LAN driver

* Supported device and LAN driver depend on the NIC installed in a server blade.

Table 2-5 Offload option settings

NIC scheduling mode	Device name	Offload value (required)							
		rx	tx	tso	sg	ufo	gso	gro	lro
Shared NIC and virtual NIC	Intel (R) 82576 Ethernet	off	on	on	on	off	on	off	off
Dedicated NIC	Broadcom 1 Gbps Ethernet	Not supported							
	Emulex 10 Gbps Ethernet	on	on	on	on	off	on	on	Off
VF NIC	Emulex 10Gbps Ethernet	on	on	on	on	off	on	on	off

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.)
#
```

Change "id:5:initdefault:" to "id:3:initdefault:".

2. Customizing offload option

   For the value of offload option settings, see Table 2-5 Offload option settings.

   – 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.

     The following shows an example of how to set shared NIC and virtual NIC.

     Range: off or on (off= Disable, on= Enable)

     Use the ethtool command to disable TCP Checksum Offload for Receive.

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

     Example. To disable two LAN controllers, 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 rx is set to off, gro is automatically set to off.

     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.

     When enabling TCP checksum Offload, replace the rx parameter value with “on”.

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.

(1) Perform the following command to stop NetworkManager service.

```
# service NetworkManager stop
```

(2) Perform the following command to set NetworkManager service to off.

```
# chkconfig NetworkManager off
```

(3) 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:

1) 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
```

2) Enabling the Magic SysRq key
Edit or add the following.

```
kernel.sysrq = 1
```

Set this command to gather information when problem occurs.

3) Setting the NIMI 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 NIMI.

5. Customizing /boot/grub/grub.conf
   (For CB 520X, /boot/efi/EFI/redhat/grub.conf)

   Set the following in grub.conf:

   – Comment out “splashimage=(hd0,0)/grub/splash.xpm.gz”.

     When “splashimage=(hd0,0)/grub/splash.xpm.gz” is commented out with CB 520X, 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 (2.6.32-431.el6.x86_64)
```

   – Add “serial --unit=1 --speed=115200”.
   – Add “terminal --timeout=10 serial console”.
   – Delete “quiet rhgb” from the Kernel line.
   – Add the ending of the Kernel line as follow:
     nmi_watchdog=0 mce=0 pci=noaer no_timer_check
     console=ttyS1,115200
     – 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 6.2 (32 bit: X86/64 bit: X86_64):

```
# 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
hiddenmenu
serial --unit=1 --speed=115200
terminal --timeout=10 serial console
title Red Hat Enterprise Linux (2.6.32-220.el6.x86_64)
     root (hd0,0)
    kernel /vmlinuz-  2.6.32-220.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

     initrd /initramfs-  2.6.32-220.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 (2.6.32-431.el6.x86_64)
       root (hd0,0)
#      kernel /tboot.gz logging=vga,serial,memory
       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=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-2.6.32-431.el6.x86_64.img
```

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 CB 520X, /boot/efi/EFI/redhat/grub.conf)

   crashkernel=[Arbitrary value]M@[Arbitrary 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

When using Red Hat Enterprise Linux 6, download the kernel security update from the Red Hat web page referring to the following table, and then apply the kernel security update.

Table 2-6 Updating kernel

Supported OS	Supported kernel	
	32bit: X86	64bit: X86_64
Red Hat Enterprise Linux 6.5	2.6.32-431.5.1.el6	
Red Hat Enterprise Linux 6.4	2.6.32-358.23.2.el6	
Red Hat Enterprise Linux 6.2	2.6.32-220.4.2.el6	

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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 *Remote Console User's Guide*.

3

Red Hat Enterprise Linux 5.9/5.7

This chapter describes installation procedure for Red Hat Enterprise Linux 5.9/5.7.

The following table shows supported kernel.

Model name	Supported OS	Supported kernel	
		32-bit x86	64-bit x86_64
CB 520H B2	Not supported	-	-
CB 520H A1/B1 CB 540A A1/B1 CB 520A A1	Red Hat Enterprise Linux 5.9	kernel-PAE-2.6.18-348.6.1.el5*	kernel-2.6.18-348.6.1.el5*
	Red Hat Enterprise Linux 5.7	kernel-PAE-2.6.18-274.18.1.el5*	kernel-2.6.18-274.18.1.el5*
* Kernels supported by Red Hat Enterprise Linux 5.9/5.7 are security update kernels.			

OS Installation

This section describes how to install Red Hat Enterprise Linux 5.7 with the Driver & Utility CD.

Precautions for OS Installation on LPAR manager

Be aware of the following precautions for LPAR manager environment.

Red Hat Enterprise Linux 5.9

Red Hat Enterprise Linux 5.9 is supported by LPAR manager firmware version 01-70 or later.

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.

Boot command option

Do not use the Boot command including “hashdist=1 mem=1024G” to avoid rebooting over and over again.

Installation steps

Follow steps shown below to install the OS. Figures in the procedure are for Red Hat Enterprise Linux 5.7.

1. Enter the following command, and then press **Enter**.

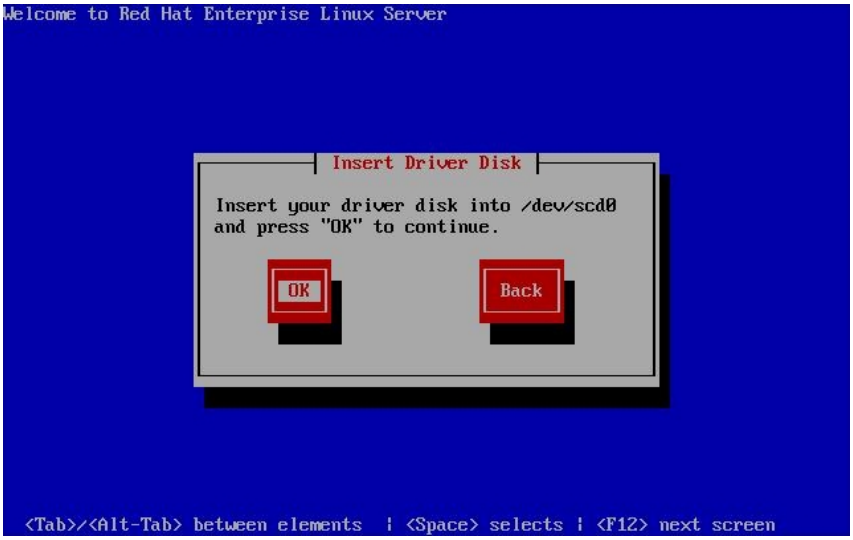
```
boot : linux xdriver=vesa dd blacklist=isci
```

Note

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

2. Select **Yes** to **Do you have a driver disk?** and press **Enter**.

3. The following window is displayed.

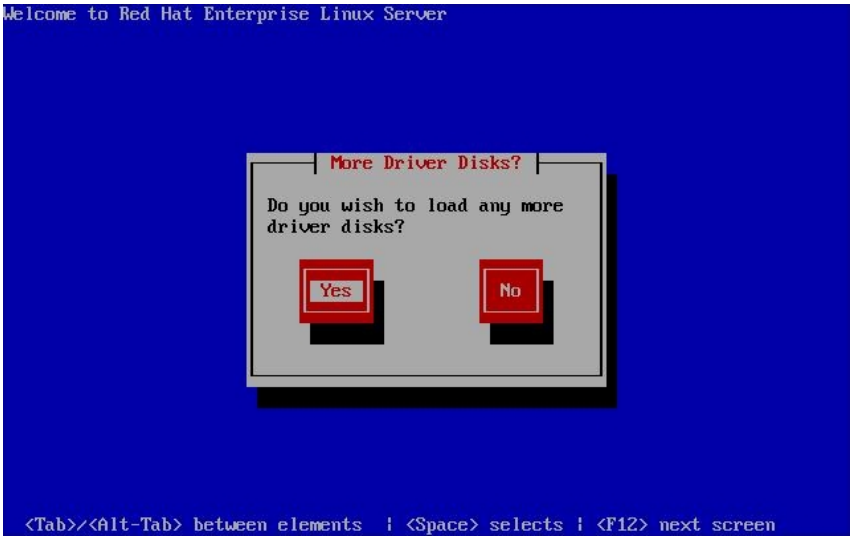


4. Uncheck **Mapped** in the virtual media console dialog box, and then remove the Installation DVD from the DVD drive.

5. Insert the Installation DVD in the DVD drive. Check **Mapped** in the **virtual media console** dialog box.

6. Click **OK** on the window shown in step 3

7. The following window is displayed.



8. Uncheck **Mapped** in the **virtual media console** dialog box, and then remove the Driver and Utility CD from the DVD drive.

9. Insert the Installation DVD in the DVD drive. Check **Mapped** in the **virtual media console** dialog box.

10. Click **No** on the window in step 7.

Follow the wizard to continue the installation.

When a message “Please select the nearest city in your time zone” is displayed, select a time zone, and uncheck “System clock uses UTC.

---

11. When all media are installed, the message “the installation is complete.” is displayed.
    - When installing the OS on LSI Software RAID, press **Ctrl** + **Alt** + **F2** keys to go on to step 12 through step 15, and proceed to step 16.
    - When installing the OS not on LSI Software RAID, jump to step 16.

When installing the OS using LSI Software RAID, make sure to perform step 12 through 15. If not, LSI Software RAID may not be recognized by the OS correctly in setting after installation.

12. The console window appears.

    Change from the installation CD to Driver & Utility CD again. Then type the following commands (a) through (d) on the console window in the order.

    (a) `# mkdir temp_swr`
    Creates a temporary directory to mount Driver & Utility CD.

    (b) `# mount /dev/scd0 temp_swr`
    Mounts Driver & Utility CD on the temporary directory.

    (C) `# cd temp_swr/hitachi_utilities/lsi_swr`
    Moves to the directory in Driver & Utility CD which the installation script for LSI Software RAID exists.

    (d) `# ./replace_ahci.sh`
    Executes installation script for LSI Software RAID

If the CD cannot be mounted at (b), change the device file name for the argument to such as `/dev/scd1`, `/dev/scd2`, and try again.

13. The following messages will appear after the installation script for LSI Software RAID (`replace_ahci.sh`) ends. Confirm that the messages and next command prompt are displayed on the console window.

