Hitachi Dynamic Link Manager (for Linux®) v8.5.0-00 Release Notes

Contents

About this document

This document (RN-00HS284-54, October 2016) provides late-breaking information about the Hitachi Dynamic Link Manager (for Linux) v8.5.0-00. It includes information that was not available at the time the technical documentation for this product was published, as well as a list of known problems and solutions.

Intended audience

This document is intended for customers and Hitachi Data Systems partners who license and use the Hitachi Dynamic Link Manager (for Linux).

Getting help

Hitachi Data Systems Support Connect is the destination for technical support of products and solutions sold by Hitachi Data Systems. To contact technical support, log on to Hitachi Data Systems Support Connect for contact information: https://support.hds.com/en_us/contact-us.html.

Hitachi Data Systems Community is a global online community for HDS customers, partners, independent software vendors, employees, and prospects. It is the destination to get answers, discover insights, and make connections**.** **Join the conversation today!** Go to community.hds.com, register, and complete your profile.

About this release

This release is a major release that adds new features and fixes bug.

Product package contents

Medium	CD-ROM	Revision	Release Type
Software	Hitachi Dynamic Link Manager (for Linux)	8.5.0-00	Full Package
Documents	Release Notes (this document)		
	MK-92DLM113-37 Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide		
	Statement of Delivery and Usage Consent Form		

New features and important enhancements

[8.5.0-00 Additional Functions and Modifications]

(1) The following distributions are supported:

- The following kernel versions of SUSE LINUX Enterprise Server 12 for EM64T/AMD64:

  3.12.59-60.45-default

  3.12.59-60.45-xen

- The following kernel versions of Oracle Unbreakable Enterprise Kernel 6.8 for EM64T/AMD64:

  4.1.12-37.4.1.el6uek.x86_64

(2) Hitachi Virtual Storage Platform G1500 and Hitachi Virtual Storage Platform F1500 are now supported.

System requirements

Refer to Chapter 3. Creating an HDLM environment of the Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide.

Host

For details on supported hosts, refer to the following manual:

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Hosts and OSs supported by HDLM

Supported OSs in a HAM environment are listed below:

Supported OS
Red Hat Enterprise Linux 5(x86/x64/IPF)
Red Hat Enterprise Linux 6(x86/x64)
SUSE LINUX Enterprise Server 10(x86/x64/IPF)

Host bus adapter (HBA)

For information on supported HBAs and drivers, refer to Appendix A - Host Bus Adapter (HBA) Support Matrix.

Storage

For details on supported storage subsystems, refer to the following manual:

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Storage subsystems supported by HDLM

Requirements to use a HAM environment are as follows:

- HDLM supports the HAM functionality of the following storage system:
    - Hitachi Universal Storage Platform V/VM
    - Hitachi Virtual Storage Platform
    - HP XP24000/XP20000
    - HP P9500
    - Hitachi Unified Storage VM

    The required microprogram versions are listed below:

RN-00HS284-54, October 2016

Storage system	Interface	Microprogram version	Remark
Universal Storage Platform V/VM	FC I/F	60-06-05-XX/XX or later	X: voluntary number
Virtual Storage Platform	FC I/F	70-01-42-XX/XX or later (*1)	X: voluntary number
XP24000/XP20000	FC I/F	60-06-05-XX/XX or later	X: voluntary number
P9500	FC I/F	70-01-42-XX/XX or later (*1)	X: voluntary number
Hitachi Unified Storage VM	FC I/F	73-03-0X-XX/XX or later	X: voluntary number

*1: If you use the HAM functionality with USP V or XP24000, apply 70-03-00-XX/XX or later.

Virtualization

The virtualization to which HDLM can be applied is shown below:

Hitachi Virtualization Manager (Hitachi Compute Blade with Itanium 2 server modules)

Xen (Virtualization) in SUSE LINUX Enterprise Server 10 SP4, SUSE LINUX Enterprise Server 11, SUSE LINUX Enterprise Server 11 SP1, SP3 and SUSE LINUX Enterprise Server 12

KVM (Virtualization) in Red Hat Enterprise Linux 5.4 Advanced Platform, Red Hat Enterprise Linux 5.4, Red Hat Enterprise Linux 5.5 Advanced Platform, Red Hat Enterprise Linux 5.5, Red Hat Enterprise Linux 5.6 Advanced Platform, Red Hat Enterprise Linux 5.6, Red Hat Enterprise Linux 5.7 Advanced Platform, Red Hat Enterprise Linux 5.7, Red Hat Enterprise Linux 5.8 Advanced Platform, Red Hat Enterprise Linux 5.8, Red Hat Enterprise Linux 5.9 Advanced Platform, Red Hat Enterprise Linux 5.9, Red Hat Enterprise Linux 5.10 Advanced Platform, Red Hat Enterprise Linux 5.10, Red Hat Enterprise Linux 5.11 Advanced Platform, Red Hat Enterprise Linux 5.11, Red Hat Enterprise Linux 6, Red Hat Enterprise Linux 6.1, Red Hat Enterprise Linux 6.2, Red Hat Enterprise Linux 6.3, Red Hat Enterprise Linux 6.4, Red Hat Enterprise Linux 6.5, Red Hat Enterprise Linux 6.6, Red Hat Enterprise Linux 6.7, Red Hat Enterprise Linux 6.8, Red Hat Enterprise Linux 7, Red Hat Enterprise Linux 7.1, Oracle Linux 6.5, Oracle Linux 6.6, Oracle Linux 6.7, Oracle Linux 7, Oracle Linux 7.1, Oracle Unbreakable Enterprise Kernel 5.6, Oracle Unbreakable Enterprise Kernel 5.7, Oracle Unbreakable Enterprise Kernel 5.8, Oracle Unbreakable Enterprise Kernel 6.2, Oracle Unbreakable Enterprise Kernel 6.3, Oracle Unbreakable Enterprise Kernel 6.4, Oracle Unbreakable Enterprise Kernel 6.5, Oracle Unbreakable Enterprise Kernel 6.6, Oracle Unbreakable Enterprise Kernel 6.7, Oracle Unbreakable Enterprise Kernel 6.8, Oracle Unbreakable Enterprise Kernel 7, Oracle Unbreakable Enterprise Kernel 7.1, and Oracle Unbreakable Enterprise Kernel 7.2

Operating systems requirements

For details on supported operating systems, refer to the following manual:

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Hosts and OSs supported by HDLM

Prerequisite programs

None.

Related programs

For details on related programs, refer to the following manual:

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Red Hat Enterprise Linux 5

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Red Hat Enterprise Linux 6

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Red Hat Enterprise Linux 7

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using SUSE LINUX Enterprise Server 10

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using SUSE LINUX Enterprise Server 11

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using SUSE LINUX Enterprise Server 12

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Enterprise Linux 5

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Unbreakable Enterprise Kernel 5

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Linux 6

RN-00HS284-54, October 2016

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Unbreakable Enterprise Kernel 6

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Linux 7

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Unbreakable Enterprise Kernel 7

Memory and disk space requirements

For details on memory and disk space requirements, refer to the following manual:

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Memory and disk capacity requirements

HDLM supported configurations

For details on the condition that HDLM can manage space requirements, refer to the following manual:

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Number of LUs and paths that are supported in HDLM

Resolved problems

[8.5.0-00 Modifications]

(1) The following problem was corrected:

In an IP-SAN environment in HDLM for Linux, if an HDLM device from which all paths are disconnected exists and its host is restarted, an error occurs if you try to use the HDLM device. This error occurs even if the paths are brought back online by using the dlnkmgr online command or via an automatic failback, and the operating status of the HDLM device appears to be (Online).

[Conditions]

This problem occurs when all of the following conditions are met:
(a) HDLM 8.1.2-00 to 8.4.0-03 is being used.

(b) HDLM uses an IP-SAN environment. (iscsi_boot=y is set in the /etc/opt/DynamicLinkManager/hdlm.conf file).

(c) An HDLM device from which all paths are disconnected exists on the host.

(d) The host in (c) is restarted.

(e) The paths are brought back online by using the dlnkmgr online command or via an automatic failback, and the operating status of the HDLM device appears to be (Online).

(f) An attempt to use the HDLM device in (e) is made.

[Case ID]

None

Known problems

If an environment is created in which HDLM is installed on the boot disk, the server is started, and a module name contains a hyphen (-), even if the module is successfully loaded, a message indicating that the module failed to load (KAPL12324-E) might be output to the console and the `/etc/opt/DynamicLinkManager/hdlmboot.log` file.

After the server has started, execute the lsmod command. If the hyphens in module names are changed and displayed as underscores (_), then there are no problems, and the action for the KAPL12324-E message in the Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide does not need to be taken.

Message output example (example of an error occurring for dm-region-hash)

```
# vi /etc/opt/DynamicLinkManager/hdlmboot.log
  :
KAPL12323-I The insertion of the module was started. Module name = dm-log
KAPL12323-I The insertion of the module was started. Module name = dm-region-hash
KAPL12324-E The module could not be inserted. Module name = dm-region-hash
KAPL12323-I The insertion of the module was started. Module name = dm-mirror
  :
 #
```

Example of using lsmod to confirm that there are no problems (example of confirming the information displayed for dm_region_hash)

```
# lsmod
  :
dm_mirror            14003  0
dm_region_hash       12200  1 dm_mirror
dm_log               10088  2 dm_mirror,dm_region_hash
  :
```

#

Operation when all paths are disconnected during intermittent error monitoring:

When I/O operations are performed continuously for an LU whose paths are all Offline(E), Online(E), or Offline(C) (because, for example, all paths have been disconnected), the number of times that an error occurs (the IEP value when dlnkmgr view -path -iem is executed) during intermittent error monitoring might increase even though the auto failback function did not recover all paths. In such a case, even though an intermittent error did not occur, HDLM often assumes an intermittent error, and excludes paths from the auto failback function. In such a case, after recovery from the failure, to change the status of a path excluded from auto failback to online, manually change the status to online.

Although the following messages are output when executing the "rpm -V HDLM" command, HDLM operations are not affected.

In Red Hat Enterprise Linux 5 Advanced Platform (IA32/IPF),
Red Hat Enterprise Linux 5 (IA32/IPF),
Red Hat Enterprise Linux 5.1 Advanced Platform (IA32/IPF),
Red Hat Enterprise Linux 5.1 (IA32/IPF),
Red Hat Enterprise Linux 5.2 Advanced Platform (IA32/IPF),
Red Hat Enterprise Linux 5.2 (IA32/IPF),
Red Hat Enterprise Linux 5.3 Advanced Platform (IA32/IPF),
Red Hat Enterprise Linux 5.3 (IA32/IPF),
Red Hat Enterprise Linux 5.4 Advanced Platform (IA32/IPF),
Red Hat Enterprise Linux 5.4 (IA32/IPF),
Red Hat Enterprise Linux 5.5 Advanced Platform (IA32/IPF),
Red Hat Enterprise Linux 5.5 (IA32/IPF),
Red Hat Enterprise Linux 5.6 Advanced Platform (IA32/IPF),
Red Hat Enterprise Linux 5.6 (IA32/IPF),
Red Hat Enterprise Linux 5.7 Advanced Platform (IA32/IPF),
Red Hat Enterprise Linux 5.7 (IA32/IPF),
Red Hat Enterprise Linux 5.8 Advanced Platform (IA32/IPF),
Red Hat Enterprise Linux 5.8 (IA32/IPF),
Red Hat Enterprise Linux 5.9 Advanced Platform (IA32/IPF),
Red Hat Enterprise Linux 5.9 (IA32/IPF),
Red Hat Enterprise Linux 5.10 Advanced Platform (IA32/IPF),
Red Hat Enterprise Linux 5.10 (IA32/IPF),
Red Hat Enterprise Linux 5.11 Advanced Platform (IA32/IPF),
Red Hat Enterprise Linux 5.11 (IA32/IPF),
Red Hat Enterprise Linux 6 (IA32),
Red Hat Enterprise Linux 6.1 (IA32),
Red Hat Enterprise Linux 6.2 (IA32),
Red Hat Enterprise Linux 6.3 (IA32),
Red Hat Enterprise Linux 6.4 (IA32),
Red Hat Enterprise Linux 6.5 (IA32),
Red Hat Enterprise Linux 6.6 (IA32),
Red Hat Enterprise Linux 6.7 (IA32),
Red Hat Enterprise Linux 6.8 (IA32),
Oracle Enterprise Linux 5 Update 1 (IA32),

Oracle Enterprise Linux 5.4 (IA32),
Oracle Enterprise Linux 5.5 (IA32),
Oracle Enterprise Linux 5.6 (IA32),
Oracle Linux 6.5 (IA32),
Oracle Linux 6.6 (IA32),
Oracle Linux 6.7 (IA32),
Oracle Unbreakable Enterprise Kernel 5.7 (IA32),
Oracle Unbreakable Enterprise Kernel 5.8 (IA32),
Oracle Unbreakable Enterprise Kernel 6.2 (IA32),
Oracle Unbreakable Enterprise Kernel 6.3 (IA32),
Oracle Unbreakable Enterprise Kernel 6.4 (IA32), and
Oracle Unbreakable Enterprise Kernel 6.5 (IA32)

missing /etc/opt/DynamicLinkManager/dlmmgr_e.xml

- Red Hat Enterprise Linux 5 Advanced Platform (EM64T/AMD64),
Red Hat Enterprise Linux 5 (EM64T/AMD64),
Red Hat Enterprise Linux 5.1 Advanced Platform (EM64T/AMD64),
Red Hat Enterprise Linux 5.1 (EM64T/AMD64),
Red Hat Enterprise Linux 5.2 Advanced Platform (EM64T/AMD64),
Red Hat Enterprise Linux 5.2 (EM64T/AMD64),
Red Hat Enterprise Linux 5.3 Advanced Platform (EM64T/AMD64),
Red Hat Enterprise Linux 5.3 (EM64T/AMD64),
Red Hat Enterprise Linux 5.4 Advanced Platform (EM64T/AMD64),
Red Hat Enterprise Linux 5.4 (EM64T/AMD64),
Red Hat Enterprise Linux 5.5 Advanced Platform (EM64T/AMD64),
Red Hat Enterprise Linux 5.5 (EM64T/AMD64),
Red Hat Enterprise Linux 5.6 Advanced Platform (EM64T/AMD64),
Red Hat Enterprise Linux 5.6 (EM64T/AMD64),
Red Hat Enterprise Linux 5.7 Advanced Platform (EM64T/AMD64),
Red Hat Enterprise Linux 5.7 (EM64T/AMD64),
Red Hat Enterprise Linux 5.8 Advanced Platform (EM64T/AMD64),
Red Hat Enterprise Linux 5.8 (EM64T/AMD64),
Red Hat Enterprise Linux 5.9 Advanced Platform (EM64T/AMD64),
Red Hat Enterprise Linux 5.9 (EM64T/AMD64),
Red Hat Enterprise Linux 5.10 Advanced Platform (EM64T/AMD64),
Red Hat Enterprise Linux 5.10 (EM64T/AMD64),
Red Hat Enterprise Linux 5.11 Advanced Platform (EM64T/AMD64),
Red Hat Enterprise Linux 5.11 (EM64T/AMD64),
Red Hat Enterprise Linux 6 (EM64T/AMD64),
Red Hat Enterprise Linux 6.1 (EM64T/AMD64),
Red Hat Enterprise Linux 6.2 (EM64T/AMD64),
Red Hat Enterprise Linux 6.3 (EM64T/AMD64),
Red Hat Enterprise Linux 6.4 (EM64T/AMD64),
Red Hat Enterprise Linux 6.5 (EM64T/AMD64),
Red Hat Enterprise Linux 6.6 (EM64T/AMD64),
Red Hat Enterprise Linux 6.7 (EM64T/AMD64),