```
CAUTION: This script modifies initrd image.
Original image is saved as <imagename>.lsi.backup.
---

Removing ahci from /etc/modprobe.conf
Removing isci from /etc/modprobe.conf
Blacklisting ahci in /etc/modprobe.d/blacklist.conf
Blacklisting isci in /etc/modprobe.d/blacklist.conf

Modifying initrd image for 2.6.xx-xxx.xxx
```

xx-xxx.xxx in "`Modifying initrd image for 2.6.xx-xxx.xxx`" shows the OS version.

14. Type the following commands in order, from (a) through (b), to unmount Driver & Utility CD. Then remove the CD.

    (a) `# cd /`
    Moves to the root directory.
    (b) `# umount temp_swr`
    Unmounts Driver & Utility CD mounted on the temporary directory.

15. Press **Ctrl** + **Alt** + **F6** keys to exit from the console window.

16. When the following window appears, click **Reboot**.

Follow the wizard to continue the installation.

Restrictions

Be aware of the following precautions for LPAR manager environment.

Basic operation on and changing settings for Red Hat Enterprise Linux 5.7/5.9

After starting Red Hat Enterprise Linux 5.7/5.9 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.

hwclock command

When RTC is changed with the hwclock command, a message 'select() to /dev/rtc to wait for clock tick timeout' may be displayed. When you change RTC using the hwclock command, an option “--directisa” should be added as shown below.

```
# hwclock –dire  ctisa
```

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.

MTU value

If Jumbo Frame is used in the virtual NIC and shared NIC, up to 9000 bytes of MTU size is supported by LPAR manager.

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

Setting up after installation

This section describes the settings after Red Hat Enterprise Linux 5.9/5.7 is installed.

For LPAR manager environment, see Setting up after installation on LPAR to perform the procedure.

Setup procedure

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

```
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.

2. 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
```

3. Customizing /boot/grub/grub.conrf

   Boot option is different according to your hardware resources.

   Add the following kernel option as needed.

   – For Red hat Enterprise Linux 5.9/5.7 (x86):

```
avoid_smi
```

   – For Red hat Enterprise Linux 5.9/5.7 (AMD/Intel 64):

```
nmi_watchdog=0 avoid_smi
```

   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 for avoiding Aero from working

4. Reflecting the new settings

   Reboot the OS to reflect the settings configured from step 1 through step 3.

5. Copying the driver

   You need to copy the driver before updating a kernel in Step 6.

Make sure to execute the following procedure. If not, kernel update may fail.

Follow the procedure described below to copy the driver from the driver CD.

(1) Perform the following command to check the architecture.

```
# uname –m
```

Performing the command above will display the following results depending on the architecture:

i686: i686

x86_64: x86_64

Some steps described below depend on the architecture and OS version.

(2) Insert the driver CD into the DVD drive.

(3) Perform the following command to mount the driver CD.

```
# mount /dev/cdrom /media/
```

(4) Perform the following command to retrieve the driver from the driver CD.

```
# mkdir -p /tmp/hitachi_drv
# zcat /media/modules.cgz >
/tmp/hitachi_drv/hitachi_modules.cgz.tmp
# cd /tmp/hitachi_drv
# cat hitachi_modules.cgz.tmp | cpio -iumd
```

(5) Perform one of the following commands depending on the architecture to check that the driver is stored in the local disk.

Red Hat Enterprise Linux 5.9 i686:

```
# ls 2.6.18-348.el5PAE/i686/
be2iscsi.ko hfcldd.ko hraslog_link.ko lpfc.ko megasr.ko
be2net.ko hfcldd_conf.ko igb.ko tg3.ko
```

Red Hat Enterprise Linux 5.9 x86_64:

```
# ls 2.6.18-348.el5/x86_64/
be2iscsi.ko hfcldd.ko hraslog_link.ko lpfc.ko megasr.ko
be2net.ko hfcldd_conf.ko igb.ko tg3.ko
```

Red Hat Enterprise Linux 5.7 i686:

```
# ls 2.6.18-274.el5PAE/i686/
be2iscsi.ko hfcldd.ko hraslog_link.ko lpfc.ko megasr.ko
be2net.ko hfcldd_conf.ko igb.ko megaraid_sas.ko tg3.ko
```

Red Hat Enterprise Linux 5.7 x86_64:

```
# ls 2.6.18-274.el5/x86_64/
be2iscsi.ko hfcldd.ko hraslog_link.ko lpfc.ko megasr.ko
be2net.ko hfcldd_conf.ko igb.ko megaraid_sas.ko tg3.ko
```

(6) Perform one of the following commands depending on the architecture to create a directory for updating the kernel.

Red Hat Enterprise Linux 5.9 i686:

```
# mkdir -p /lib/modules/2.6.18-348.6.1.el5PAE/updates
```

Red Hat Enterprise Linux 5.9 x86_64:

```
# mkdir -p /lib/modules/2.6.18-348.6.1.el5/updates
```

Red Hat Enterprise Linux 5.7 i686:

```
# mkdir –p /lib/modules/2.6.18-274.18.1.el5PAE/updates
```

Red Hat Enterprise Linux 5.7 x86_64:

```
# mkdir –p /lib/modules/2.6.18-274.18.1.el5/updates
```

(7) Perform one of the following commands depending on the architecture to copy the driver.

Red Hat Enterprise Linux 5.9 i686:

```
# cp -a 2.6.18-348.el5PAE/i686/* /lib/modules/2.6.18-
348.6.1.el5PAE/updates/.
```

```
# ls /lib/modules/2.6.18-348.6.1.el5PAE/updates/
```

```
be2iscsi.ko hfcldd.ko hraslog_link.ko lpfc.ko megasr.ko
be2net.ko hfcldd_conf.ko igb.ko tg3.ko
```

Red Hat Enterprise Linux 5.9 x86_64:

```
# cp -a 2.6.18-348.el5/x86_64/* /lib/modules/2.6.18-
348.6.1.el5/updates/.
```

```
# ls /lib/modules/2.6.18-348.6.1.el5/
```

```
updates/be2iscsi.ko hfcldd.ko hraslog_link.ko lpfc.ko
megasr.ko be2net.ko hfcldd_conf.ko igb.ko tg3.ko
```

Red Hat Enterprise Linux 5.7 i686:

```
# cp –a 2.6.18-274.el5PAE/i686/* /lib/modules/2.6.18-
274.18.1.el5PAE/updates/.
```

```
# ls /lib/modules/2.6.18-274.18.1.el5PAE/updates/
```

```
e1000.ko hfcldd.ko hfcldd_conf.ko hradrv.ko hraslog_link.ko
igb.ko ixgbe.ko megaraid_sas.ko megasr.ko tg3.ko
```

Red Hat Enterprise Linux 5.7 x86_64:

```
# cp –a 2.6.18-274.el5/x86_64/* /lib/modules/2.6.18-
274.18.1.el5/updates/.
```

```
# ls /lib/modules/2.6.18-274.18.1.el5/updates/
```

```
e1000.ko hfcldd.ko hfcldd_conf.ko hradrv.ko hraslog_link.ko
igb.ko ixgbe.ko megaraid_sas.ko megasr.ko tg3.ko
```

(8) Perform the following command to unmount the driver CD.

```
# umount /media/
```

(9) Perform the following command to delete the working directory.

```
# cd /tmp
# rm –rf /tmp/hitachi_drv
```

6. Updating kernel

   When using Red Hat Enterprise Linux 5.7, download the kernel security update from the Red Hat web page referring to the following table, and then apply the kernel security update.

Table 3-1 Updating kernel

Model name	Supported OS	Supported kernel	
		32-bit x86	64-bit x86_64
CB 520H A1/B1 CB 540A A1/B1 CB 520A A1	Red Hat Enterprise Linux 5.9	kernel-PAE-2.6.18-348.6.1.el5	kernel-2.6.18-348.6.1.el5
	Red Hat Enterprise Linux 5.7	kernel-PAE-2.6.18-274.18.1.el5	kernel-2.6.18-274.18.1.el5

   Red Hat, Inc

   https://rhn.redhat.com/

7. Updating drivers

   You can confirm the driver version using the following command.

   #modinfo *driver name*

   Download and utilize the latest driver.

8. 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 *Remote Console User's Guide*.

9. Setting LSI Software RAID

   When using LSI Software RAID, execute LSI Software RAID setting by following the steps below after installing the OS.

When installing RHEL 5.9/5.7 in an environment with LSI Software RAID, make sure to execute this utility setting. If you do not execute LSI Software RAID setting, the RAID setting is incomplete and the utility may not work properly

(1) Mount Driver & Utility CD on any directory. The following steps show an example where the CD is mounted on /media/cdrom.

```
# mount /dev/cdrom /media/cdrom
```

(2) Execute the following command to start LSI Software RAID setting script.

```
# cd /media/cdrom/hitachi_utilities/lsi_swr
# ./swrset.sh
```

(3) The following message appears, and LSI Software RAID setting is executed.

```
LSI Software RAID setting for 520A is executed.
```

If you execute this setting script on a system without LSI Software RAID, the following message will appear.

The system is not 520A Patsburg-A LSI Software RAID model !!
LSI Software RAID setting is skipped.

---

(4) The setting is complete when the next command prompt is displayed on the console window. Unmount Driver & Utility CD and remove the CD.

The setting up after installation is completed. Perform Installing Utilities.

Setting up after installation on LPAR

This section describes the further settings and driver update required for running Red Hat Enterprise Linux 5.7/5.9 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 3-2 Setting items and values after OS installation (1/2)

<table>
<tr><th colspan="2">Item (file)</th><th colspan="3">Value (required)</th></tr>
<tr><th></th><th>Guest OS</th><th colspan="2">Red Hat Enterprise Linux 5</th><th>Red Hat Enterprise Linux 6</th></tr>
<tr><th></th><th>Architecture</th><th>X86</th><th>AMD/Intel64</th><th>32bit: X86 / 64bit: X86_64</th></tr>
<tr><td colspan="2">/etc/inittab</td><td colspan="3">Change it to id:3:initdefault:</td></tr>
<tr><td colspan="2">Offload option settings</td><td colspan="3">See Table 3-4 Offload option settings.</td></tr>
<tr><td colspan="2" rowspan="2">/etc/sysctl.conf</td><td colspan="3">Add the following:
kernel.printk=3 4 1 7
kernel.sysrq=1
kernel.unknown_nmi_panic=0
kernel.panic_on_unrecovered_nmi=1</td></tr>
<tr><td colspan="2">N/A</td><td>Add the following:
kernel.panic_on_io_nmi=1</td></tr>
<tr><td colspan="2" rowspan="4">Kernel line in /boot/grub/grub.conf</td><td colspan="3">Add the following:
nmi_watchdog=0
vga=792[1]</td></tr>
<tr><td colspan="3">Delete the following:
quiet
rhgb</td></tr>
<tr><td colspan="2">Add the following:
Lpj=[processor frequency][2]</td><td rowspan="2">Add the following:
mce=0
pci=noaer
no_timer_check</td></tr>
<tr><td>N/A</td><td>Add the following:
clock=tsccount</td></tr>
<tr><td colspan="2">/etc/sysconfig/syslog</td><td colspan="2">Change KLOGD_OPTIONS as follows:
(Before) KLOGD_OPTIONS="-x"
(After) KLOGD_OPTIONS="-x -c 3"</td><td>N/A</td></tr>
<tr><td colspan="2">/etc/sysconfig/clock</td><td>Add the following:
CLOCKFLAGS
="--directisa"</td><td>N/A</td><td>N/A</td></tr>
</table>

Table 3-2 Setting items and values after OS installation (2/2)

Item (file)	Value (required)		
Guest OS	Red Hat Enterprise Linux 5		Red Hat Enterprise Linux 6
Architecture	X86	AMD/Intel64	32bit: X86 / 64bit: X86_64
Serial console			
/boot/grub/grub.conf	Comment out the following line in splashimage=(hd0,0)/grub/splash.xpm.gz: (Before) splashimage=(hd0,0)/grub/splash.xpm.gz (After) #splashimage=(hd0,0)/grub/splash.xpm.gz		
	Add the following two lines between hiddenmenu line and the title line: serial --unit=1 --speed=115200 terminal --timeout=10 serial console		
	Add the following at the end of the kernel line: console=tty0 console=ttyS1,115200		Add the following at the end of the kernel line: console=ttyS1,115200
/etc/sysconfig/init	Change BOOTUP as follows: (Before) BOOTUP=color (After) BOOTUP=serial		
/etc/sysconfig/kudzu	Change SAFE as follows: (Before) SAFE=no (After) SAFE=yes		N/A
/etc/inittab	Add the following at the last line: co:2345:respawn:/sbin/agetty 115200 ttyS1 vt100		N/A
/etc/securetty	Add the following at the last line: ttyS1		N/A

1 Add this parameter if LPAR manager version is 01-60 or later.

2 For example, if the processor frequency is “2.53 GHz” in the running system, enter “lpj=2530000”.

Table 3-3 NIC device name and type of LAN drivers

NIC scheduling mode	Device name	LAN driver
Shared NIC and virtual NIC	Intel ® 82576 Ethernet	igb LAN driver
Dedicated NIC*	Broadcom 1 Gbps Ethernet	tg3 LAN driver
	Emulex 10 Gbps Ethernet	be2net LAN driver

* Supported device and LAN driver depend on the NIC installed in a server blade.

Table 3-4 Offload option settings

NIC scheduling mode	Device name	Offload value (required)							
		rx	tx	tso	sg	ufo	gso	gro	lro
Shared NIC and virtual NIC	Intel (R) 82576 Ethernet	off	on	on	on	off	on	off	off
Dedicated NIC	Broadcom 1 Gbps Ethernet	Not supported							
	Emulex 10 Gbps Ethernet	on	on	on	on	off	on	on	off

To set up and update the followings, 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.)
#
```

Change "id:5:initdefault:" to "id:3:initdefault:".

2. Customizing offload option

For the value of offload option settings, see Table 3-4 Offload option settings.

- 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.

The following shows an example of how to set shared NIC and virtual NIC.

Range: off or on (off= Disable, on= Enable)

Use the ethtool command to disable TCP Checksum Offload for Receive.

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

Example. To disable two LAN controllers, 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 rx is set to off, gro is automatically set to off.

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.

When enabling TCP checksum Offload, replace the rx parameter value with “on”.

3. Customizing etc/sysctl.conf

Set the following three:

1) 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
```

2) Enabling the Magic SysRq key
Edit or add the following.

```
kernel.sysrq = 1
```

Set this command to gather information when problem occurs.

3) Setting the NIMI interrupt
Edit or add the following.

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

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

4. Customizing /boot/grub/grub.conf

Set the following in grub.conf:

- Comment out "`splashimage=(hd0,0)/grub/splash.xpm.gz`".
- Add "`serial --unit=1 --speed=115200`".
- Add "`terminal --timeout=10 serial console`".
- Delete "`quiet rhgb`" from the Kernel line.
- Add the following to the kernel line.

< x86>

```
nmi_watchdog=0 lpj=[Frequency of the currently running processor in KHz]
console=tty0 console=ttyS1,115200
```

Add "vga=792" as well if LPAR manager version is 01-60 or later.

<AMD/Intel64>

```
nmi_watchdog=0 clock=tsccount lpj= [Frequency of the currently running
processor in KHz] console=tty0 console=ttyS1,115200
```

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 5.7 (32 bit: X86/64 bit: X86_64):

```
# 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/VolGroup00/LogVol00
# initrd /initrd-version.img
#boot=/dev/sda
default=0
timeout=5
#splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
serial --unit=1 --speed=115200
terminal --timeout=10 serial console
title Red Hat Enterprise Linux (2.6.18-274.18.1.el5PAE)
root (hd0,0)
kernel /vmlinuz- 2.6.18-274.18.1.el5PAE ro
root=/dev/VolGroup00/LogVol00 nodmraid
nmi_watchdog=0 lpj=2530000 console=tty0 console=ttyS1.115200 vga=792

initrd/initrd-2.6.18-274.18.1.el5PAE.img
```

- Do not use ”hashdist=1 mem=mem=1024G” command in the Kernel parameter because using the option can cause the Red Hat Enterprise Linux 5.7 boot fail.
- The following message is displayed while booting Red Hat Enterprise Linux, applications might not operate properly.

```
calibrate_delay_direct() failed to get a good estimate for loops_per_jiff
Probably due to long platform interrupts.
Consider using “lpj=” boot option.
Calibrating delay loop…XX.XX BogoMIPS (lpj=XXXX)
```

Add “lpj=[*processor frequency*]” in kernel line of /boot/grub/grub.conf to avoid this problem. For example, if the processor frequency is “2.53 GHz” in /proc/cpuinfo of the running system, enter “lpj=2530000”.

When the processor frequency is changed in the OS that is set “lpj”, set “lpj” again after changing the processor frequency. You can change the processor frequency when replacing server blades or performing LPAR migration.

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.

```
crashkernel=[Arbitrary value]M@[Arbitrary value]M
```

   (Example: crashkernel=256M@48M)

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

6. Customizing /etc/sysconfig/syslog

   Change KLOGD_OPTIONS="-x" to the following:

```
KLOGD_OPTIONS="-x –c 3"
```

The following item 7 is set when using Red Hat Enterprise Linux 5.7/5.9 (x86). Do not have to set this item when using Red Hat Enterprise Linux 5.7/5.9 (AMD/Intel 64).

7. Customizing /etc/sysconfig/clock

   Add the following with underlined at the last line:

```
ZONE="Asia/Tokyo"
UTC=false
ARC=false
CLOCKFLAGS="--directisa"
```

When using Red Hat Enterprise Linux 5.7/5.9 (x86), you must add the above. If you do not add the above, the system clock might gain or lose time of OS when booting or shutting down OS.

8. Customizing /etc/sysconfig/init

   Change BOOTUP=color to the following:

```
BOOTUP=serial
```

9. Customizing /etc/sysconfig/kudzu

Change SAFE=no to the following:

```
SAFE=yes
```

10. Customizing /etc/inittab

Add the following at the last line:

```
co:2345:respawn:/sbin/agetty 115200 ttyS1 vt100
```

11. Customizing /etc/securetty

Add the following at the last line:

```
ttyS1
```

12. Restarting the system

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

```
reboot
```

13. 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
```

14. Checking the NMI interrupt setting

After starting the system, enter 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
```

15.Copying the driver

(1) Perform the following command to check the architecture.

```
# uname -m
```

Performing the command above will display the following results depending on the architecture:

X86 (i686) : i686
AMD/Intel64 (x86_64): x86_64

Some steps described below depend on the architecture.

(2) Insert the Driver & Utility CD into the CD/DVD-ROM drive.

(3) Perform the following command to mount the Driver & Utility CD.
(X: appropriate number)

```
# mount /dev/scdx /media/
```

(4) Perform the following command to retrieve the driver from the Driver & Utility CD.