Red Hat Enterprise Linux 6.8 (EM64T/AMD64),
Red Hat Enterprise Linux 7 (EM64T/AMD64),
Red Hat Enterprise Linux 7.1 (EM64T/AMD64),
Red Hat Enterprise Linux 7.2 (EM64T/AMD64),
Oracle Enterprise Linux 5 Update 1 (EM64T/AMD64),
Oracle Enterprise Linux 5.4 (EM64T/AMD64),
Oracle Enterprise Linux 5.5 (EM64T/AMD64),
Oracle Enterprise Linux 5.6 (EM64T/AMD64),
Oracle Linux 6.5 (EM64T/AMD64),
Oracle Linux 6.6 (EM64T/AMD64),
Oracle Linux 6.7 (EM64T/AMD64),
Oracle Linux 7 (EM64T/AMD64),
Oracle Linux 7.1 (EM64T/AMD64),
Oracle Unbreakable Enterprise Kernel 5.6 (EM64T/AMD64),
Oracle Unbreakable Enterprise Kernel 5.7 (EM64T/AMD64),
Oracle Unbreakable Enterprise Kernel 5.8 (EM64T/AMD64),
Oracle Unbreakable Enterprise Kernel 6.2 (EM64T/AMD64),
Oracle Unbreakable Enterprise Kernel 6.3 (EM64T/AMD64),
Oracle Unbreakable Enterprise Kernel 6.4 (EM64T/AMD64),
Oracle Unbreakable Enterprise Kernel 6.5 (EM64T/AMD64),
Oracle Unbreakable Enterprise Kernel 6.6 (EM64T/AMD64),
Oracle Unbreakable Enterprise Kernel 6.7 (EM64T/AMD64),
Oracle Unbreakable Enterprise Kernel 6.8 (EM64T/AMD64),
Oracle Unbreakable Enterprise Kernel 7 (EM64T/AMD64),
Oracle Unbreakable Enterprise Kernel 7.1 (EM64T/AMD64), and
Oracle Unbreakable Enterprise Kernel 7.2 (EM64T/AMD64)

```
missing /etc/opt/DynamicLinkManager/dlmmgr_e.xml
missing /opt/DynamicLinkManager/lib/libdlm.so_32
missing /opt/DynamicLinkManager/lib/libdlmgui_jni.so_32
missing /opt/DynamicLinkManager/lib/libhdlmhcc-x.x.x.so_32
  (*1)
missing /opt/DynamicLinkManager/lib/libhdlmhccmp-x.x.x.so_32
  (*1)
```

- SUSE LINUX Enterprise Server 10 (IA32/IPF), and
SUSE LINUX Enterprise Server 11 (IA32/IPF)

```
missing /etc/opt/DynamicLinkManager/dlmmgr_e.xml
```

- SUSE LINUX Enterprise Server 10 (EM64T/AMD64),
SUSE LINUX Enterprise Server 11 (EM64T/AMD64), and
SUSE LINUX Enterprise Server 12 (EM64T/AMD64)

```
missing /etc/opt/DynamicLinkManager/dlmmgr_e.xml
missing /opt/DynamicLinkManager/lib/libdlm.so_32
missing /opt/DynamicLinkManager/lib/libdlmgui_jni.so_32
```

```
missing /opt/DynamicLinkManager/lib/libhdlmhcc-x.x.x.so_32
(*1)
missing /opt/DynamicLinkManager/lib/libhdlmhccmp-x.x.x.so_32
(*1)
```

Notes:

*1: voluntary number.

While installation and uninstallation of HDLM are performed, do not interrupt the processing (for example, do not press the Ctrl+C keys).

If there are 1025 or more paths, including those other than Online, you cannot execute the dlmchname utility.

If the operation is performed with the following procedure, the status is returned to what it was before the refresh operation was executed. As a result, make sure to re-execute the refresh command after restarting the host and recovering from a path failure.

(a) The dlnkmgr command is used to perform a refresh.

(b) Path errors occur for some or all of the paths, and a path status becomes Offline(E).

(c) The host is restarted before a path failure is recovered.

The partition numbers that can be used for HDLM management targets are from 1 to 15. A partition number of 16 or higher can be assigned in UEFI, but a SCSI device with a partition number of 16 or higher cannot be used for an HDLM management target.

If you want to execute either of the following utilities in an environment where the language is Japanese or a language other than English, change the language to English (LANG=C), and then execute the utility:

- dlmsetopt utility
- dlmmkinitrd utility

Example for the execution:

(a) Check the current setting, and then back up LANG information.

```
# echo $LANG
zh_CN.gbk
```

```
#
# bk_LANG=$LANG
# echo $bk_LANG
zh_CN.gbk
#
```

(b) Change the setting of LANG to C (English).

```
# export LANG=C
#
```

(c) Execute the dlmsetopt utility.

```
# /opt/DynamicLinkManager/bin/dlmsetopt -r -1
KAPL12554-I The utility for setting HDLM driver option has started.
KAPL12555-I The utility for setting HDLM driver option completed normally.
KAPL12558-I Please restart the computer so that the option settings take
effect.
#
```

(d) According to the result of (a), return the setting of LANG to the original setting.

```
# export LANG=$bk_LANG
#
# echo $LANG
zh_CN.gbk
#
```

Closing known problems

None.

Installation precautions

For Hitachi Dynamic Link Manager 6.5.0 and later, the HDLM installation media has been changed to a DVD-ROM. Also, the directory structure of the HDLM installation media has changed.

Refer to `Contents_list.txt` on the HDLM installation media, and then replace the descriptions regarding the HDLM installation media directories in the Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide.

For details on HDLM installation, refer to the following manual:

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 2. HDLM functions - Performing failover and failback using path switching

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Hosts and OSs supported by HDLM

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Red Hat Enterprise Linux 5

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Red Hat Enterprise Linux 6

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Red Hat Enterprise Linux 7

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using SUSE LINUX Enterprise Server 10

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using SUSE LINUX Enterprise Server 11

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using SUSE LINUX Enterprise Server 12

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Enterprise Linux 5

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Unbreakable Enterprise Kernel 5

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Linux 6

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Unbreakable Enterprise Kernel 6

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Linux 7

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Unbreakable Enterprise Kernel 7

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - Knowledge required before you install HDLM

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - Notes on creating an HDLM environment

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - Installing HDLM for managing boot disks - Notes on installing HDLM in a boot disk environment

- Hitachi Command Suite Dynamic Link Manager (for Linux®) User Guide Chapter 3. Creating an HDLM environment - The process-specific-trace information file - Notes on using the Hitachi Network Objectplaza Trace Library

Updating installation of HDLM precautions

For details on updating HDLM, refer to the following manual:

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - Notes on creating an HDLM environment - Notes on installing HDLM

Uninstallation precautions

For details on HDLM uninstallation, refer to the following manual:

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - Canceling the settings for HDLM - Removing HDLM

System generation precautions

None.

Usage precautions

For details on usage precautions when using HDLM, refer to the following manual:

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 2. HDLM Functions - Distributing a load using load balancing - Load balancing algorithms

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 2. HDLM functions - Performing failover and failback using path switching - Path status transition

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 2. HDLM functions - Cluster support

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Red Hat Enterprise Linux 5

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Red Hat Enterprise Linux 6

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Red Hat Enterprise Linux 7

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using SUSE LINUX Enterprise Server 10

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using SUSE LINUX Enterprise Server 11

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using SUSE LINUX Enterprise Server 12

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Enterprise Linux 5

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Unbreakable Enterprise Kernel 5

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Linux 6

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Unbreakable Enterprise Kernel 6

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Linux 7

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - HDLM system requirements - Related products when using Oracle Unbreakable Enterprise Kernel 7

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - Settings for md Devices - Notes on Settings Up md Devices

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - Settings for LVM2

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - Settings for Oracle RAC

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - Settings for the RHCM - Notes on using RHCM

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - Canceling the Settings for HDLM - Canceling the settings for LVM2

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 3. Creating an HDLM environment - Canceling the Settings for HDLM - Removing HDLM

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 4. HDLM operation - Notes on using HDLM

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 4. HDLM operation - HDLM operations using commands - Notes on using commands

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 4. HDLM operation - HDLM operations using commands - updating the license

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 4. HDLM operation - Starting and stopping the HDLM manager

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 4. HDLM operation - Reconfiguring the HDLM operating environment - Changing the HDLM device configuration

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 5. Troubleshooting - What to do for a path error – Placing the path online

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 6. Command reference - Overview of the HDLM command dlnkmgr

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 7. Utility reference - Overview of the utilities

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 7. Utility reference - DLMgetras utility for collecting HDLM error information - Parameters

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 7. Utility reference - dlmcfgmgr utility for managing the HDLM configuration - Parameters

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 7. Utility reference - dlmsetopt utility for setting HDLM driver options

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Chapter 8.Messages - Before viewing the list of messages - Components that output messages to syslog

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Notes on Linux commands and files

- Hitachi Command Suite Dynamic Link Manager（for Linux®) User Guide Functional differences between versions of HDLM

Additional Usage Precautions

Note that if descriptions include the term Red Hat Enterprise Linux or Red Hat Enterprise Linux 5, and there is no specific explanation about Red Hat Enterprise Linux 6, read them as Red Hat Enterprise Linux 6 when necessary.

When using an Emulex HBA driver, and if you execute the HDLM-configuration definition utility (dlmcfgmgr -v), a hyphen (-) might be displayed in the Device column of the execution results.

To change to a status that does not display a hyphen, execute the dlmcfgmgr utility with the -u parameter specified.

For details on the dlmcfgmgr utility, see dlmcfgmgr Utility for Managing the HDLM Configuration.

Settings of OS and other programs, which were changed at HDLM introduction, must be returned to the original settings after the uninstallation of HDLM.

Version numbers are displayed as follows after this version of HDLM is installed.

Function	Item	Version number
HDLM command (dlnkmgr)	HDLM Version	8.5.0-00
	HDLM Manager	8.5.0-00
	HDLM Alert Driver	8.5.0-00
	HDLM Driver	8.5.0-00

The following example shows the text displayed when dlnkmgr view -sys is executed.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view -sys
HDLM Version              : 8.5.0-00
Service Pack Version      :
Load Balance              : on(extended lio)
Support Cluster           :
Elog Level                : 3
Elog File Size (KB)       : 9900
Number Of Elog Files      : 2
Trace Level               : 0
Trace File Size (KB)      : 1000
Number Of Trace Files     : 4
Path Health Checking      : on(30)
Auto Failback             : on(1)
Reservation Status        :
Intermittent Error Monitor    : off
Dynamic I/O Path Control  : off(10)
HDLM Manager Ver      WakeupTime
Alive       8.5.0-00    2016/10/03 19:03:42
HDLM Alert Driver Ver      WakeupTime         ElogMem Size
Alive           8.5.0-00    2016/10/03 19:02:21    1000
HDLM Driver Ver      WakeupTime
Alive       8.5.0-00    2016/10/03 19:02:24
License Type Expiration
Temporary    2016/10/05(2days after)
KAPL01001-I The HDLM command completed normally. Operation
name = view, completion time = 2016/10/03 20:22:01
```

This version of HDLM does not support the virtualization (the Xen function) provided by Red Hat Enterprise Linux 5 Advanced Platform, Red Hat Enterprise Linux 5, Red Hat Enterprise Linux 5.1 Advanced Platform, Red Hat Enterprise Linux 5.1, Red Hat Enterprise Linux 5.2 Advanced Platform, Red Hat Enterprise Linux 5.2, Red Hat Enterprise Linux 5.3 Advanced Platform, Red Hat Enterprise Linux 5.3, Red Hat Enterprise Linux 5.4 Advanced Platform, Red Hat Enterprise Linux 5.4, Red Hat Enterprise Linux 5.5 Advanced Platform, Red Hat Enterprise

Linux 5.5, Red Hat Enterprise Linux 5.6 Advanced Platform, Red Hat Enterprise Linux 5.6, Red Hat Enterprise Linux 5.7 Advanced Platform, Red Hat Enterprise Linux 5.7, Red Hat Enterprise Linux 5.8 Advanced Platform, Red Hat Enterprise Linux 5.8, Red Hat Enterprise Linux 5.9 Advanced Platform, Red Hat Enterprise Linux 5.9, Red Hat Enterprise Linux 5.10 Advanced Platform, Red Hat Enterprise Linux 5.10, Red Hat Enterprise Linux 5.11 Advanced Platform, Red Hat Enterprise Linux 5.11, Red Hat Enterprise Linux 6, Red Hat Enterprise Linux 6.1, Red Hat Enterprise Linux 6.2, Red Hat Enterprise Linux 6.3, Red Hat Enterprise Linux 6.4, Red Hat Enterprise Linux 6.5, Red Hat Enterprise Linux 6.6, Red Hat Enterprise Linux 6.7, Red Hat Enterprise Linux 6.8, Red Hat Enterprise Linux 7, Red Hat Enterprise Linux 7.1, Red Hat Enterprise Linux 7.2, Oracle Linux 7, and Oracle Linux 7.1. HDLM cannot be used in the domain 0 and the domain U of the virtualization (the Xen function).

HDLM cannot be installed on an unsupported OS. Even if the installation is successful, the operation cannot be guaranteed.

If HDLM is used with LifeKeeper for Linux, the following message may be output to the LifeKeeper for Linux log, but there is no effect on operation:

quickCheck: The daemon "dlmmgr" was restarted by quickCheck.

quickCheck: The daemon "dlmmgr" does not appear to be running and could not be restarted.

Path failures may not be correctly handled without this daemon.

Execute the following command to check whether the HDLM manager is running:

/opt/DynamicLinkManager/bin/dlnkmgr view -sys -msrv

HDLM Manager Ver WakeupTime

Alive 8.5.0-00 *yyyy*/*mm*/*dd hh*:*mm*:*ss*

KAPL01001-I The HDLM command ended successfully. (operation name = view, end time = *yyyy*/*mm*/*dd hh*:*mm*:*ss*)

When all of the following conditions are met, if you execute the shutdown command with specifying the -F option which always executes fsck at reboot, a host boot fails with an error in the fsck command which is executed at the OS boot.

If your environment meets the conditions, do not specify the -F option for the shutdown command. If you do execute the shutdown command with the -F option specified, when the setup screen for the boot loader startup is displayed, select the startup from the SCSI device and boot the host. After that, reboot the host without specifying the -F option.

Conditions

- Red Hat Enterprise Linux 5, Oracle Enterprise Linux 5, or Oracle Unbreakable Enterprise Kernel 5 is used.

- An HDLM device is used as a boot disk.

- A value other than 0 is set for the sixth field (fs_passno) in the /etc/fstab file.

- UTC is not used for the system clock on the host.

If you restart the host, the route information changes and an increased number of offline (E) paths per LU might be displayed. If the number of online paths per LU is the same as before the host was restarted, remove unnecessary offline (E) paths by using dlmcfgmgr -u {HDLM device}.

In Red Hat Enterprise Linux 6, Oracle Unbreakable Enterprise Kernel 5, Oracle Unbreakable Enterprise Kernel 6, and SUSE LINUX Enterprise Server 11:

If you execute the dlmcfgmgr utility (dlmcfgmgr -u), path information is deleted when a path failure occurs. The path information is deleted even if a hyphen (-) is not displayed for an SCSI device name in the device row displayed as a result of executing the dlmcfgmgr utility or the HDLM command view operation (specifying -lu or -drv).

If path information is deleted as described above, execute dlmcfgmgr -r after recovering the failed path, make sure the recovered path is discovered by HDLM, and then confirm that the path status has become online.

HDLM for Linux does not support cluster software in a HAM environment.

In the case of displaying the LU information, the HAM information is not output by specifying the "all" parameter-value for the HDLM command. Specify the "ha" and "hastat" parameter-value instead of it.

An online operation is performed on an owner path, a non-owner path's status may change to Offline(E). After performing an online operation on an owner path, use the HDLM command to make sure that the non-owner path's status is Online. If the non-owner path's status is Offline(E), change the status of HAM pairs to PAIR, and then perform an online operation on the Offline(E) path again.

When you set up a HAM pair to be managed by HDLM, make sure that the host recognizes paths to the MCU (Primary VOL) and RCU (Secondary VOL) after the HAM pair is created.

Execute the dlnkmgr view -lu -item hastat operation. If ha is not displayed in the HaStat column, then the corresponding LU is not recognized as being in a HAM configuration.

If the host recognizes the paths to the MCU and RCU before the HAM pair is created, restart the host after the HAM pair is created.

If you release a HAM pair to recover the system after a HAM volume failure, do not restart a host that is connected to the MCU and RCU while the HAM pair is released. If you need to restart the host while the HAM pair is released, disconnect all paths to the MCU and RCU, restart the host, re-create the HAM pair, and then reconnect the paths.

If you restart a host that is connected to the MCU and RCU while the HAM pair is released, the RCU volume will be recognized as a volume other than an MCU volume. If this occurs, restart the host after the HAM pair is re-created.

Execute the dlnkmgr view -lu -item hastat operation, and then confirm that ha is displayed in the HaStat column.

While the path health check provided by HDLM is enabled (on), if a HAM pair is released, the status of the paths (non-owner paths) connected to the RCU might become Offline(E) or Online(E). After creating (recovering) a HAM pair, return the status of the paths to Online by using the HDLM command online operation.

Do not use an XFS file system or a btrfs file system for a system partition in any of the following environments:

- Red Hat Enterprise Linux 5.6 (EM64T/AMD64)
- Red Hat Enterprise Linux 6.2 (EM64T/AMD64)
- Red Hat Enterprise Linux 6.4 (EM64T/AMD64)
- Red Hat Enterprise Linux 6.5 (EM64T/AMD64)
- Red Hat Enterprise Linux 6.6 (EM64T/AMD64)
- Red Hat Enterprise Linux 6.7 (EM64T/AMD64)
- Red Hat Enterprise Linux 6.8 (EM64T/AMD64)
- Oracle Unbreakable Enterprise Kernel 6.5 (EM64T/AMD64)
- Oracle Unbreakable Enterprise Kernel 6.6 (EM64T/AMD64)
- Oracle Unbreakable Enterprise Kernel 6.7 (EM64T/AMD64)
- Oracle Unbreakable Enterprise Kernel 6.8 (EM64T/AMD64)
- SUSE LINUX Enterprise Server 11 SP4 (EM64T/AMD64)

If you are using SLES 11 SP4 (IA32), do not specify the `inode64` option when mounting an XFS file system.

If you are using btrfs file systems in SLES 11 SP4 (IA32), do not create more than 2^{32} files in a single file system.

Documentation

Available documents

Manual Name	Manual No.	Issue Date
Hitachi Command Suite Dynamic Link Manager (for Linux®) User Guide	MK-92DLM113-37	October, 2016

Documentation errata

Contents of corrections of the Hitachi Dynamic Link Manager Software User Guide for Linux(R):

No.	Location to be corrected	Corrections	
1	How to Set Up the Kdump Function Notes	Before	Regardless of whether HDLM is used in a non-boot disk environment or in a boot disk environment, you cannot specify a SCSI device in an LVM configuration for the kernel dump output destination. Following the procedure described in Add a disk for the kernel dump output on page C-2, add the output destination.
		After	In Red Hat Enterprise Linux 6 or Oracle Unbreakable Enterprise Kernel 6, regardless of whether HDLM is used in a non-boot disk environment or in a boot disk environment, kernel dump output will fail if the following conditions are met: - In the filter setting of /etc/lvm/lvm.conf, a permanent name is specified for a SCSI device. (*Note) - A logical volume created on a SCSI device is specified as the output destination for kdump kernel dumps. If the above conditions are met, add a disk used for the kernel dump output. To do this, follow the procedure in Add a disk for the kernel dump output in the HDLM User Guide. (*Note) For details, see Notes on Using LVM2 in the HDLM User Guide.

Appendix A

Host bus adapter (HBA) support matrix

Use the Fibre Channel I/F adapters given below. When using two or more adapters, use the same type of adapter. If you combine different types of HBA, HDLM may not be able to switch a path when an error occurs.

(1) QLogic (*1)

OS	Kernel	Driver
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (IA32)	2.6.18-8.el5 2.6.18-8.el5PAE	8.01.07-k1 (*3)(*4)
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (IPF)	2.6.18-8.el5	8.01.07-k1 (*3)
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (EM64T/AMD64)	2.6.18-8.el5	8.01.07-k1 (*3)(*4)
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (IA32)	2.6.18-53.el5 2.6.18-53.el5PAE	8.01.07-k7 (*3)(*4) 8.02.14 (*6)
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (IPF)	2.6.18-53.el5	8.01.07-k7 (*3) 8.02.14 (*6)
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (EM64T/AMD64)	2.6.18-53.el5	8.01.07-k7 (*3)(*4) 8.02.14 (*6)
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (IA32)	2.6.18-92.el5 2.6.18-92.el5PAE	8.02.00-k5 (*3)(*4) 8.02.14 (*6) 8.02.23 (*6)
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (IPF)	2.6.18-92.el5	8.02.00-k5 (*3) 8.02.14 (*6) 8.02.23 (*6)
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (EM64T/AMD64)	2.6.18-92.el5	8.02.00-k5 (*3)(*4) 8.02.14 (*6) 8.02.23 (*6)

OS	Kernel	Driver
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (IA32)	2.6.18-128.el5 2.6.18-128.el5PAE	8.02.00.06.05.03-k (*3)(*4) 8.02.23 (*6) 8.02.00.51 8.03.01.06 (*4)
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (IPF)	2.6.18-128.el5	8.02.00.06.05.03-k (*3) 8.02.23 (*6)
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (EM64T/AMD64)	2.6.18-128.el5	8.02.00.06.05.03-k (*3)(*4) 8.02.23 (*6) 8.02.00.51 8.03.01.06 (*4)
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (IA32)	2.6.18-164.el5 2.6.18-164.el5PAE	8.03.00.10.05.04-k (*3)(*4) 8.03.00.1.05.05-k (*3)(*4)(*9) 8.03.01.06 (*4) 8.03.03.15.05.06 (*4)
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (IPF)	2.6.18-164.el5	8.03.00.10.05.04-k (*3) 8.03.00.1.05.05-k (*3)(*9)
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (EM64T/AMD64)	2.6.18-164.el5	8.03.00.10.05.04-k (*3)(*4) 8.03.00.1.05.05-k (*3)(*4)(*9) 8.03.01.06 (*4) 8.03.03.15.05.06 (*4)