```
# mkdir -p /tmp/hitachi_drv
# zcat /media/modules.cgz >
/tmp/hitachi_drv/hitachi_modules.cgz.tmp
# cd /tmp/hitachi_drv
# cat hitachi_modules.cgz.tmp | cpio -iumd
```

(5) Perform one of the following commands depending on the architecture to check that the driver is stored in the local disk.

<RHEL 5.7>

X86 (i686):

```
# ls 2.6.18-274.el5PAE/i686/
be2iscsi.ko be2net.ko hfcldd.ko hfcldd_conf.ko
hraslog_link.ko igb.ko lpfc.ko megaraid_sas.ko tg3.ko
```

AMD/Intel64 (x86_64):

```
# ls 2.6.18-274.el5/x86_64/
be2iscsi.ko be2net.ko hfcldd.ko hfcldd_conf.ko
hraslog_link.ko igb.ko lpfc.ko megaraid_sas.ko tg3.ko
```

<RHEL 5.9>

X86 (i686):

```
# ls 2.6.18-348.el5PAE/i686/
be2iscsi.ko be2net.ko hfcldd.ko hfcldd_conf.ko
hraslog_link.ko igb.ko lpfc.ko tg3.ko
```

AMD/Intel64 (x86_64):

```
# ls 2.6.18-348.el5/x86_64/
be2iscsi.ko be2net.ko hfcldd.ko hfcldd_conf.ko
hraslog_link.ko igb.ko lpfc.ko tg3.ko
```

(6) Perform one of the following commands depending on the architecture to create a directory for updating the kernel.

<RHEL 5.7>

X86 (i686):

```
# mkdir –p /lib/modules/2.6.18-274.18.1.el5PAE/updates
```

AMD/Intel64 (x86_64):

```
# mkdir –p /lib/modules/2.6.18-274.18.1.el5/updates
```

<RHEL 5.9>

X86 (i686):

```
# mkdir -p /lib/modules/2.6.18-348.6.1.el5PAE/updates
```

AMD/Intel64 (x86_64):

```
# mkdir -p /lib/modules/2.6.18-348.6.1.el5/updates
```

(7) Perform one of the following commands depending on the architecture to copy the driver.

<RHEL 5.7>

X86 (i686):

```
# cp –a 2.6.18-274.el5PAE/i686/* /lib/modules/2.6.18-
274.18.1.el5PAE/updates/.
be2iscsi.ko be2net.ko hfcldd.ko hfcldd_conf.ko
hraslog_link.ko igb.ko lpfc.ko megaraid_sas.ko tg3.ko
```

AMD/Intel64 (x86_64):

```
# cp –a 2.6.18-274.el5/x86_64/* /lib/modules/2.6.18-
274.18.1.el5/updates/.
# ls /lib/modules/2.6.18-274.18.1.el5/updates/
be2iscsi.ko be2net.ko hfcldd.ko hfcldd_conf.ko
hraslog_link.ko igb.ko lpfc.ko megaraid_sas.ko tg3.ko
```

<RHEL 5.9>

X86 (i686):

```
# cp -a 2.6.18-348.el5PAE/i686/* /lib/modules/2.6.18-
348.6.1.el5PAE/updates/.
# ls /lib/modules/2.6.18-348.6.1.el5PAE/updates/
be2iscsi.ko be2net.ko hfcldd.ko hfcldd_conf.ko
hraslog_link.ko igb.ko lpfc.ko tg3.ko
```

AMD/Intel64 (x86_64):

```
# cp -a 2.6.18-348.el5/x86_64/* /lib/modules/2.6.18-
348.6.1.el5/updates/.
# ls /lib/modules/2.6.18-348.6.1.el5/updates/
be2iscsi.ko be2net.ko hfcldd.ko hfcldd_conf.ko
hraslog_link.ko igb.ko lpfc.ko tg3.ko
```

(8) Perform the following command to unmount the Driver & Utility CD.

```
# umount/media/
```

(9) Perform the following command to delete the working directory.

```
# cd /tmp
             # rm –rf /tmp/hitachi_drv
```

16. Adding settings before updating kernel

When Emulex 10 Gb LAN mezzanine card is installed in the server blade using the NIC in dedicated mode, perform the following procedure.

[Target device manager]

- be2net driver
  Perform the following command to confirm if be2net is used or not.

```
# lsmode:grep be2net
             be2net xxxxxxx 0
```

When be2net driver is displayed in the above, add the target driver as follow:

```
# echo “override be2net 2.6.32-* weak-updates/be2net” >
/etc/depmod.d/be2net.conf
             # chmod 644 /etc/depmod.d/be2net.conf
```

17. Updating kernel

When using Red Hat Enterprise Linux 5.7, download the kernel security update from the Red Hat web page referring to the following table, and then apply the kernel security update.

Table 3-5 Updating kernel

Supported OS	Supported kernel	
	32bit: X86	64bit: AMD / Intel64
Red Hat Enterprise Linux 5.7	kernel-PAE-2.6.18-274.18.1.el5.i686.rpm	kernel-2.6.18-274.18.1.el5.x86_64.rpm
Red Hat Enterprise Linux 5.9	kernel-PAE-2.6.18-348.18.1.el5.i686.rpm	kernel-2.6.18-348.18.1.el5.x86_64.rpm

Red Hat, Inc

https://rhn.redhat.com/

18. Adding/Updating Hitachi drivers

With the configuration using HITACHI Gigabit Fibre Channel adapter, install hfcldd driver (RPM package) following the steps from (1) through (3).

(1) Copy the latest hfcldd driver (RPM package), contained in HITACHI Gigabit

Fibre Channel Adapter Drivers CD (*1) attached to the system unit, under/tmp.

(*1) Make sure to use Ver.03-00 or later for 8 Gbps HITACHI Gigabit Fibre Channel Adapter

(2) Install RPM package referring to *HITACHI Gigabit Fibre Channel Adapter User's Guide (Linux/VMware Driver Edition)*. The following is an example.

```
# rpm -ivh --force /tmp/[RPM package name for hfcldd driver]
# rpm -ivh --force /tmp/[RPM package name for hfcldd-tools]
```

(3) Check that the installation is completed referring to *HITACHI Gigabit Fibre Channel Adapter User's Guide (Linux/VMware Driver Edition)*.

19. Updating drivers

    You can confirm the driver version using the following command.

    `#modinfo` *`driver name`*

    Download and utilize the latest driver.

20. 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 *Remote Console User's Guide*.

4

Utilities

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

Installing Utilities

This section describes the installing procedure of utilities for Red Hat Enterprise Linux 6 with the Driver & Utility CD.

For Red Hat Enterprise Linux 5.9/5.7, see manuals of those utilities. For the directory of each manual, see Supplied Software.

Install packages (library) required for each utility before installing the utility by referring to the manual described in Supplied Software.

You should change to the terminal size to 80 x 24 or higher, and log on as the root account to perform the following installation.

This script supports operating conditions of the utility installation script with Driver & Utility CD 0640-xx or later only on the first installation. On the second or later installation and uninstallation, see manuals for each utility.

1 Mount the Driver & Utility CD.

```
# mkdir -p /mnt/SNV
# mount /dev/cdrom /mnt/SNV
```

2 Start the utility install script. Perform the following command.

– Driver & Utility CD 0620-xx

```
# cd /mnt/SNV/hitachi_utilities
# ./hitachi_utilities_install.sh
```

– Driver & Utility CD 0640-xx or later

```
# cd /mnt/SNV/RHEL6_x/Utility/hitachi_utilities
# ./hitachi_utilities_install.sh
```

"x" in RHEL6_x stands for a version of RHEL.

3 Select the installed utilities.
The following installation window will be displayed, and then enter numbers of unnecessary utilities. Asterisks of unnecessary utilities will be changed to unmark.
Confirm the marked asterisks of necessary utilities to install.