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (IA32)	2.6.18-194.el5 2.6.18-194.el5PAE	8.03.01.04.05.05-k (*3)(*4) 8.03.01.06 (*4) 8.03.03.15.05.06 (*4) 8.03.07.03.5.6-k 8.03.07.05.5.6-k-sw1
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (IPF)	2.6.18-194.el5	8.03.01.04.05.05-k (*3)
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (EM64T/AMD64)	2.6.18-194.el5	8.03.01.04.05.05-k (*3)(*4) 8.03.01.06 (*4) 8.03.03.15.05.06 (*4) 8.03.07.03.5.6-k 8.03.07.05.5.6-k-sw1
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (IA32)	2.6.18-238.el5 2.6.18-238.el5PAE	8.03.01.05.05.06-k (*3)(*4) 8.03.07.03.5.6-k

OS	Kernel	Driver
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (IPF)	2.6.18-238.el5	8.03.01.05.05.06-k (*3)
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (EM64T/AMD64)	2.6.18-238.el5	8.03.01.05.05.06-k (*3)(*4) 8.03.07.03.5.6-k
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (IA32)	2.6.18-274.el5 2.6.18-274.el5PAE	8.03.07.03.05.07-k (*3)(*4)
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (IPF)	2.6.18-274.el5	8.03.07.03.05.07-k (*3)
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (EM64T/AMD64)	2.6.18-274.el5	8.03.07.03.05.07-k (*3)(*4) 8.2.0.33.3p-1.6.1-MCL
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (IA32)	2.6.18-308.el5 2.6.18-308.el5PAE	8.03.07.09.05.08-k (*3)(*4) 8.06.00.11.5.6-k
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (IPF)	2.6.18-308.el5	8.03.07.09.05.08-k (*3)
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (EM64T/AMD64)	2.6.18-308.el5	8.03.07.09.05.08-k (*3)(*4) 8.06.00.11.5.6-k
Red Hat Enterprise Linux 5.9 Advanced Platform/Red Hat Enterprise Linux 5.9 (IA32)	2.6.18-348.el5 2.6.18-348.el5PAE	8.03.07.15.05.09-k (*3)(*4) 8.06.00.11.5.6-k
Red Hat Enterprise Linux 5.9 Advanced Platform/Red Hat Enterprise Linux 5.9 (IPF)	2.6.18-348.el5	8.03.07.15.05.09-k (*3)
Red Hat Enterprise Linux 5.9 Advanced Platform/Red Hat Enterprise Linux 5.9 (EM64T/AMD64)	2.6.18-348.el5	8.03.07.15.05.09-k (*3)(*4) 8.06.00.11.5.6-k
Red Hat Enterprise Linux 5.10 Advanced Platform/Red Hat Enterprise Linux 5.10 (IA32)	2.6.18-371.el5 2.6.18-371.el5PAE	8.03.07.15.05.09-k (*3)(*4) 8.06.00.11.5.6-k

OS	Kernel	Driver
Red Hat Enterprise Linux 5.10 Advanced Platform/Red Hat Enterprise Linux 5.10 (IPF)	2.6.18-371.el5	8.03.07.15.05.09-k (*3)
Red Hat Enterprise Linux 5.10 Advanced Platform/Red Hat Enterprise Linux 5.10 (EM64T/AMD64)	2.6.18-371.el5	8.03.07.15.05.09-k (*3)(*4) 8.06.00.11.5.6-k
Red Hat Enterprise Linux 5.11 Advanced Platform/Red Hat Enterprise Linux 5.11 (IA32)	2.6.18-398.el5 2.6.18-398.el5PAE	8.03.07.15.05.09-k (*3)(*4)
Red Hat Enterprise Linux 5.11 Advanced Platform/Red Hat Enterprise Linux 5.11 (IPF)	2.6.18-398.el5	8.03.07.15.05.09-k (*3)
Red Hat Enterprise Linux 5.11 Advanced Platform/Red Hat Enterprise Linux 5.11 (EM64T/AMD64)	2.6.18-398.el5	8.03.07.15.05.09-k (*3)(*4)
Red Hat Enterprise Linux 6 (IA32)	2.6.32-71.el6.i686	8.03.01.05.06.0-k8 (*3)(*4)
Red Hat Enterprise Linux 6 (EM64T/AMD64)	2.6.32-71.el6.x86_64	8.03.01.05.06.0-k8 (*3)(*4)
Red Hat Enterprise Linux 6.1 (IA32)	2.6.32-131.0.15.el6.i686	8.03.07.03.06.1-k (*3)(*4) 8.03.07.13.06.0-k
Red Hat Enterprise Linux 6.1 (EM64T/AMD64)	2.6.32-131.0.15.el6.x86_64	8.03.07.03.06.1-k (*3)(*4) 8.03.07.13.06.0-k
Red Hat Enterprise Linux 6.2 (IA32)	2.6.32-220.el6.i686	8.03.07.05.06.2-k (*3)(*4) 8.03.07.13.06.0-k 8.04.00.06.06.0-k 8.06.00.10.06.0-k
Red Hat Enterprise Linux 6.2 (EM64T/AMD64)	2.6.32-220.el6.x86_64	8.03.07.05.06.2-k (*3)(*4) 8.03.07.13.06.0-k 8.04.00.06.06.0-k 8.06.00.10.06.0-k
Red Hat Enterprise Linux 6.3 (IA32)	2.6.32-279.el6.i686	8.04.00.04.06.3-k (*3)(*4) 8.05.00.03.06.0-k 8.06.00.10.06.0-k
Red Hat Enterprise Linux 6.3 (EM64T/AMD64)	2.6.32-279.el6.x86_64	8.04.00.04.06.3-k (*3)(*4) 8.05.00.03.06.0-k 8.06.00.10.06.0-k
Red Hat Enterprise Linux 6.4 (IA32)	2.6.32-358.el6.i686	8.04.00.08.06.4-k (*3)(*4) 8.05.00.03.06.0-k 8.06.00.10.06.0-k 8.07.00.08.06.0-k

OS	Kernel	Driver
Red Hat Enterprise Linux 6.4 (EM64T/AMD64)	2.6.32-358.el6.x86_64	8.04.00.08.06.4-k (*3)(*4) 8.05.00.03.06.0-k 8.06.00.10.06.0-k 8.07.00.08.06.0-k
Red Hat Enterprise Linux 6.5 (IA32)	2.6.32-431.el6.i686	8.05.00.03.06.5-k2 (*3)(*4) 8.07.00.08.06.0-k
Red Hat Enterprise Linux 6.5 (EM64T/AMD64)	2.6.32-431.el6.x86_64	8.05.00.03.06.5-k2 (*3)(*4) 8.07.00.08.06.0-k
Red Hat Enterprise Linux 6.6 (IA32)	2.6.32-504.el6.i686	8.07.00.08.06.6-k1 (*3)(*4)
Red Hat Enterprise Linux 6.6 (EM64T/AMD64)	2.6.32-504.el6.x86_64	8.07.00.08.06.6-k1 (*3)(*4)
Red Hat Enterprise Linux 6.7 (IA32)	2.6.32-573.el6.i686	8.07.00.16.06.7-k (*3)(*4)
Red Hat Enterprise Linux 6.7 (EM64T/AMD64)	2.6.32-573.el6.x86_64	8.07.00.16.06.7-k (*3)(*4)
Red Hat Enterprise Linux 6.8 (IA32)	2.6.32-642.el6.i686	8.07.00.26.06.8-k (*3)(*4)
Red Hat Enterprise Linux 6.8 (EM64T/AMD64)	2.6.32-642.el6.x86_64	8.07.00.26.06.8-k (*3)(*4)
Red Hat Enterprise Linux 7 (EM64T/AMD64)	3.10.0-123.el7.x86_64	8.06.00.08.07.0-k2 (*3)(*4)
		8.06.00.08.07.0-k3 (*3)(*10)(*4)
Red Hat Enterprise Linux 7.1 (EM64T/AMD64)	3.10.0-229.el7.x86_64	8.07.00.08.07.1-k2 (*3)(*4)
Red Hat Enterprise Linux 7.2 (EM64T/AMD64)	3.10.0-327.el7.x86_64	8.07.00.18.07.2-k (*3)(*4)
SUSE LINUX Enterprise Server 10 (IA32)	2.6.16.60-0.85.1-default 2.6.16.60-0.85.1-smp 2.6.16.60-0.85.1-bigsmp	8.03.01.12.10.3-k4 (*3)(*4)
	2.6.16.60-0.85.1-xenpae	8.03.01.12.10.3-k4 (*3)(*4)
SUSE LINUX Enterprise Server 10 (IPF)	2.6.16.60-0.85.1-default	8.03.01.12.10.3-k4 (*3)
SUSE LINUX Enterprise Server 10 (EM64T/AMD64)	2.6.16.60-0.85.1-default 2.6.16.60-0.85.1-smp	8.03.01.12.10.3-k4 (*3)(*4)
	2.6.16.60-0.85.1-xen	8.03.01.12.10.3-k4 (*3)(*4)
SUSE LINUX Enterprise Server 11 (IA32)	2.6.27.21-0.1.2-default 2.6.27.21-0.1.2-pae	8.02.01.03.11.0-k9(*3)(*4)
	2.6.27.21-0.1.2-xen	8.02.01.03.11.0-k9 (*3)(*4)
	2.6.32.12-0.7.1-default	8.03.01.06.11.1-k8 (*3)(*4)

OS	Kernel	Driver
	2.6.32.12-0.7.1-pae	8.03.01.08.11.1-k8 (*3)(*4)(*9)
		8.03.07.13.11.1-k
		8.03.04.14.11.1-k0 (*4)
	2.6.32.12-0.7.1-xen	8.03.01.06.11.1-k8 (*3)(*4)
		8.03.01.08.11.1-k8 (*3)(*4)(*9)
		8.03.07.13.11.1-k
		8.03.04.14.11.1-k0 (*4)
	3.0.13-0.27-default 3.0.13-0.27-pae	8.03.07.07-k (*3)(*4)
	3.0.76-0.11-default 3.0.76-0.11-pae	8.04.00.13.11.3-k (*3)(*4)
SUSE LINUX Enterprise Server 11 (IPF)	2.6.27.21-0.1.2-default	8.02.01.03.11.0-k9 (*3)
	2.6.32.12-0.7.1-default	8.03.01.06.11.1-k8 (*3)
		8.03.01.08.11.1-k8 (*3)(*9)
	3.0.13-0.27-default	8.03.07.07-k (*3)
	3.0.76-0.11-default	8.04.00.13.11.3-k (*3)
SUSE LINUX Enterprise Server 11 (EM64T/AMD64)	2.6.27.21-0.1.2-default	8.02.01.03.11.0-k9 (*3)(*4)
	2.6.27.21-0.1.2-xen	8.02.01.03.11.0-k9 (*3)(*4)
	2.6.32.12-0.7.1-default	8.03.01.06.11.1-k8 (*3)(*4)
		8.03.01.08.11.1-k8 (*3)(*4)(*9)
		8.03.07.13.11.1-k
		8.03.04.14.11.1-k0 (*4)
	2.6.32.12-0.7.1-xen	8.03.01.06.11.1-k8 (*3)(*4)
		8.03.01.08.11.1-k8 (*3)(*4)(*9)
		8.03.07.13.11.1-k
		8.03.04.14.11.1-k0 (*4)
	3.0.13-0.27-default	8.03.07.07-k (*3)(*4)
	3.0.76-0.11-default	8.04.00.13.11.3-k (*3)(*4)
	3.0.76-0.11-xen	8.04.00.13.11.3-k (*3)(*4)
SUSE LINUX Enterprise Server 12 (EM64T/AMD64)	3.12.28-4-default	8.07.00.08.12.0-k (*3)(*4)
	3.12.28-4-xen	8.07.00.08.12.0-k (*3)(*4)
	3.12.59-60.45-default	8.07.00.18-k (*3)(*4)
	3.12.59-60.45-xen	8.07.00.18-k (*3)(*4)
Oracle Enterprise Linux 5 (IA32)	2.6.18-53.el5 2.6.18-53.el5PAE	8.01.07-k7 (*3)(*4)
Oracle Enterprise Linux 5 (EM64T/AMD64)	2.6.18-53.el5	8.01.07-k7 (*3)(*4)

OS	Kernel	Driver
Oracle Enterprise Linux 5.4 (IA32)	2.6.18-164.el5 2.6.18-164.el5PAE	8.03.00.10.05.04-k (*3)(*4)
Oracle Enterprise Linux 5.4 (EM64T/AMD64)	2.6.18-164.el5	8.03.00.10.05.04-k (*3)(*4)
Oracle Enterprise Linux 5.5 (IA32)	2.6.18-194.el5 2.6.18-194.el5PAE	8.03.01.04.05.05-k (*3)(*4)
Oracle Enterprise Linux 5.5 (EM64T/AMD64)	2.6.18-194.el5	8.03.01.04.05.05-k (*3)(*4)
Oracle Enterprise Linux 5.6 (IA32)	2.6.18-238.el5 2.6.18-238.el5PAE	8.03.01.05.05.06-k (*3)(*4)
Oracle Enterprise Linux 5.6 (EM64T/AMD64)	2.6.18-238.el5	8.03.01.05.05.06-k (*3)(*4)
Oracle Enterprise Linux 5.7 (IA32)	2.6.18-274.el5 2.6.18-274.el5PAE	8.03.07.03.05.07-k (*3)(*4)
Oracle Enterprise Linux 5.7 (EM64T/AMD64)	2.6.18-274.el5	8.03.07.03.05.07-k (*3)(*4)
Oracle Linux 6.5 (IA32)	2.6.32-431.el6.i686	8.05.00.03.06.5-k2 (*3)(*4)
Oracle Linux 6.5 (EM64T/AMD64)	2.6.32-431.el6.x86_64	8.05.00.03.06.5-k2 (*3)(*4)
Oracle Linux 6.6 (IA32)	2.6.32-504.el6.i686	8.07.00.08.06.6-k1 (*3)(*4)
Oracle Linux 6.6 (EM64T/AMD64)	2.6.32-504.el6.x86_64	8.07.00.08.06.6-k1 (*3)(*4)
Oracle Linux 6.7 (IA32)	2.6.32-573.el6.i686	8.07.00.16.06.7-k (*3)(*4)
Oracle Linux 6.7 (EM64T/AMD64)	2.6.32-573.el6.x86_64	8.07.00.16.06.7-k (*3)(*4)
Oracle Linux 7 (EM64T/AMD64)	3.10.0-123.el7.x86_64	8.06.00.08.07.0-k (*3)(*4)
Oracle Linux 7.1 (EM64T/AMD64)	3.10.0-229.el7.x86_64	8.07.00.08.07.1-k2 (*3)(*4)
Oracle Unbreakable Enterprise Kernel 5.6 (EM64T/AMD64)	2.6.32-100.26.2.el5	8.03.01.02.32.1-k9 (*3)(*4)
Oracle Unbreakable Enterprise Kernel 5.7 (IA32)	2.6.32-200.13.1.el5uek	8.03.07.04.32.1-k (*3)(*4)
	2.6.32-300.27.1.el5uek	8.03.07.08.32.1-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 5.7 (EM64T/AMD64)	2.6.32-200.13.1.el5uek	8.03.07.04.32.1-k (*3)(*4)
	2.6.32-300.27.1.el5uek	8.03.07.08.32.1-k (*3)(*4)

OS	Kernel	Driver
Oracle Unbreakable Enterprise Kernel 5.8 (IA32)	2.6.32-300.39.2.el5uek	8.03.07.08.32.1-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 5.8 (EM64T/AMD64)	2.6.32-300.39.2.el5uek	8.03.07.08.32.1-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 6.2 (IA32)	2.6.39-200.29.1.el6uek.686	8.04.00.03.39.0-k (*3)(*4)
	2.6.39-200.29.2.el6uek.686	8.04.00.03.39.0-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 6.2 (EM64T/AMD64)	2.6.39-200.29.1.el6uek.x86_64	8.04.00.03.39.0-k (*3)(*4)
	2.6.39-200.29.2.el6uek.x86_64	8.04.00.03.39.0-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 6.3 (IA32)	2.6.39-200.24.1.el6uek.686	8.04.00.03.39.0-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 6.3 (EM64T/AMD64)	2.6.39-200.24.1.el6uek.x86_64	8.04.00.03.39.0-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 6.4 (IA32)	2.6.39-400.211.1.el6uek.686	8.05.00.03.39.0-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 6.4 (EM64T/AMD64)	2.6.39-400.211.1.el6uek.x86_64	8.05.00.03.39.0-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 6.5 (IA32)	2.6.39-400.211.1.el6uek.686	8.05.00.03.39.0-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 6.5 (EM64T/AMD64)	3.8.13-16.2.1.el6uek.x86_64	8.05.00.03.39.0-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 6.5 (EM64T/AMD64)	3.8.13-44.el6uek.x86_64	8.07.00.08.39.0-k1 (*3)(*4)
Oracle Unbreakable Enterprise Kernel 6.6 (EM64T/AMD64)	3.8.13-44.1.1.el6uek.x86_64	8.07.00.08.39.0-k1 (*3)(*4)
Oracle Unbreakable Enterprise Kernel 6.6 (EM64T/AMD64)	3.8.13-68.el6uek.x86_64 3.8.13-68.1.3.el6uek.x86_64	8.07.00.16.39.0-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 6.7 (IA32)	2.6.39-400.250.7.el6uek.686	8.05.00.03.39.0-k (*3)(*4)

OS	Kernel	Driver
Oracle Unbreakable Enterprise Kernel 6.7 (EM64T/AMD64)	3.8.13-68.3.4.el6uek.x86_64	8.07.00.16.39.0-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 6.8 (EM64T/AMD64)	4.1.12-37.4.1.el6uek.x86_64	8.07.00.33.40.0-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 7 (EM64T/AMD64)	3.8.13-44.el7uek.x86_64	8.07.00.08.39.0-k1 (*3)(*4)
Oracle Unbreakable Enterprise Kernel 7.1 (EM64T/AMD64)	3.8.13-55.1.6.el7uek.x86_64 3.8.13-68.el7uek.x86_64 3.8.13-68.2.2.el7uek.x86_64	8.07.00.16.39.0-k (*3)(*4)
Oracle Unbreakable Enterprise Kernel 7.2 (EM64T/AMD64)	3.8.13-98.7.1.el7uek.x86_64	8.07.00.18.39.0-k (*3)(*4)

Notes:

*1: Do not use the HBA driver's failover function.

Check the setting for the failover function by performing the following procedure:

- For Red Hat Enterprise Linux 5 Advanced Platform, Red Hat Enterprise Linux 5, Red Hat Enterprise Linux 5.1 Advanced Platform, Red Hat Enterprise Linux 5.1, Red Hat Enterprise Linux 5.2 Advanced Platform, Red Hat Enterprise Linux 5.2, Red Hat Enterprise Linux 5.3 Advanced Platform, Red Hat Enterprise Linux 5.3, Red Hat Enterprise Linux 5.4 Advanced Platform, Red Hat Enterprise Linux 5.4, Red Hat Enterprise Linux 5.5 Advanced Platform, Red Hat Enterprise Linux 5.5, Red Hat Enterprise Linux 5.6 Advanced Platform, Red Hat Enterprise Linux 5.6, Red Hat Enterprise Linux 5.7 Advanced Platform, Red Hat Enterprise Linux 5.7, Red Hat Enterprise Linux 5.8 Advanced Platform, Red Hat Enterprise Linux 5.8, Red Hat Enterprise Linux 5.9 Advanced Platform, Red Hat Enterprise Linux 5.9, Red Hat Enterprise Linux 5.10 Advanced Platform, Red Hat Enterprise Linux 5.10, Red Hat Enterprise Linux 5.11 Advanced Platform, Red Hat Enterprise Linux 5.11, Red Hat Enterprise Linux 6, Red Hat Enterprise Linux 6.1, Red Hat Enterprise Linux 6.2, Red Hat Enterprise Linux 6.3, Red Hat Enterprise Linux 6.4, Red Hat Enterprise Linux 6.5, Red Hat Enterprise Linux 6.6, Red Hat Enterprise Linux 6.7, Red Hat Enterprise Linux 6.8, Red Hat Enterprise Linux 7, Red Hat Enterprise Linux 7.1, Red Hat Enterprise Linux 7.2, Oracle Enterprise Linux 5, Oracle Enterprise Linux 5.4, Oracle Enterprise Linux 5.5, Oracle Enterprise Linux 5.6, Oracle Unbreakable Enterprise Kernel 5.6, Oracle Unbreakable Enterprise Kernel 5.7, Oracle Unbreakable Enterprise Kernel 5.8, Oracle Unbreakable Enterprise Kernel 6.2, Oracle Unbreakable Enterprise Kernel 6.3, Oracle Unbreakable Enterprise Kernel 6.4, Oracle Unbreakable Enterprise Kernel 6.5, Oracle Unbreakable Enterprise Kernel 6.6, Oracle Unbreakable Enterprise Kernel 6.7, Oracle Unbreakable Enterprise Kernel 6.8, Oracle Unbreakable Enterprise Kernel 7, Oracle

Unbreakable Enterprise Kernel 7.1, Oracle Unbreakable Enterprise Kernel 7.2, SUSE LINUX Enterprise Server 10, and SUSE LINUX Enterprise Server 11

1) Execute the following command to check the version of the driver:

cat /sys/class/scsi_host/hostn/driver_version

n: the instance number of the HBA port

2) Check the output result to see whether the characters "fo" are added to the version notation.

- When the failover function is enabled:

  8.01.07-k1-fo

- When the failover function is disabled:

  8.01.07-k1

*2: The drivers mentioned in the page of "Hitachi Data Systems - HBA Approved Software" in the QLogic website are supported. Get the drivers from the following URL:

http://support.qlogic.com/support/oem_detail_hds.asp?oemid=84&classid=237

The above-mentioned URL may be changed without notice. When the URL is changed, look for the page of "Hitachi Data Systems - HBA Approved Software" in the QLogic website.

*3: Use the driver bundled with the kernel.

*4: Using an HDLM device as the boot disk is supported.

*5: HDLM also supports the environments in which 32-bit kernel packages are installed on a system using an AMD Opteron processor.

*6: Since the failover function is Enable by default, change it to Disable. For changing the setting of the failover function to Disable, set the following in /etc/modprobe.conf file.

Example: When the driver version is 8.01.01.

options qla2xxx ql2xfailover=0

Refer to the document of the HBA attachment for details of the setting change of the failover function.

*7: EM64T indicates the environments in which 64-bit kernel packages are installed on a system using an Intel EM64T processor.

*8: AMD64 indicates the environments in which 64-bit kernel packages are installed on a system using an AMD Opteron processor.

*9: Supported by Kernel 2.6.32.24-0.2.1 or later.

*10: Supported by Kernel 3.10.0-123.13.2 or later.

(2) Emulex

OS	Kernel	Driver
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (IA32)	2.6.18-8.el5 2.6.18-8.el5PAE	8.1.10.3 (*2)(*3) 8.1.10.12 8.2.0.22 8.2.0.29 8.2.0.33.3p
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (IPF)	2.6.18-8.el5	8.1.10.3 (*2)(*3) 8.1.10.12 8.2.0.22 8.2.0.29 8.2.0.33.3p
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (EM64T/AMD64)	2.6.18-8.el5	8.1.10.3 (*2)(*3) 8.1.10.12 8.2.0.22 8.2.0.29 8.2.0.33.3p
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (IA32)	2.6.18-53.el5 2.6.18-53.el5PAE	8.1.10.9 (*2)(*3) 8.1.10.12 (*7) 8.2.0.22 8.2.0.29 8.2.0.33.3p
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (IPF)	2.6.18-53.el5	8.1.10.9 (*2)(*3) 8.1.10.12 (*7) 8.2.0.22 8.2.0.29 8.2.0.33.3p
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (EM64T/AMD64)	2.6.18-53.el5	8.1.10.9 (*2)(*3) 8.1.10.12 (*7) 8.2.0.22 8.2.0.29 8.2.0.33.3p
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (IA32)	2.6.18-92.el5 2.6.18-92.el5PAE	8.2.0.22 (*2)(*3) 8.2.0.29 8.2.0.33.3p

OS	Kernel	Driver
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (IPF)	2.6.18-92.el5	8.2.0.22 (*2)(*3) 8.2.0.29 8.2.0.33.3p
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (EM64T/AMD64)	2.6.18-92.el5	8.2.0.22 (*2)(*3) 8.2.0.29 8.2.0.33.3p
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (IA32)	2.6.18-128.el5 2.6.18-128.el5PAE	8.2.0.33.3p (*2)(*3)
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (IPF)	2.6.18-128.el5	8.2.0.33.3p (*2)(*3)
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (EM64T/AMD64)	2.6.18-128.el5	8.2.0.33.3p (*2)(*3)
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (IA32)	2.6.18-164.el5 2.6.18-164.el5PAE	8.2.0.48.2p (*2)(*3) 8.2.0.48.3p (*2)(*3)(*8)
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (IPF)	2.6.18-164.el5	8.2.0.48.2p (*2)(*3) 8.2.0.48.3p (*2)(*3)(*8)
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (EM64T/AMD64)	2.6.18-164.el5	8.2.0.48.2p (*2)(*3) 8.2.0.48.3p (*2)(*3)(*8)
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (IA32)	2.6.18-194.el5 2.6.18-194.el5PAE	8.2.0.63.3p (*2)(*3)
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (IPF)	2.6.18-194.el5	8.2.0.63.3p (*2)(*3)
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (EM64T/AMD64)	2.6.18-194.el5	8.2.0.63.3p (*2)(*3)
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (IA32)	2.6.18-238.el5 2.6.18-238.el5PAE	8.2.0.87.1p (*2)(*3)

OS	Kernel	Driver
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (IPF)	2.6.18-238.el5	8.2.0.87.1p (*2)(*3)
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (EM64T/AMD64)	2.6.18-238.el5	8.2.0.87.1p (*2)(*3)
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (IA32)	2.6.18-274.el5 2.6.18-274.el5PAE	8.2.0.96.2p (*2)(*3)
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (IPF)	2.6.18-274.el5	8.2.0.96.2p (*2)(*3)
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (EM64T/AMD64)	2.6.18-274.el5	8.2.0.96.2p (*2)(*3)
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (IA32)	2.6.18-308.el5 2.6.18-308.el5PAE	8.2.0.108.4p (*2)(*3)
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (IPF)	2.6.18-3084.el5	8.2.0.108.4p (*2)(*3)
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (EM64T/AMD64)	2.6.18-308.el5	8.2.0.108.4p (*2)(*3)
Red Hat Enterprise Linux 5.9 Advanced Platform/Red Hat Enterprise Linux 5.9 (IA32)	2.6.18-348.el5 2.6.18-348.el5PAE	8.2.0.128.3p (*2)(*3)
Red Hat Enterprise Linux 5.9 Advanced Platform/Red Hat Enterprise Linux 5.9 (IPF)	2.6.18-348.el5	8.2.0.128.3p (*2)(*3)
Red Hat Enterprise Linux 5.9 Advanced Platform/Red Hat Enterprise Linux 5.9 (EM64T/AMD64)	2.6.18-348.el5	8.2.0.128.3p (*2)(*3)
Red Hat Enterprise Linux 5.10 Advanced Platform/Red Hat Enterprise Linux 5.10 (IA32)	2.6.18-371.el5 2.6.18-371.el5PAE	8.2.0.128.3p (*2)(*3)

OS	Kernel	Driver
Red Hat Enterprise Linux 5.10 Advanced Platform/Red Hat Enterprise Linux 5.10 (IPF)	2.6.18-371.el5	8.2.0.128.3p (*2)(*3)
Red Hat Enterprise Linux 5.10 Advanced Platform/Red Hat Enterprise Linux 5.10 (EM64T/AMD64)	2.6.18-371.el5	8.2.0.128.3p (*2)(*3)
Red Hat Enterprise Linux 5.11 Advanced Platform/Red Hat Enterprise Linux 5.11 (IA32)	2.6.18-398.el5 2.6.18-398.el5PAE	8.2.0.128.3p (*2)(*3)
Red Hat Enterprise Linux 5.11 Advanced Platform/Red Hat Enterprise Linux 5.11 (IPF)	2.6.18-398.el5	8.2.0.128.3p (*2)(*3)
Red Hat Enterprise Linux 5.11 Advanced Platform/Red Hat Enterprise Linux 5.11 (EM64T/AMD64)	2.6.18-398.el5	8.2.0.128.3p (*2)(*3)
Red Hat Enterprise Linux 6 (IA32)	2.6.32-71.el6.i686	8.3.5.17 (*2)(*3)
Red Hat Enterprise Linux 6 (EM64T/AMD64)	2.6.32-71.el6.x86_64	8.3.5.17 (*2)(*3)
Red Hat Enterprise Linux 6.1 (IA32)	2.6.32-131.0.15.el6.i686	8.3.5.30.1p (*2)(*3)
Red Hat Enterprise Linux 6.1 (EM64T/AMD64)	2.6.32-131.0.15.el6.x86_64	8.3.5.30.1p (*2)(*3) 8.3.7.18-1
Red Hat Enterprise Linux 6.2 (IA32)	2.6.32-220.el6.i686	8.3.5.45.4p (*2)(*3)
Red Hat Enterprise Linux 6.2(EM64T/AMD64)	2.6.32-220.el6.x86_64	8.3.5.45.4p (*2)(*3) 8.3.7.18-1
Red Hat Enterprise Linux 6.3 (IA32)	2.6.32-279.el6.i686	8.3.5.68.5p (*2)(*3)
Red Hat Enterprise Linux 6.3(EM64T/AMD64)	2.6.32-279.el6.x86_64	8.3.5.68.5p (*2)(*3) 8.3.7.18-1
Red Hat Enterprise Linux 6.4 (IA32)	2.6.32-358.el6.i686	8.3.5.86.1p (*2)(*3)
Red Hat Enterprise Linux 6.4(EM64T/AMD64)	2.6.32-358.el6.x86_64	8.3.5.86.1p (*2)(*3) 8.3.7.18-1
Red Hat Enterprise Linux 6.5 (IA32)	2.6.32-431.el6.i686	8.3.7.21.4p (*2)(*3)
Red Hat Enterprise Linux 6.5(EM64T/AMD64)	2.6.32-431.el6.x86_64	8.3.7.21.4p (*2)(*3) 8.3.7.39 10.2.340.16 11.0.240.0
Red Hat Enterprise Linux	2.6.32-504.el6.i686	10.2.802.1 (*2)(*3)

OS	Kernel	Driver
6.6 (IA32)		10.2.469.0
Red Hat Enterprise Linux 6.6(EM64T/AMD64)	2.6.32-504.el6.x86_64	10.2.802.1 (*2)(*3)
		10.2.469.0
Red Hat Enterprise Linux 6.7 (IA32)	2.6.32-573.el6.i686	10.6.0.20 (*2)(*3)
Red Hat Enterprise Linux 6.7(EM64T/AMD64)	2.6.32-573.el6.x86_64	10.6.0.20 (*2)(*3)
Red Hat Enterprise Linux 6.8 (IA32)	2.6.32-642.el6.i686	11.0.0.4 (*2)(*3)
Red Hat Enterprise Linux 6.8(EM64T/AMD64)	2.6.32-642.el6.x86_64	11.0.0.4 (*2)(*3)
Red Hat Enterprise Linux 7 (EM64T/AMD64)	3.10.0-123.el7.x86_64	8.3.7.31.1p (*2)(*3)
Red Hat Enterprise Linux 7.1 (EM64T/AMD64)	3.10.0-229.el7.x86_64	10.2.8021.1 (*2)(*3)
		10.16.193.12 (*3)
Red Hat Enterprise Linux 7.2 (EM64T/AMD64)	3.10.0-327.el7.x86_64	10.7.0.1 (*2)(*3)
		10.16.193.21 (*3)
SUSE LINUX Enterprise Server 10 (IA32)	2.6.16.60-0.85.1-default 2.6.16.60-0.85.1-smp 2.6.16.60-0.85.1-bigsmp	8.2.0.92.1p (*2)
	2.6.16.60-0.85.1-xenpae	8.2.0.92.1p (*2)
SUSE LINUX Enterprise Server 10 (IPF)	2.6.16.60-0.85.1-default	8.2.0.92.1p (*2)
SUSE LINUX Enterprise Server 10 (EM64T/AMD64)	2.6.16.60-0.85.1-default 2.6.16.60-0.85.1-smp	8.2.0.92.1p (*2)
	2.6.16.60-0.85.1-xen	8.2.0.92.1p (*2)
SUSE LINUX Enterprise Server 11 (IA32)	2.6.27.21-0.1.2-default 2.6.27.21-0.1.2-pae	8.2.8.14 (*2)
	2.6.27.21-0.1.2-xen	8.2.8.14 (*2)
	2.6.32.12-0.7.1-default 2.6.32.12-0.7.1-pae	8.3.5.8.1p (*2) 8.3.5.8.2p (*2)(*10)
	2.6.32.12-0.7.1-xen	8.3.5.8.1p (*2) 8.3.5.8.2p (*2)(*10)
	3.0.13-0.27-default 3.0.13-0.27-pae	8.3.5.48.2p (*2)
	3.0.76-0.11-default 3.0.76-0.11-pae	8.3.7.10.6p (*2)

OS	Kernel	Driver
SUSE LINUX Enterprise Server 11 (IPF)	2.6.27.21-0.1.2-default	8.2.8.14 (*2)
	2.6.32.12-0.7.1-default	8.3.5.8.1p (*2) 8.3.5.8.2p (*2)(*10)
	3.0.13-0.27-default	8.3.5.48.2p (*2)
	3.0.76-0.11-default	8.3.7.10.6p (*2)
SUSE LINUX Enterprise Server 11 (EM64T/AMD64)	2.6.27.21-0.1.2-default	8.2.8.14 (*2)
	2.6.27.21-0.1.2-xen	8.2.8.14 (*2)
	2.6.32.12-0.7.1-default	8.3.5.8.1p (*2) 8.3.5.8.2p (*2)(*10)
	2.6.32.12-0.7.1-xen	8.3.5.8.1p (*2) 8.3.5.8.2p (*2)(*10)
	3.0.13-0.27-default	8.3.5.48.2p (*2) (*3)
	3.0.76-0.11-default	8.3.7.10.6p (*2)
	3.0.76-0.11-xen	8.3.7.10.6p (*2)
SUSE LINUX Enterprise Server 12 (EM64T/AMD64)	3.12.28-4-default	10.2.8040.1 (*2)
	3.12.28-4-xen	10.2.8040.1 (*2)
	3.12.59-60.45-default	10.5.0.2 (*2)
	3.12.59-60.45-xen	10.5.0.2 (*2)
Oracle Enterprise Linux 5 (IA32)	2.6.18-53.el5 2.6.18-53.el5PAE	8.1.10.9 (*2)
Oracle Enterprise Linux 5 (EM64T/AMD64)	2.6.18-53.el5	8.1.10.9 (*2)
Oracle Enterprise Linux 5.4 (IA32)	2.6.18-164.el5 2.6.18-164.el5PAE	8.2.0.48.2p (*2)(*3)
Oracle Enterprise Linux 5.4 (EM64T/AMD64)	2.6.18-164.el5	8.2.0.48.2p (*2)(*3)
Oracle Enterprise Linux 5.5 (IA32)	2.6.18-194.el5 2.6.18-194.el5PAE	8.2.0.63.3p (*2)(*3)
Oracle Enterprise Linux 5.5 (EM64T/AMD64)	2.6.18-194.el5	8.2.0.63.3p (*2)(*3)
Oracle Enterprise Linux 5.6 (IA32)	2.6.18-238.el5 2.6.18-238.el5PAE	8.2.0.87.1p (*2)(*3)
Oracle Enterprise Linux 5.6 (EM64T/AMD64)	2.6.18-238.el5	8.2.0.87.1p (*2)(*3)
Oracle Enterprise Linux 5.7 (IA32)	2.6.18-274.el5 2.6.18-274.el5PAE	8.2.0.96.2p (*2)(*3)
Oracle Enterprise Linux 5.7 (EM64T/AMD64)	2.6.18-274.el5	8.2.0.96.2p (*2)(*3)
Oracle Linux 6.5 (IA32)	2.6.32-431.el6.i686	8.3.7.21.4p (*2)(*3)

OS	Kernel	Driver
Oracle Linux 6.5 (EM64T/AMD64)	2.6.32-431.el6.x86_64	8.3.7.21.4p (*2)(*3)
Oracle Linux 6.6 (IA32)	2.6.32-504.el6.i686	10.2.802.1 (*2)(*3)
Oracle Linux 6.6 (EM64T/AMD64)	2.6.32-504.el6.x86_64	10.2.802.1 (*2)(*3)
Oracle Linux 6.7 (IA32)	2.6.32-573.el6.i686	10.6.0.20 (*2)(*3)
Oracle Linux 6.7 (EM64T/AMD64)	2.6.32-573.el6.x86_64	10.6.0.20 (*2)(*3)
Oracle Linux 7 (EM64T/AMD64)	3.10.0-123.el7.x86_64	8.3.7.34.3p (*2)(*3)
Oracle Linux 7.1 (EM64T/AMD64)	3.10.0-229.el7.x86_64	10.2.8021.1 (*2)(*3)
Oracle Unbreakable Enterprise Kernel 5.6 (EM64T/AMD64)	2.6.32-100.26.2.el5	8.3.18 (*2)(*3)
Oracle Unbreakable Enterprise Kernel 5.7 (IA32)	2.6.32-200.13.1.el5uek	8.3.5.44 (*2)(*3)
	2.6.32-300.27.1.el5uek	8.3.5.45.4p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 5.7 (EM64T/AMD64)	2.6.32-200.13.1.el5uek	8.3.5.44 (*2)(*3)
	2.6.32-300.27.1.el5uek	8.3.5.45.4p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 5.8 (IA32)	2.6.32-300.39.2.el5uek	8.3.5.45.4p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 5.8 (EM64T/AMD64)	2.6.32-300.39.2.el5uek	8.3.5.45.4p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 6.2 (IA32)	2.6.39-200.29.1.el6uek.i686	8.3.5.68.6p (*2)(*3)
	2.6.39-200.29.2.el6uek.i686	8.3.5.68.6p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 6.2 (EM64T/AMD64)	2.6.39-200.29.1.el6uek.x86_64	8.3.5.68.6p (*2)(*3)
	2.6.39-200.29.2.el6uek.x86_64	8.3.5.68.6p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 6.3 (IA32)	2.6.39-200.24.1.el6uek.i686	8.3.5.68.6p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 6.3 (EM64T/AMD64)	2.6.39-200.24.1.el6uek.x86_64	8.3.5.68.6p (*2)(*3)

OS	Kernel	Driver
Oracle Unbreakable Enterprise Kernel 6.4 (IA32)	2.6.39-400.211.1.el6uek.i686	8.3.7.26.3p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 6.4 (EM64T/AMD64)	2.6.39-400.211.1.el6uek.x86_64	8.3.7.26.3p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 6.5 (IA32)	2.6.39-400.211.1.el6uek.i686	8.3.7.26.3p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 6.5 (EM64T/AMD64)	3.8.13-16.2.1.el6uek.x86_64	8.3.7.26.2p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 6.5 (EM64T/AMD64)	3.8.13-44.el6uek.x86_64	8.3.7.34.4p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 6.6 (EM64T/AMD64)	3.8.13-44.1.1.el6uek.x86_64	8.3.7.34.4p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 6.6 (EM64T/AMD64)	3.8.13-68.el6uek.x86_64 3.8.13-68.2.2.el6uek.x86_64	10.6.61.0 (*2)(*3)
Oracle Unbreakable Enterprise Kernel 6.7 (IA32)	2.6.39-400.250.7.el6uek.i686	8.3.7.26.3p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 6.7 (EM64T/AMD64)	3.8.13-68.3.4.el6uek.x86_64	10.6.61.0 (*2)(*3)
Oracle Unbreakable Enterprise Kernel 6.8 (EM64T/AMD64)	4.1.12-37.4.1.el6uek.x86_64	11.0.0.13 (*2)(*3)
Oracle Unbreakable Enterprise Kernel 7 (EM64T/AMD64)	3.8.13-44.el7uek.x86_64	8.3.7.34.4p (*2)(*3)
Oracle Unbreakable Enterprise Kernel 7.1 (EM64T/AMD64)	3.8.13-55.1.6.el7uek.x86_64	10.2.8061.0 (*2)(*3)
Oracle Unbreakable Enterprise Kernel 7.1 (EM64T/AMD64)	3.8.13-68.el7uek.x86_64 3.8.13-68.2.2.el7uek.x86_64	10.6.61.0 (*2)(*3)
Oracle Unbreakable Enterprise Kernel 7.2 (EM64T/AMD64)	3.8.13-98.7.1.el7uek.x86_64	10.6.61.0 (*2)(*3)

Notes:

*1: AMD64 indicates the environments in which 64-bit kernel packages are installed on a system using an AMD Opteron processor.

*2: Use the driver bundled with the kernel.

*3: Using an HDLM device as the boot disk is supported.

*4: HDLM also supports the environments in which 32-bit kernel packages are installed on a system using an AMD Opteron processor.

*5: EM64T indicates the environments in which 64-bit kernel packages are installed on a system using an Intel EM64T processor.

*6: HP HBA drivers are supported.

*7: Supported SAN Boot by Kernel 2.6.18-53.1.21 or later.

*8: Supported by Kernel 2.6.18-164.11.1 or later.

*9: Supported by Kernel 2.6.9-89.0.11 or later.

*10: Supported by Kernel 2.6.32.36-0.5.2 or later.

(3) Hitachi

Hitachi HBA supports the environment combined with Hitachi Compute Blade only.

All drivers applied to Hitachi HBA cards for Hitachi Compute Blade are supported.

(4)IBM

OS	Kernel	Driver
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (IA32)	2.6.18-8.el5 2.6.18-8.el5PAE	8.02.12 (*1)(*3)
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (IPF)	2.6.18-8.el5	8.02.12 (*1)(*3)
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (EM64T/AMD64)	2.6.18-8.el5	8.02.12 (*1)(*3)
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (IA32)	2.6.18-53.el5 2.6.18-53.el5PAE	8.1.10.9 (*5) 8.02.12 (*1)(*3) 8.02.14 (*1)(*3)
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat	2.6.18-53.el5	8.1.10.9 (*5) 8.02.12 (*1)(*3)

OS	Kernel	Driver
Enterprise Linux 5.1 (IPF)		8.02.14 (*1)(*3)
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (EM64T/AMD64)	2.6.18-53.el5	8.1.10.9 (*5) 8.02.12 (*1)(*3) 8.02.14 (*1)(*3)
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (IA32)	2.6.18-92.el5 2.6.18-92.el5PAE	8.02.12 (*1)(*3) 8.02.14 (*1)(*3)
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (IPF)	2.6.18-92.el5	8.02.12 (*1)(*3) 8.02.14 (*1)(*3)
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (EM64T/AMD64)	2.6.18-92.el5	8.02.12 (*1)(*3) 8.02.14 (*1)(*3)
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (IA32)	2.6.18-128.el5 2.6.18-128.el5PAE	8.02.00.51 (*1) 8.03.01.06 (*8)
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (EM64T/AMD64)	2.6.18-128.el5	8.02.00.51 (*1) 8.03.01.06 (*8)
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (IA32)	2.6.18-164.el5 2.6.18-164.el5PAE	8.03.00.10.05.04-k (*1)(*3) 8.03.00.1.05.05-k (*1)(*3)(*6) 8.03.01.06 (*8)
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (EM64T/AMD64)	2.6.18-164.el5	8.03.00.10.05.04-k (*1)(*3) 8.03.00.1.05.05-k (*1)(*3)(*6) 8.03.01.06 (*8)
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (IA32)	2.6.18-194.el5 2.6.18-194.el5PAE	8.03.01.04.05.05-k (*1)(*3) 8.03.01.04.05.05-k (*1)(*3)(*7)(*8) 8.03.01.06 (*8)
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (EM64T/AMD64)	2.6.18-194.el5	8.03.01.04.05.05-k (*1)(*3) 8.03.01.04.05.05-k (*1)(*3)(*7)(*8) 8.03.01.06 (*8)
Red Hat Enterprise Linux 6.4 (IA32)	2.6.32-358.el6.i686	8.3.7.29-1
Red Hat Enterprise Linux 6.4 (EM64T/AMD64)	2.6.32-358.el6.x86_64	8.3.7.29-1

Notes:

*1: QLogic HBA drivers are supported.

*2: HDLM also supports the environments in which 32-bit kernel packages are installed on a system using an AMD Opteron processor.

*3: Since the failover function is Enable by default, change it to Disable. For changing the setting of the failover function to Disable, set the following in /etc/modprobe.conf file.

Example: When the driver version is 8.01.01.

options qla2xxx ql2xfailover=0

Refer to the document of the HBA attachment for details of the setting change of the failover function.

*4: The drivers mentioned in the page of "Hitachi Data Systems - HBA Approved Software" in the QLogic website are supported. Get the drivers from the following URL:

http://support.qlogic.com/support/oem_detail_hds.asp?oemid=84&classid=237

The above-mentioned URL may be changed without notice. When the URL is changed, look for the page of "Hitachi Data Systems - HBA Approved Software" in the QLogic website.

*5: Emulex HBA drivers are supported.

*6: Supported by Kernel 2.6.18-164.9.1 or later.

*7: The supported combination of IBM model and Bus I/F are shown below.

44X1945

*8: Using an HDLM device as the boot disk is supported.

(5) HP

OS	Kernel	Driver
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (IA32)	2.6.18-8.el5 2.6.18-8.el5PAE	8.1.10.11 8.2.0.33.3p (*9)
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (IPF)	2.6.18-8.el5	8.2.0.33.3p (*9)
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (EM64T/AMD64)	2.6.18-8.el5	8.1.10.11 8.2.0.33.3p (*9)
Red Hat Enterprise Linux 5.1 Advanced	2.6.18-53.el5 2.6.18-53.el5PAE	8.01.07.25 8.02.11

OS	Kernel	Driver
Platform/Red Hat Enterprise Linux 5.1 (IA32)		8.2.0.33.3p (*9) 8.01.07.25-2
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (IPF)	2.6.18-53.el5	8.2.0.33.3p (*9)
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (EM64T/AMD64)	2.6.18-53.el5	8.01.07.25 8.02.11 8.2.0.33.3p (*9) 8.01.07.25-2
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (IA32)	2.6.18-92.el5 2.6.18-92.el5PAE	8.01.07.25 8.02.11 8.2.0.22_p1 (*3)(*6)(*8) 8.2.0.33.3p (*9)
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (IPF)	2.6.18-92.el5	8.2.0.33.3p (*9)
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (EM64T/AMD64)	2.6.18-92.el5	8.01.07.25 8.02.11 8.2.0.22_p1 (*3)(*6)(*8) 8.2.0.33.3p (*9)
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (IA32)	2.6.18-128.el5 2.6.18-128.el5PAE	8.2.0.33.3p (*2)(*9)
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (IPF)	2.6.18-128.el5	8.2.0.33.3p (*2)(*9)
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (EM64T/AMD64)	2.6.18-128.el5	8.2.0.33.3p (*2)(*9)
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (IA32)	2.6.18-164.el5 2.6.18-164.el5PAE	8.03.00.10.05.04-k (*1)(*2)(*4) 8.03.00.1.05.05-k (*1)(*2)(*4)(*10) 8.2.0.48.2p (*2)(*9) 8.2.0.48.3p (*2)(*9) (*11) 8.03.01.05.05.06-k 8.03.03.15.05.06 (*3)
Red Hat Enterprise Linux 5.4 Advanced	2.6.18-164.el5	8.03.00.10.05.04-k (*1)(*2)(*4)

OS	Kernel	Driver
Platform/Red Hat Enterprise Linux 5.4 (IPF)		8.03.00.1.05.05-k (*1)(*2)(*4)(*10) 8.2.0.48.2p (*2)(*9) 8.2.0.48.3p (*2)(*9) (*11) 8.03.01.05.05.06-k
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (EM64T/AMD64)	2.6.18-164.el5	8.03.00.10.05.04-k (*1)(*2)(*4) 8.03.00.1.05.05-k (*1)(*2)(*4)(*10) 8.2.0.48.2p (*2)(*9) 8.2.0.48.3p (*2)(*9) (*11) 8.03.01.05.05.06-k 8.03.03.15.05.06 (*3)
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (IA32)	2.6.18-194.el5 2.6.18-194.el5PAE	8.03.01.04.05.05-k (*1)(*2)(*4) 8.2.0.63.3p (*2)(*9) 8.03.03.15.05.06 (*3) 8.03.07.03.5.6 (*3) 8.2.0.106-1 (*3) 8.2.0.134
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (IPF)	2.6.18-194.el5	8.2.0.63.3p (*2)(*9) 8.2.0.106-1 (*3) 8.2.0.134
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (EM64T/AMD64)	2.6.18-194.el5	8.03.01.04.05.05-k (*1)(*2)(*4) 8.2.0.63.3p (*2)(*9) 8.03.03.15.05.06 (*3) 8.03.07.03.5.6 (*3) 8.2.0.106-1 (*3) 8.2.0.134
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (IA32)	2.6.18-238.el5 2.6.18-238.el5PAE	8.03.07.03.5.6 (*3) 8.2.0.106-1 (*3) 8.2.0.134
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (IPF)	2.6.18-238.el5	8.2.0.106-1 (*3) 8.2.0.134
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (EM64T/AMD64)	2.6.18-238.el5	8.03.07.03.5.6 (*3) 8.2.0.106-1 (*3) 8.2.0.134

OS	Kernel	Driver
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (IA32)	2.6.18-274.el5 2.6.18-274.el5PAE	8.2.0.134 8.03.07.03.5.6 (*3) 8.03.07.14.5.6 (*3)
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (IPF)	2.6.18-274.el5	8.2.0.134
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (EM64T/AMD64)	2.6.18-274.el5	8.2.0.134 8.03.07.03.5.6 (*3) 8.03.07.14.5.6 (*3)
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (IA32)	2.6.18-308.el5 2.6.18-308.el5PAE	8.2.0.134 8.03.07.14.5.6 (*3) 8.04.00.10.5.6 (*3)
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (IPF)	2.6.18-308.el5	8.2.0.134
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (EM64T/AMD64)	2.6.18-308.el5	8.2.0.134 8.03.07.14.5.6 (*3) 8.04.00.10.5.6 (*3)
Red Hat Enterprise Linux 5.9 Advanced Platform/Red Hat Enterprise Linux 5.9 (IA32)	2.6.18-348.el5 2.6.18-348.el5PAE	8.04.00.10.5.6 (*3)
Red Hat Enterprise Linux 5.9 Advanced Platform/Red Hat Enterprise Linux 5.9 (EM64T/AMD64)	2.6.18-348.el5	8.04.00.10.5.6 (*3)
Red Hat Enterprise Linux 6 .2(EM64T/AMD64)	2.6.32-220.el6.x86_64	8.04.00.09.06.0-k (*3)
Red Hat Enterprise Linux 6 .4(EM64T/AMD64)	2.6.32-358.el6.x86_64	8.04.00.12.06.0-k2 8.07.00.08.06.0-k (*3)
Red Hat Enterprise Linux 6 .5(EM64T/AMD64)	2.6.32-431.el6.x86_64	8.07.00.23.06.0-k2
Red Hat Enterprise Linux 6 .6(EM64T/AMD64)	2.6.32-504.el6.x86_64	8.07.00.28.06.0-k1
Red Hat Enterprise Linux 6 .7(EM64T/AMD64)	2.6.32-573.el6.x86_64	8.07.00.28.06.0-k1
Red Hat Enterprise Linux 7(EM64T/AMD64)	3.10.0-123.el7.x86_64	8.07.00.28.07.0_k1

OS	Kernel	Driver
Red Hat Enterprise Linux 7.1(EM64T/AMD64)	3.10.0-229.el7.x86_64	8.07.00.28.07.0_k1
Red Hat Enterprise Linux 7.2(EM64T/AMD64)	3.10.0-327.el7.x86_64	8.07.00.28.07.0_k1

Notes:

*1: QLogic HBA drivers are supported.

*2: Use the driver bundled with the kernel.

*3: Using an HDLM device as the boot disk is supported.