```
======================== Select Utilities To Install ========================
<No> <Name>                                                  <Version>
0 [*] System Info Collect Tool(systoru)                       |01-02
1 [*] JP1/ServerConductor/Agent                               |09-53
2 [*] JP1/ServerConductor/Advanced Agent                      |09-51-/A
3 [*] Log Monitor(Hitachi Hardware Maintenance Agent)         |V09-03
4 [*] OneCommand Manager                                      |6.0.15.1-1
5 [*] Alive Monitor                                           |07-40
6 [*] Hitachi Fibre Channel Adapter Linux Utility             |x.6.17.2096
7 [*] LSI S/W RAID setting - 01 (Set the RAID setting)        |-
8 [*] LSI S/W RAID setting - 02 (Set the blacklist file)      |-
9 [ ] MegaRAID Storage Manager                                |11.08.03-02/8.31-01
10 [ ] HDD error monitoring service(PrdFail)                  |5.0.0.3
11 [ ] internal storage monitor                               |2.3.0.8
==============================================================================
[*] Utilities will be installed.
Input a number to select utility or 'run' to start installation
[0-11,run,exit]:
```

- Internal storage monitor and MegaRAID Storage Manager are utilities for monitoring internal disk arrays of server blades and storage expansion blades. When you use internal disk arrays, make sure to install one of the two utilities, not both of them. Internal storage monitor is recommended.
- Make sure to uninstall one utility before installing the other for use.
- MegaRAID Storage Manager is not supported on LPAR manager environment. Uncheck MegaRAID Storage Manager before installing the utility. With MegaRAID Storage Manager checked, FAIL message appears after executing installation.

4 Execute installation.
Enter **run**, and then press **Enter**. Start the installation.

```
* Select install number or run [0-7,run,exit]:run
```

5 The following window will be displayed, and then confirm that necessary utilities status are **SUCCESS**.

If FAIL message is displayed, see FAIL Messages.

The following window is just an example.

```
************************ install result ****************************
 No.0 System Info Collect Tool(systoru): SUCCESS
 No.1 JP1/ServerConductor/Agent: FAIL
       - This utility is already installed.
 No.2 JP1/ServerConductor/Advanced Agent: FAIL
       - This utility is already installed.
 No.3 MegaRAID Storage Manager: FAIL
       - This utility is already installed.
 No.4 Hitachi Hardware Maintenance Agent: SUCCESS
 No.5 OneCommand Manager: SUCCESS
 No.6 Hitachi Fibre Channel Adapter Linux Utility: SUCCESS
 No.7 Hitachi RAID Adapter Linux Utility: FAIL
       - The error occurred during utility installation.
********************************************************************
```

- The result of installation with Driver & Utility CD 0620-xx is saved in the following file.
  /tmp/hitachi_utilities/[yyyymmddhhmmss]_install.log
- The result of installation with Driver & Utility CD 0640-xx or later is saved in the following file.
  /root/hitachi_utilities_[yyyymmddhhmmss].log
- For Driver & Utility CD 0640-xx or later, Reboot message shown in the following step 6 will not be displayed if the result of even a single selected utility shows FAIL. If FAIL is displayed, refer to FAIL Messages.

6 To execute reboot.
You need to reboot after complete installation.
The following window will be displayed, and then enter **Yes** or **No**.
You must reboot later when enter **No**.

```
Reboot now? (Yes/No)
```

Utilities installation is completed.

FAIL messages

When a FAIL message is displayed after installing, see the following table. And then perform the manual of utility which FAIL message is displayed.

Table 4-1 FAIL messages

FAIL message	Description
The error occurred during utility installation.	Shows the installation error occurred after utility installing. See the manual of the utility, which is displayed this FAIL message, for performing uninstallation and reinstallation.
The premise package is not installed.	Shows the premise package (library), which utility needs, is lacked. See the manual of the utility, which is displayed this FAIL message, for performing reinstallation after the premise package (library) installing.
This utility is already installed.	Shows the utility, which is displayed this FAIL message, is already installed.
This architecture is not supported.	Shows the unsupported architecture is performed the utility install script. The utility install script only can be performed on the 32-bit x86 and 64-bit x86_64 environment.
yyyy/mm/dd hh:mm:ss [main] START	Shows the target OS version is not supported by the installation script. Please confirm that you are using proper Driver CD for utility installation. If you are using proper CD, please install utilities manually.
The reason is unknown.	Shows other error occurred. See the manual of the utility, which is displayed this FAIL message, for performing uninstallation and reinstallation.
Note: For the manual of each utility, see Supplied software.	

Supplied Software

MegaRAID Storage Manager

MegaRAID Storage Manager is a utility to monitor the internal disk array of server blade/storage expansion blade. When using the internal disk array of server blade/storage expansion blade, you must install this utility.

For setup details, see *MegaRAID Storage Manager Version xx.xx.xx-xx Instruction Manual* in the flash memory embedded in the server chassis.

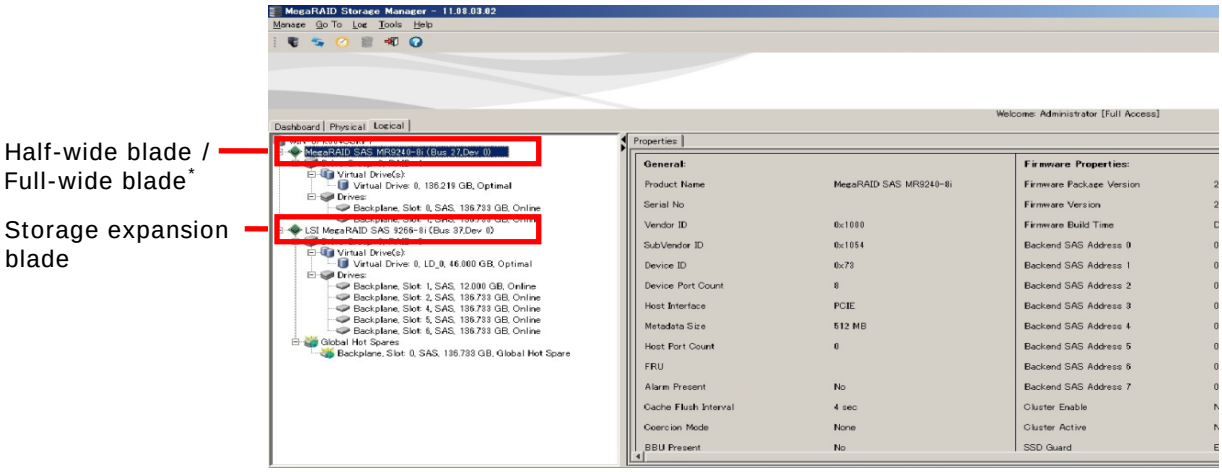
If this utility is not installed, double fault may occur because the hard disk failure cannot be detected, and also the failure cannot be analyzed correctly.

RAID controller type varies with the form factor. The RAID controller names for MegaRAID Storage Manager (MSM) are displayed as the following table. For details of the RAID management utility specifications, see *MegaRAID Storage Manager Version xxx Instruction Manual*.

Form factor	RAID controller type	Number of HDD	RAID controller name in RAID management utility
Half-wide blade	LSI SAS 2004	Maximum: 2	N/A*
	LSI SAS 2008	Maximum: 2	MegaRAID SAS MR9240-8i
	LSI Software RAID	Maximum: 2	LSI Embedded MegaRAID
Full-wide blade	LSI SAS 2004	Maximum: 2	N/A*
	LSI SAS 2008	Maximum: 2	MegaRAID SAS MR9240-8i
Storage expansion blade	LSI SAS 2208	Maximum: 6	LSI MegaRAID SAS 9266-8i
*LSI SAS 2004 doesn't support RAID management utility.			

The following figure shows the location of RAID controller names. To show Storage expansion blade properties, select Storage expansion blade.

The order of RAID controllers depends on the type of blade. Identify a specific one by the controller name.



Installing internal storage monitor

Internal storage monitor is a utility to monitor the internal disk array of server blade/storage expansion blade. When using the internal disk array of server blade/storage expansion blade, you must install this utility. If this utility is not installed, double fault may occur because the hard disk failure cannot be detected, and also the failure cannot be analyzed correctly. See *Server installation and monitoring tool User's Guide internal storage monitoring functions.*

When using this utility, make sure to uninstall MegaRAID Storage Manager (MSM) before installing internal storage monitor.

RAID controller type varies with the form factor. For the RAID controller names of internal storage monitor, see RAID controller name view in *Server installation and monitoring tool User's Guide internal storage monitoring functions*.

The order of RAID controllers depends on the type of blade. Identify a specific one by the controller name.

Execute the following command to check: `hrncli␣-ctrlinfo␣-aall`.

Half-wide blade / Full-wide blade*

Storage expansion blade