*4: Since the failover function is Enable by default, change it to Disable. For changing the setting of the failover function to Disable, set the following in /etc/modprobe.conf file.

Example: When the driver version is 8.01.01.

options qla2xxx ql2xfailover=0

Refer to the document of the HBA attachment for details of the setting change of the failover function.

*5: The drivers mentioned in the page of "Hitachi Data Systems - HBA Approved Software" in the QLogic website are supported. Get the drivers from the following URL:

http://support.qlogic.com/support/oem_detail_hds.asp?oemid=84&classid=237

The above-mentioned URL may be changed without notice. When the URL is changed, look for the page of "Hitachi Data Systems - HBA Approved Software" in the QLogic website.

*6: The supported combinations of HP models and Bus I/Fs are shown below.

FC2143, FC2243, FC2142SR, FC2242SR

*7: HDLM also supports the environments in which 32-bit kernel packages are installed on a system using an AMD Opteron processor.

*8: The supported combinations of HP models and Bus I/Fs are shown below.

403621-B21

*9: Emulex HBA drivers are supported.

*10: Supported by Kernel 2.6.18-164.9.1 or later.

*11: Supported by Kernel 2.6.18-164.11.1 or later.

(6) Brocade

OS	Kernel	Driver
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (IA32)	2.6.18-53.el5 2.6.18-53.el5PAE	1.0.0.3 1.1.0.1 1.1.0.6 (*1) 2.1.0.0 (*1)
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (IPF)	2.6.18-53.el5	1.1.0.1 1.1.0.6 2.1.0.0 2.1.0.0
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (EM64T/AMD64)	2.6.18-53.el5	1.0.0.3 1.1.0.1 1.1.0.6 (*1) 2.1.0.0 (*1)
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (IA32)	2.6.18-92.el5 2.6.18-92.el5PAE	1.0.0.3 1.1.0.1 1.1.0.6 (*1) 2.1.0.0 (*1) 2.1.0.2
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (IPF)	2.6.18-92.el5	1.1.0.1 1.1.0.6 2.1.0.0 2.1.0.2
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (EM64T/AMD64)	2.6.18-92.el5	1.0.0.3 1.1.0.1 1.1.0.6 (*1) 2.1.0.0 (*1) 2.1.0.2
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (IA32)	2.6.18-128.el5 2.6.18-128.el5PAE	1.1.0.6 (*1) 2.1.0.0 (*1) 2.1.0.2 2.2.0.0 2.3.0.0 3.0.0.0
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (IPF)	2.6.18-128.el5	1.1.0.6 2.1.0.0 2.1.0.2 2.2.0.0 2.3.0.0 3.0.0.0

OS	Kernel	Driver
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (EM64T/AMD64)	2.6.18-128.el5	1.1.0.6 (*1) 2.1.0.0 (*1) 2.1.0.2 2.2.0.0 2.3.0.0 3.0.0.0
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (IA32)	2.6.18-164.el5 2.6.18-164.el5PAE	2.1.0.0 (*1) 2.1.0.2 2.2.0.0 (*1) 2.3.0.0 (*1) 3.0.0.0
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (IPF)	2.6.18-164.el5	2.1.0.0 2.1.0.2 2.2.0.0 (*1) 2.3.0.0 (*1) 3.0.0.0
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (EM64T/AMD64)	2.6.18-164.el5	2.1.0.0 (*1) 2.1.0.2 2.2.0.0 (*1) 2.3.0.0 (*1) 3.0.0.0
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (IA32)	2.6.18-194.el5 2.6.18-194.el5PAE	2.1.0.0 2.2.0.0 (*1) 2.3.0.0 (*1) 3.0.0.0 (*1)
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (IPF)	2.6.18-194.el5	2.1.0.0 2.2.0.0 (*1) 2.3.0.0 (*1) 3.0.0.0 (*1)
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (EM64T/AMD64)	2.6.18-194.el5	2.1.0.0 2.2.0.0 (*1) 2.3.0.0 (*1) 3.0.0.0 (*1)
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (IA32)	2.6.18-238.el5 2.6.18-238.el5PAE	3.0.0.0 (*1)

OS	Kernel	Driver
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (IPF)	2.6.18-238.el5	3.0.0.0 (*1)
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (EM64T/AMD64)	2.6.18-238.el5	3.0.0.0 (*1)
Red Hat Enterprise Linux 6 (IA32)	2.6.32-71.el6.i686	2.3.0.0 (*1)
Red Hat Enterprise Linux 6 (EM64T/AMD64)	2.6.32-71.el6.x86_64	2.3.0.0 (*1)
Red Hat Enterprise Linux 6.1 (IA32)	2.6.32-131.0.15.el6.i686	3.0.0.0 (*1)
Red Hat Enterprise Linux 6 .1(EM64T/AMD64)	2.6.32-131.0.15.el6.x86_64	3.0.0.0 (*1)
SUSE LINUX Enterprise Server 11 (IA32)	2.6.27.21-0.1.2-default 2.6.27.21-0.1.2-pae	2.1.0.0 2.2.0.0 (*1)
	2.6.32.12-0.7.1-default 2.6.32.12-0.7.1-pae 2.6.32.12-0.7.1-xen	2.3.0.0 (*1)
SUSE LINUX Enterprise Server 11 (IPF)	2.6.27.21-0.1.2-default	2.1.0.0 2.2.0.0 (*1)
	2.6.32.12-0.7.1-default	2.3.0.0 (*1)
SUSE LINUX Enterprise Server 11 (EM64T/AMD64)	2.6.27.21-0.1.2-default	2.1.0.0 2.2.0.0 (*1)
	2.6.32.12-0.7.1-default 2.6.32.12-0.7.1-xen	2.3.0.0 (*1)

Note:

*1: Using an HDLM device as the boot disk is supported.

(7) Cisco

OS	Kernel	Driver
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (EM64T/AMD64)	2.6.18-194.el5	1.4.0.145
Red Hat Enterprise Linux 5.9 Advanced Platform/Red Hat Enterprise Linux 5.9 (EM64T/AMD64)	2.6.18-348.el5	1.6.0.12b (*1) 1.6.0.18 (*1)
Red Hat Enterprise Linux 5.10 Advanced Platform/Red Hat Enterprise Linux 5.10 (EM64T/AMD64)	2.6.18-371.el5	1.6.0.23 (*1)
Red Hat Enterprise Linux 6.6 (EM64T/AMD64)	2.6.32-504.el6.x86_64	1.6.0.12b (*1) 1.6.0.18 (*1) 1.6.0.23 (*1)

Note:

*1: Using an HDLM device as the boot disk is supported.

Use the Fibre Channel over Ethernet (FCoE) I/F adapters given below. When using two or more adapters, use the same type of adapter. If you combine different types of HBA, HDLM may not be able to switch a path when an error occurs.

(1) QLogic (*1)

OS	Kernel	Driver
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (IA32)	2.6.18-128.el5 2.6.18-128.el5PAE	8.03.00.09
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (IPF)	2.6.18-128.el5	8.03.00.09
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (EM64T/AMD64)	2.6.18-128.el5	8.03.00.09
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (IA32)	2.6.18-164.el5 2.6.18-164.el5PAE	8.03.03.15.05.06
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (EM64T/AMD64)	2.6.18-164.el5	8.03.03.15.05.06
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (IA32)	2.6.18-194.el5 2.6.18-194.el5PAE	8.03.03.15.05.06
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (EM64T/AMD64)	2.6.18-194.el5	8.03.03.15.05.06
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (IA32)	2.6.18-274.el5 2.6.18-274.el5PAE	8.03.07.03.05.07-k
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (IPF)	2.6.18-274.el5	8.03.07.03.05.07-k

OS	Kernel	Driver
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (EM64T/AMD64)	2.6.18-274.el5	8.03.07.03.05.07-k
Red Hat Enterprise Linux 6 (IA32)	2.6.32-71.el6.i686	8.03.04.12.06.0-k0
Red Hat Enterprise Linux 6 (EM64T/AMD64)	2.6.32-71.el6.x86_64	8.03.04.12.06.0-k0
Red Hat Enterprise Linux 6.3 (IA32)	2.6.32-279.el6.i686	8.04.00.04.06.3-k
Red Hat Enterprise Linux 6.3 (EM64T/AMD64)	2.6.32-279.el6.x86_64	8.04.00.04.06.3-k
Red Hat Enterprise Linux 6.4 (IA32)	2.6.32-358.el6.i686	8.07.00.08.06.0-k
Red Hat Enterprise Linux 6.4 (EM64T/AMD64)	2.6.32-358.el6.x86_64	8.07.00.08.06.0-k
Red Hat Enterprise Linux 6.5 (IA32)	2.6.32-431.el6.i686	8.07.00.08.06.0-k
Red Hat Enterprise Linux 6.5 (EM64T/AMD64)	2.6.32-431.el6.x86_64	8.07.00.08.06.0-k
SUSE LINUX Enterprise Server 11 (IA32)	2.6.27.21-0.1.2-default 2.6.27.21-0.1.2-pae	8.03.01.15.11.0-k4
	2.6.27.21-0.1.2-xen	8.03.01.15.11.0-k4
	2.6.32.12-0.7.1-default 2.6.32.12-0.7.1-pae	8.03.04.14.11.1-k0
	2.6.32.12-0.7.1-xen	8.03.04.14.11.1-k0
SUSE LINUX Enterprise Server 11 (EM64T/AMD64)	2.6.27.21-0.1.2-default	8.03.01.15.11.0-k4
	2.6.27.21-0.1.2-xen	8.03.01.15.11.0-k4
	2.6.32.12-0.7.1-default	8.03.04.14.11.1-k0
	2.6.32.12-0.7.1-xen	8.03.04.14.11.1-k0

Notes:

*1: Do not use the HBA driver's failover function.

Check the setting for the failover function by performing the following procedure:

- For Red Hat Enterprise Linux 5.3 Advanced Platform, Red Hat Enterprise Linux 5.3, Red Hat Enterprise Linux 5.4 Advanced Platform, Red Hat Enterprise Linux 5.4, Red Hat Enterprise Linux 5.5 Advanced Platform, Red Hat Enterprise Linux 5.5, Red Hat Enterprise Linux 5.7 Advanced Platform, Red

Hat Enterprise Linux 5.7, Red Hat Enterprise Linux 6, Red Hat Enterprise Linux 6.3, and SUSE LINUX Enterprise Server 11:

1) Execute the following command to check the version of the driver:

cat /sys/class/scsi_host/hostn/driver_version

n: the instance number of the HBA port

2) Check the output result to see whether the characters "fo" are added to the version notation.

- When the failover function is enabled:

  8.01.07-k1-fo

- When the failover function is disabled:

  8.01.07-k1

(2) Emulex

OS	Kernel	Driver
Red Hat Enterprise Linux AS4.6/ES4.6 (IA32)	2.6.9-67.EL 2.6.9-67.ELsmp 2.6.9-67.ELhugemem	8.0.16.44
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (IA32)	2.6.18-8.el5 2.6.18-8.el5PAE	8.2.0.29
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (IPF)	2.6.18-8.el5	8.2.0.29
Red Hat Enterprise Linux 5 Advanced Platform/Red Hat Enterprise Linux 5 (EM64T/AMD64)	2.6.18-8.el5	8.2.0.29
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (IA32)	2.6.18-53.el5 2.6.18-53.el5PAE	8.2.0.29
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (IPF)	2.6.18-53.el5	8.2.0.29
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (EM64T/AMD64)	2.6.18-53.el5	8.2.0.29

OS	Kernel	Driver
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (IA32)	2.6.18-92.el5 2.6.18-92.el5PAE	8.2.0.29
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (IPF)	2.6.18-92.el5	8.2.0.29
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (EM64T/AMD64)	2.6.18-92.el5	8.2.0.29
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (IA32)	2.6.18-164.el5 2.6.18-164.el5PAE	8.2.0.71
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (IPF)	2.6.18-164.el5	8.2.0.71
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (EM64T/AMD64)	2.6.18-164.el5	8.2.0.71
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (IA32)	2.6.18-194.el5 2.6.18-194.el5PAE	8.2.0.71 8.2.0.96 8.2.0.126
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (IPF)	2.6.18-194.el5	8.2.0.71 8.2.0.126
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (EM64T/AMD64)	2.6.18-194.el5	8.2.0.71 8.2.0.96 8.2.0.126
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (IA32)	2.6.18-238.el5 2.6.18-238.el5PAE	8.2.0.96 8.2.0.126
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (IPF)	2.6.18-238.el5	8.2.0.126

OS	Kernel	Driver
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (EM64T/AMD64)	2.6.18-238.el5	8.2.0.96 8.2.0.126
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (IA32)	2.6.18-274.el5 2.6.18-274.el5PAE	8.2.0.126
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (IPF)	2.6.18-274.el5	8.2.0.126
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (EM64T/AMD64)	2.6.18-274.el5	8.2.0.126
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (IA32)	2.6.18-308.el5 2.6.18-308.el5PAE	8.2.0.108.4p (*2)
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (IPF)	2.6.18-308.el5	8.2.0.108.4p (*2)
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (EM64T/AMD64)	2.6.18-308.el5	8.2.0.108.4p (*2)
Red Hat Enterprise Linux 6 (IA32)	2.6.32-71.el6.i686	8.3.5.65 (*1)
Red Hat Enterprise Linux 6 (EM64T/AMD64)	2.6.32-71.el6.x86_64	8.3.5.65 (*1)
Red Hat Enterprise Linux 6.1 (IA32)	2.6.32-131.0.15.el6.i686	8.3.5.30.1p 8.3.5.65 (*1)
Red Hat Enterprise Linux 6 .1(EM64T/AMD64)	2.6.32-131.0.15.el6.x86_64	8.3.5.30.1p 8.3.5.65 (*1)
Red Hat Enterprise Linux 6.2 (IA32)	2.6.32-220.el6.i686	8.3.5.65 (*1)
Red Hat Enterprise Linux 6.2 (EM64T/AMD64)	2.6.32-220.el6.x86_64	8.3.5.65 (*1)
Red Hat Enterprise Linux 6.5 (IA32)	2.6.32-431.el6.i686	10.2.370.12

OS	Kernel	Driver
Red Hat Enterprise Linux 6.5 (EM64T/AMD64)	2.6.32-431.el6.x86_64	10.2.370.12
Red Hat Enterprise Linux 6.6 (IA32)	2.6.32-504.el6.i686	10.2.273.0r
Red Hat Enterprise Linux 6.6 (EM64T/AMD64)	2.6.32-504.el6.x86_64	10.2.273.0r
Red Hat Enterprise Linux 7.1 (EM64T/AMD64)	3.10.0-229.el7.x86_64	10.2.8021.1
SUSE LINUX Enterprise Server 11 (IA32)	2.6.32.12-0.7.1-default 2.6.32.12-0.7.1-pae 2.6.32.12-0.7.1-xen	8.3.5.35
SUSE LINUX Enterprise Server 11 (EM64T/AMD64)	2.6.32.12-0.7.1-default 2.6.32.12-0.7.1-xen	8.3.5.35
Oracle Unbreakable Enterprise Kernel 6.6 (EM64T/AMD64)	3.8.13-44.1.1.el6uek.x86_64	8.3.7.34.4p (*2)
Oracle Unbreakable Enterprise Kernel 7.1 (EM64T/AMD64)	3.8.13-55.1.6.el7uek.x86_64	10.2.8061.0 (*2)

Notes:

*1: Using an HDLM device as the boot disk is supported.

*2: Use the driver bundled with the kernel.

(3) Brocade

OS	Kernel	Driver