```
[root@localhost]# hrncli -ctrlinfo -aall
RAID Controller: 0
### General Information ###
Product Name : MegaRAID SAS MR9240-8i
PCI Bus/Dev/Func : 27/0/0
Serial No :
Vendor ID : 0x1000
Device ID : 0x73
SubVendor ID : 0x1054
SubDevice ID : 0x3035
...
RAID Controller: 1
### General Information ###
Product Name : LSI MegaRAID SAS 9266-8i
PCI Bus/Dev/Func : 37/0/0
Serial No : SR136P0392
Vendor ID : 0x1000
Device ID : 0x5B
SubVendor ID : 0x1000

SubDevice ID : 0x9266
```

OneCommand Manager

The OneCommand Manager is a utility to manage CNA onboard adapter, CNA mezzanine card, fibre channel mezzanine card. When using CNA onboard adapter, CNA mezzanine card (GG-CN3MXG2X1-Y), or fibre channel mezzanine card (GG-CC3M8G1X1-Y), make sure to install this utility.

For the detail of installation and restrictions, see *OneCommand Manager Manual* in the Driver & Utility CD.

5

LAN Connection

This section describes LAN connections.

- Connection between LAN Device and LAN Switch Module

Connection between LAN Device and LAN Switch Module

When confirming a LAN switch module where each port of LAN device is connected, check the installed LAN devices using the Web console and identify the LAN switch module by the PCI bus and the function's number referred on the OS.

The LAN devices are as follows:

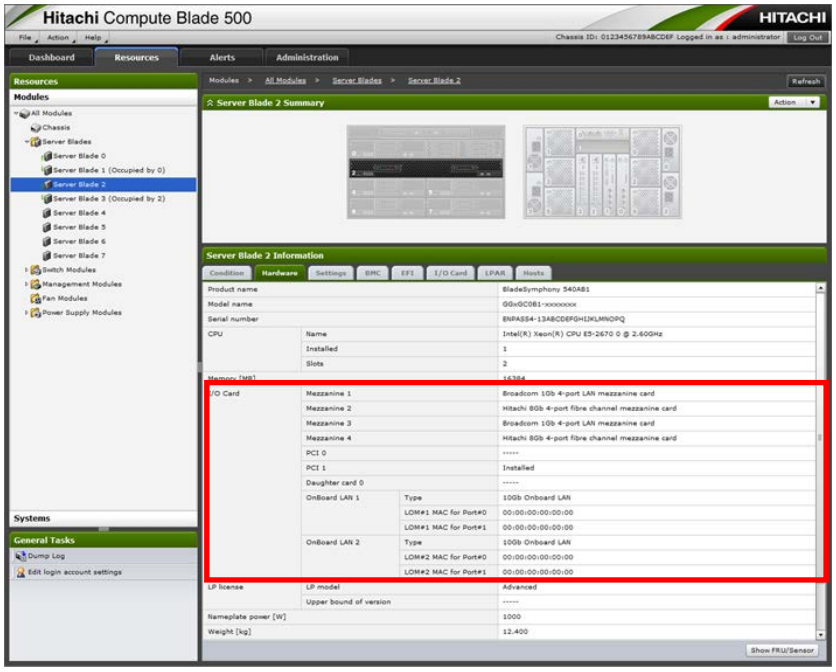
- Onboard LAN (CB 520H B1/CB 520H B2/CB 540A B1)
- Broadcom 1 Gb 4-port LAN mezzanine card
- Broadcom 1 Gb 4-port LAN and LSI SAS2008 RAID mezzanine card
- Broadcom 1 Gb 8-port LAN mezzanine card
- Broadcom 1 Gb 8-port LAN and LSI SAS2008 RAID mezzanine card
- Emulex 10 Gb 4-port converged network mezzanine card
- Emulex 10 Gb 4-port LAN mezzanine card

Confirming installed LAN devices

Follow the procedure below to confirm installed LAN devices using the Web console.

1 Select the ***target server blade*** from the menu tree on the **Resources** tab of Web console.

2 Click the **Hardware** tab. Confirm **I/O card** and **Onboard LAN** to check the installed LAN device.

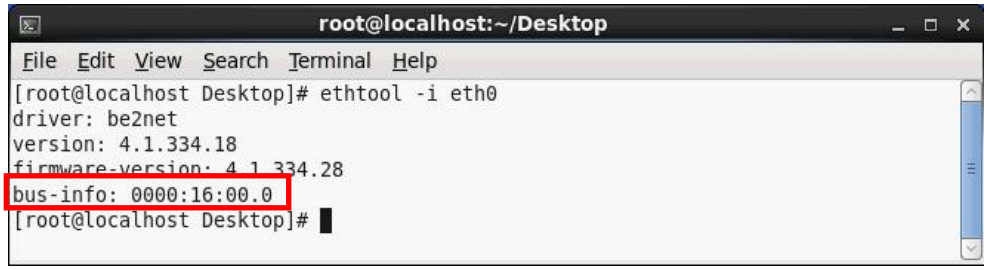


Confirming LAN switch module

Confirm the connection between each port of the LAN device and the LAN switch module. You can identify the LAN switch module by the LAN device and the PCI bus and the function's number referred on the OS.

The procedure to get the PCI bus and the function number is as follows:

Execute “ethtool –i <*LAN device number*>” on a system console, and then confirm “bus-info”.
(In the following example, PCI bus is “16”: function is “0” [the last “0”])



Referring the examples below, confirm the connected LAN switch module or LAN path through module.

The PCI path number varies with system unit's configuration. PCI bus numbers in the example are shown in alphabet.
(Small: A -> B -> C -> D -> E: large)

CB 520H model

- Onboard LAN
  Mezzanine card 2: Emulex 10 Gb 4-port

Item	Physical port No.*	PCI path	Function	Connection
Onboard LAN	0	A	0	Switch module slot #0
	1		1	Switch module slot #1
Emulex 10 Gb 4-port (Mezzanine card 2)	0	B	0	Switch module slot #2
	2	C	0	
	1	B	1	Switch module slot #3
	3	C	1	
* Physical port number that actually exists in the system unit				

- Mezzanine card 1: Broadcom 1 Gb 4-port
  Mezzanine card 2: Broadcom 1 Gb 8-port

Item	Physical port No.*	PCI path	Function	Connection
Broadcom 1 Gb 4-port (Mezzanine card 1)	0	A	0	Switch module slot #0
	2		2	
	1		1	Switch module slot #1
	3		3	
Broadcom 1 Gb 8-port (Mezzanine card 2)	0	B	0	Switch module slot #2
	2		2	
	4	C	0	
	6		2	
	1	B	1	Switch module slot #3
	3		3	
	5	C	1	
	7		3	
* Physical port number that actually exists in the system unit				

- Onboard LAN (Port partitioning)
  Mezzanine card 2: Broadcom 1 Gb 4-port

Item	Physical port No.*	PCI path	Function	Connection
Onboard LAN (Port partitioning)	0	A	0	Switch module slot #0
			2	
			4	
			6	
	1		1	Switch module slot #1
			3	
			5	
			7	
Broadcom 1 Gb 4-port (Mezzanine card 2)	0	B	0	Switch module slot #2
	2		2	
	1		1	Switch module slot #3
	3		3	
* Physical port number that actually exists in the system unit				

CB 520A model

- Mezzanine card 1: Emulex 10 Gb 4-port
  Mezzanine card 2: Emulex 10 Gb 4-port

Item	Physical port No.*	PCI path	Function	Connection
Emulex 10 Gb 4-port (Mezzanine card 1)	2	D	0	Switch module slot #0
	0	B	0	
	3	D	1	Switch module slot #1
	1	B	1	
Emulex 10 Gb 4-port (Mezzanine card 2)	0	A	0	Switch module slot #2