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (IA32)	2.6.18-53.el5 2.6.18-53.el5PAE	2.1.0.0 (*1)
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (IPF)	2.6.18-53.el5	2.1.0.0
Red Hat Enterprise Linux 5.1 Advanced Platform/Red Hat Enterprise Linux 5.1 (EM64T/AMD64)	2.6.18-53.el5	2.1.0.0 (*1)

OS	Kernel	Driver
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (IA32)	2.6.18-92.el5 2.6.18-92.el5PAE	2.1.0.0 (*1)
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (IPF)	2.6.18-92.el5	2.1.0.0
Red Hat Enterprise Linux 5.2 Advanced Platform/Red Hat Enterprise Linux 5.2 (EM64T/AMD64)	2.6.18-92.el5	2.1.0.0 (*1)
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (IA32)	2.6.18-128.el5 2.6.18-128.el5PAE	2.1.0.0 (*1) 2.2.0.0 2.3.0.0
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (IPF)	2.6.18-128.el5	2.1.0.0 2.2.0.0 2.3.0.0
Red Hat Enterprise Linux 5.3 Advanced Platform/Red Hat Enterprise Linux 5.3 (EM64T/AMD64)	2.6.18-128.el5	2.1.0.0 (*1) 2.2.0.0 2.3.0.0
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (IA32)	2.6.18-164.el5 2.6.18-164.el5PAE	2.1.0.0 (*1) 2.2.0.0 (*1) 2.3.0.0 (*1)
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (IPF)	2.6.18-164.el5	2.1.0.0 2.2.0.0 (*1) 2.3.0.0 (*1)
Red Hat Enterprise Linux 5.4 Advanced Platform/Red Hat Enterprise Linux 5.4 (EM64T/AMD64)	2.6.18-164.el5	2.1.0.0 (*1) 2.2.0.0 (*1) 2.3.0.0 (*1)
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (IA32)	2.6.18-194.el5 2.6.18-194.el5PAE	2.1.0.0 2.2.0.0 (*1) 2.3.0.0 (*1)
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (IPF)	2.6.18-194.el5	2.1.0.0 2.2.0.0 (*1) 2.3.0.0 (*1)

OS	Kernel	Driver
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (EM64T/AMD64)	2.6.18-194.el5	2.1.0.0 2.2.0.0 (*1) 2.3.0.0 (*1)
Red Hat Enterprise Linux 6 (IA32)	2.6.32-71.el6.i686	2.3.0.0 (*1)
Red Hat Enterprise Linux 6 (EM64T/AMD64)	2.6.32-71.el6.x86_64	2.3.0.0 (*1)
SUSE LINUX Enterprise Server 11 (IA32)	2.6.27.21-0.1.2-default 2.6.27.21-0.1.2-pae	2.1.0.0
	2.6.32.12-0.7.1-default 2.6.32.12-0.7.1-pae 2.6.32.12-0.7.1-xen	2.3.0.0 (*1)
SUSE LINUX Enterprise Server 11 (IPF)	2.6.27.21-0.1.2-default	2.1.0.0
	2.6.32.12-0.7.1-default	2.3.0.0 (*1)
SUSE LINUX Enterprise Server 11 (EM64T/AMD64)	2.6.27.21-0.1.2-default	2.1.0.0
	2.6.32.12-0.7.1-default 2.6.32.12-0.7.1-xen	2.3.0.0 (*1)

Notes:

*1: Using an HDLM device as the boot disk is supported.

(4) HP

OS	Kernel	Driver
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (IA32)	2.6.18-274.el5 2.6.18-274.el5PAE	8.2.0.136
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (EM64T/AMD64)	2.6.18-274.el5	8.2.0.136
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (IA32)	2.6.18-308.el5 2.6.18-308.el5PAE	8.2.0.136

OS	Kernel	Driver
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (EM64T/AMD64)	2.6.18-308.el5	8.2.0.136
Red Hat Enterprise Linux 6.1 (EM64T/AMD64)	2.6.32-131.0.15.el6.x86_64	8.3.5.77.1p
Red Hat Enterprise Linux 6.2 (EM64T/AMD64)	2.6.32-220.el6.x86_64	8.3.5.77.1p

(5) Cisco

OS	Kernel	Driver
Red Hat Enterprise Linux 5.5 Advanced Platform/Red Hat Enterprise Linux 5.5 (EM64T/AMD64)	2.6.18-194.el5	1.5.0.1 (*1)
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (EM64T/AMD64)	2.6.18-238.el5	1.4.0.145 (*1) 1.5.0.1 (*1)
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (EM64T/AMD64)	2.6.18-274.el5	1.5.0.1 (*1) 1.5.0.20 (*1)
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (EM64T/AMD64)	2.6.18-308.el5	1.5.0.1 (*1)
Red Hat Enterprise Linux 5.9 Advanced Platform/Red Hat Enterprise Linux 5.9 (EM64T/AMD64)	2.6.18-348.el5	1.6.0.12 (*3)
Red Hat Enterprise Linux 6.0 (EM64T/AMD64)	2.6.32-71.el6.x86_64	1.5.0.1 (*1)
Red Hat Enterprise Linux 6.1 (EM64T/AMD64)	2.6.32-131.0.15.el6.x86_64	1.5.0.1 (*1)
Red Hat Enterprise Linux 6.2 (EM64T/AMD64)	2.6.32-220.el6.x86_64	1.5.0.1 (*1)
Red Hat Enterprise Linux 6.4 (EM64T/AMD64)	2.6.32-358.el6.x86_64	1.5.0.45 (*2) 1.6.0.12b (*2) 1.6.0.18 (*2)
Red Hat Enterprise Linux 6.5 EM64T/AMD64)	2.6.32-431.el6.x86_64	1.5.0.45

Notes:

*1: Only using an HDLM device as the boot disk is supported.

*2: Using an HDLM device as the boot disk is not supported.

*3: Using an HDLM device as the boot disk is supported.

Use the iSCSI connections given below. When using two or more adapters, use the same type of adapter. If you combine different types of HBA, HDLM may not be able to switch a path when an error occurs.

(1) Red Hat

OS	Kernel	Driver Type	Driver
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (IA32)	2.6.18-238.el5 2.6.18-238.el5PAE	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (IPF)	2.6.18-238.el5	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 5.6 Advanced Platform/Red Hat Enterprise Linux 5.6 (EM64T/AMD64)	2.6.18-238.el5	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (IA32)	2.6.18-274.el5 2.6.18-274.el5PAE	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (IPF)	2.6.18-274.el5	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 5.7 Advanced Platform/Red Hat Enterprise Linux 5.7 (EM64T/AMD64)	2.6.18-274.el5	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (IA32)	2.6.18-308.el5 2.6.18-308.el5PAE	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (IPF)	2.6.18-308.el5	iSCSI Initiator (*1)(*2)	Bundle(*3)

OS	Kernel	Driver Type	Driver
Red Hat Enterprise Linux 5.8 Advanced Platform/Red Hat Enterprise Linux 5.8 (EM64T/AMD64)	2.6.18-308.el5	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 5.9 Advanced Platform/Red Hat Enterprise Linux 5.9 (IA32)	2.6.18-348.el5 2.6.18-348.el5PAE	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 5.9 Advanced Platform/Red Hat Enterprise Linux 5.9 (IPF)	2.6.18-348.el5	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 5.9 Advanced Platform/Red Hat Enterprise Linux 5.9 (EM64T/AMD64)	2.6.18-348.el5	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 6.1 (IA32)	2.6.32-131.0.15.el6.i686	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 6.1 (EM64T/AMD64)	2.6.32-131.0.15.el6.x86_64	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 6.2 (IA32)	2.6.32-220.el6.i686	iSCSI Initiator (*1)(*2)	Bundle(*4)
Red Hat Enterprise Linux 6.2 (EM64T/AMD64)	2.6.32-220.el6.x86_64	iSCSI Initiator (*1)(*2)	Bundle(*4)
Red Hat Enterprise Linux 6.3 (IA32)	2.6.32-279.el6.i686	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 6.3 (EM64T/AMD64)	2.6.32-279.el6.x86_64	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 6.4 (IA32)	2.6.32-358.el6.i686	iSCSI Initiator (*1)(*2)	Bundle(*4)
Red Hat Enterprise Linux 6.4 (EM64T/AMD64)	2.6.32-358.el6.x86_64	iSCSI Initiator (*1)(*2)	Bundle (*4)
Red Hat Enterprise Linux 6.7 (IA32)	2.6.32-573.el6.i686	iSCSI Initiator (*1)(*2)	Bundle(*3)

OS	Kernel	Driver Type	Driver
Red Hat Enterprise Linux 6.7 (EM64T/AMD64)	2.6.32-573.el6.x86_64	iSCSI Initiator (*1)(*2)	Bundle (*3)
Red Hat Enterprise Linux 6.8 (IA32)	2.6.32-642.el6.i686	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 6.8 (EM64T/AMD64)	2.6.32-642.el6.x86_64	iSCSI Initiator (*1)(*2)	Bundle (*3)
Red Hat Enterprise Linux 7 (EM64T/AMD64)	3.10.0-123.el7.x86_64	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 7.1 (EM64T/AMD64)	3.10.0-229.el7.x86_64	iSCSI Initiator (*1)(*2)	Bundle(*3)
Red Hat Enterprise Linux 7.2 (EM64T/AMD64)	3.10.0-327.el7.x86_64	iSCSI Initiator (*1)(*2)	Bundle(*3)

Notes:

*1: 1GbE NIC is supported. 10GbE NIC is not supported.

*2: iSCSI HBA/CNA is not supported.

*3: Using an HDLM device as the boot disk is not supported.

*4: Using an HDLM device as the boot disk is supported.

(2) Emulex

OS	Kernel	Driver Type	Driver
Red Hat Enterprise Linux 6.2 (IA32)	2.6.32-220.el6.i686	iSCSI HBA/CAN	4.1.334.15 (*1)
			4.2.374.0 (*2)(*3)
Red Hat Enterprise Linux 6.2 (EM64T/AMD64)	2.6.32-220.el6.x86_64	iSCSI HBA/CNA	4.1.334.15 (*1)
			4.2.374.0 (*2)(*3)
Red Hat Enterprise Linux 6.4 (IA32)	2.6.32-358.el6.i686	iSCSI HBA/CAN	4.2.374.0 (*2)(*3)

OS	Kernel	Driver Type	Driver
Red Hat Enterprise Linux 6.4 (EM64T/AMD64)	2.6.32-358.el6.x86_64	iSCSI HBA/CNA	4.2.374.0 (*2)(*3)
Red Hat Enterprise Linux 6.5 (IA32)	2.6.32-431.el6.i686	iSCSI CNA	Bundle (*2)
Red Hat Enterprise Linux 6.5 (EM64T/AMD64)	2.6.32-431.el6.x86_64	iSCSI CNA	Bundle (*2)
Red Hat Enterprise Linux 6.6 (IA32)	2.6.32-504.el6.i686	iSCSI CNA	Bundle (*2)
Red Hat Enterprise Linux 6.6 (EM64T/AMD64)	2.6.32-504.el6.x86_64	iSCSI CNA	Bundle (*2)
Red Hat Enterprise Linux 7.1 (EM64T/AMD64)	3.10.0-229.el7.x86_64	iSCSI CNA	Bundle (*2)

Notes:

*1: Using an HDLM device as the boot disk is not supported.

*2: Using an HDLM device as the boot disk is supported.

*3: CNA F/W 4.2.433.604 or later is required.

(3) Novell

OS	Kernel	Driver Type	Driver
SUSE LINUX Enterprise Server 11 (IA32)	2.6.27.21-0.1.2-default 2.6.27.21-0.1.2-pae	iSCSI Initiator (*1)(*2)	Bundle(*3)
	2.6.27.21-0.1.2-xen		
	2.6.32.12-0.7.1-default 2.6.32.12-0.7.1-pae		
	2.6.32.12-0.7.1-xen		
	3.0.13-0.27-default 3.0.13-0.27-pae		
	3.0.76-0.11-default 3.0.76-0.11-pae		
SUSE LINUX Enterprise Server 11 (IPF)	2.6.27.21-0.1.2-default	iSCSI Initiator (*1)(*2)	Bundle(*3)
	2.6.32.12-0.7.1-default		
	3.0.13-0.27-default		
	3.0.76-0.11-default		
SUSE LINUX Enterprise Server 11 (EM64T/AMD64)	2.6.27.21-0.1.2-default	iSCSI Initiator (*1)(*2)	Bundle(*3)
	2.6.27.21-0.1.2-xen		
	2.6.32.12-0.7.1-default		
	2.6.32.12-0.7.1-xen		
	3.0.13-0.27-default		

	3.0.76-0.11-default		
	3.0.76-0.11-xen		
SUSE LINUX Enterprise Server 12 (EM64T/AMD64)	3.12.28-4-default	iSCSI Initiator (*1)(*2)	Bundle(*3)
	3.12.28-4-xen		
	3.12.59-60.45-default		
	3.12.59-60.45-xen		

Notes:

*1: 1GbE NIC is supported. 10GbE NIC is not supported.

*2: iSCSI HBA/CNA is not supported.

*3: Using an HDLM device as the boot disk is not supported.

Copyrights and licenses

Hitachi, Ltd., reserves the right to make changes to this document at any time without notice and assumes no responsibility for its use. This document contains the most current information available at the time of publication. When new or revised information becomes available, this entire document will be updated and distributed to all registered users.

Some of the features described in this document might not be currently available. Refer to the most recent product announcement for information about feature and product availability, or contact Hitachi, Ltd., at https://support.hds.com/en_us/contact-us.html.

Notice: Hitachi, Ltd., products and services can be ordered only under the terms and conditions of the applicable Hitachi Data Systems Corporation agreements. The use of Hitachi, Ltd., products is governed by the terms of your agreements with Hitachi Data Systems Corporation.

By using this software, you agree that you are responsible for:

1) Acquiring the relevant consents as may be required under local privacy laws or otherwise from employees and other individuals to access relevant data; and

2) Verifying that data continues to be held, retrieved, deleted, or otherwise processed in accordance with relevant laws.

Notice on Export Controls. The technical data and technology inherent in this Document may be subject to U.S. export control laws, including the U.S. Export Administration Act and its associated regulations, and may be subject to export or import regulations in other countries. Reader agrees to comply strictly with all such regulations and acknowledges that Reader has the responsibility to obtain licenses to export, re-export, or import the Document and any Compliant Products.

Hitachi is a registered trademark of Hitachi, Ltd., in the United States and other countries. Hitachi Data Systems is a registered trademark and service mark of Hitachi, Ltd., in the United States and other countries.

Archivas, BlueArc, Essential NAS Platform, HiCommand, Hi-Track, ShadowImage, Tagmaserve, Tagmasoft, Tagmasolve, Tagmastore, TrueCopy, Universal Star Network, and Universal Storage Platform are registered trademarks of Hitachi Data Systems Corporation.

AIX, AS/400, DB2, Domino, DS6000, DS8000, Enterprise Storage Server, ESCON, FICON, FlashCopy, IBM, MVS, Lotus, OS/390, RS6000, S/390, System z9, System z10, Tivoli, VM/ESA, z/OS, z9, z10, zSeries, z/VM, and z/VSE are registered trademarks and DS6000, MVS, and z10 are trademarks of International Business Machines Corporation.