	2	C	0	
	1	A	1	Switch module slot #3
	3	C	1	
* Physical port number that actually exists in the system unit				

- Mezzanine card 1: Broadcom 1 Gb 4-port
  Mezzanine card 2: Broadcom 1 Gb 8-port

Item	Physical port No.*	PCI path	Function	Connection
Broadcom 1 Gb 4-port (Mezzanine card 1)	0	C	0	Switch module slot #0
	2		2	
	1		1	Switch module slot #1
	3		3	
Broadcom 1 Gb 8-port (Mezzanine card 2)	4	B	0	Switch module slot #2
	6		2	
	0	A	0	
	2		2	
	5	B	1	Switch module slot #3
	7		3	
	1	A	1	
	3		3	
* Physical port number that actually exists in the system unit				

- Mezzanine card 1: Broadcom 1 Gb 8-port
  Mezzanine card 2: Broadcom 1 Gb 4-port

Item	Physical port No.*	PCI path	Function	Connection
Broadcom 1 Gb 8-port (Mezzanine card 1)	0	B	0	Switch module slot #0
	2		2	
	4	C	0	
	6		2	
	1	B	1	Switch module slot #1
	3		3	
	5	C	1	
	7		3	
Broadcom 1 Gb 4-port (Mezzanine card 2)	0	A	0	Switch module slot #2
	2		2	
	1		1	Switch module slot #3
	3		3	
* Physical port number that actually exists in the system unit				

CB 540A model

- Onboard LAN 1
  Mezzanine card 2: Broadcom 1 Gb 4-port
- Onboard LAN 2
  Mezzanine card 4: Broadcom 1 Gb 4-port

Item	Physical port No.*	PCI path	Function	Connection
Onboard LAN 1	0	A	0	Switch module slot #0
	1		1	Switch module slot #1
Broadcom 1 Gb 4-port (Mezzanine card 2)	2	B	0	Switch module slot #2
	4		2	
	3		1	Switch module slot #3
	5		3	
Onboard LAN 2	6	C	0	Switch module slot #0
	7		1	Switch module slot #1
Broadcom 1 Gb 4-port (Mezzanine card 4)	8	D	0	Switch module slot #2
	10		2	
	9		1	Switch module slot #3
	11		3	
* Physical port number that actually exists in the system unit				

- Mezzanine card 1: Emulex 10 Gb 4-port
  Mezzanine card 3: Emulex 10 Gb 4-port

Item	Physical port No.*	PCI path	Function	Connection
Emulex 10 Gb 4-port (Mezzanine card 1)	0	A	0	Switch module slot #0
	2	B	0	
	1	A	1	Switch module slot #1
	3	B	1	
Emulex 10 Gb 4-port (Mezzanine card 3)	4	C	0	Switch module slot #2
	6	D	0	
	5	C	1	Switch module slot #3
	7	D	1	
* Physical port number that actually exists in the system unit				

- Mezzanine card 1: Broadcom 1 Gb 8-port
  Mezzanine card 3: Broadcom 1 Gb 8-port

Item	Physical port No.*	PCI path	Function	Connection
Broadcom 1 Gb 8-port (Mezzanine card 1)	0	A	0	Switch module slot #0
	2		2	
	4	B	0	
	6		2	
	1	A	1	Switch module slot #1
	3		3	
	5	B	1	
	7		3	
Broadcom 1 Gb 8-port (Mezzanine card 3)	8	C	0	Switch module slot #0
	10		2	
	12	D	0	
	14		2	
	9	C	1	Switch module slot #1
	11		3	
	13	D	1	
	15		3	
* Physical port number that actually exists in the system unit				

- Onboard LAN (Port partitioning)
  Onboard LAN (Port partitioning)

Item	Physical port No.*	PCI path	Function	Connection
Onboard LAN 1 (Port partitioning)	0	A	0	Switch module slot #0
			2	
			4	
			6	
	1		1	Switch module slot #1
			3	
			5	
			7	
Onboard LAN 2 (Port partitioning)	2	B	0	Switch module slot #0
			2	
			4	
			6	
	3		1	Switch module slot #1
			3	
			5	
			7	
* Physical port number that actually exists in the system unit				

CB 520X model

- Mezzanine Card 1: Broadcom 1Gb 4-port
  Mezzanine Card 2: Broadcom 1Gb 4-port

Item	Physical port No.*	PCI path	Function	Connection
Broadcom 1 Gb 4-port (Mezzanine card 1)	0	A	0	Switch module slot #0
	2		2	
	1		1	Switch module slot #1
	3		3	
Broadcom 1 Gb 4-port (Mezzanine card 2)	4	B	0	Switch module slot #2
	6		2	
	5		1	Switch module slot #3
	7		3	
* Physical port number that actually exists in the system unit				

- Mezzanine Card 1: Emulex 10Gb 4-port
  Mezzanine Card 2: Emulex 10Gb 4-port

Item	Physical port No.*	PCI path	Function	Connection
Broadcom 10 Gb 4-port (Mezzanine card 1)	0	A	0	Switch module slot #0
	2		2	
	1		1	Switch module slot #1
	3		3	
Broadcom 10 Gb 4-port (Mezzanine card 2)	4	B	0	Switch module slot #2
	6		2	
	5		1	Switch module slot #3
	7		3	
* Physical port number that actually exists in the system unit				

- Mezzanine Card 1: Emulex 10Gb 4-port
  Mezzanine Card 2: Emulex 10Gb 4-port (Port partitioning)

Item	Physical port No.*	PCI path	Function	Connection
Emulex 10Gb 4-port (Mezzanine card 1)	0	A	0	Switch module slot #0
	2		2	
	1		1	Switch module slot #1
	3		3	
Emulex 10Gb 4-port (Port partitioning) (Mezzanine card 2)	4	B	0	Switch module slot #2
	6		2	
	8		4	
	10		6	
	5		1	Switch module slot #3
	7		3	
	9		5	
	11		7	
* Physical port number that actually exists in the system unit				

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