Hitachi Dynamic Link Manager (for Windows®) 8.5.0-00 Release Notes

Contents

About this document

This document (RN-00HS272-37, October 2016) provides late-breaking information about Hitachi Dynamic Link Manager (for Windows) 8.5.0-00. 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 Hitachi Dynamic Link Manager (for Windows).

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.

Product package contents

Medium	CD-ROM	Revision	Release Type	Prerequisite version of Service Pack
Software	Hitachi Dynamic Link Manager (for Windows)	8.5.0-00	Full Package	-
Documents	Hitachi Command Suite Dynamic Link Manager (for Windows®) User Guide	MK-92DLM129-39		

New features and important enhancements

[8.5.0-00 Additional Functions and Modifications]

(1) 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 User Guide for Windows®.

Host

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

- Hitachi Command Suite Dynamic Link Manager User Guide for Windows®
  Chapter 3. Creating an HDLM environment - HDLM system requirements - OSs supported by HDLM

Supported OSs in a HAM environment are listed below:

Supported OS
Windows Server 2008(x86/x64/IPF)
Windows Server 2008 R2(x64/IPF)
Windows Server 2012(x64)
Windows Server 2012 R2(x64)

Supported cluster software in a HAM environment is listed below:

OS	Service Pack	Cluster software
Windows Server 2008(x86/x64)	SP2	Microsoft Failover Cluster
Windows Server 2008 R2(x64/IPF)	No service pack/SP1	Microsoft Failover Cluster
Windows Server 2012 (x64)	No service pack	Microsoft Failover Cluster (*1)
Windows Server 2012 R2 (x64)	No service pack	Microsoft Failover Cluster (*1)

*1: A Cluster Shared Volume (CSV) is not supported.

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, refer to the following manual:

- Hitachi Command Suite Dynamic Link Manager User Guide for Windows®
  Chapter 3. Creating an HDLM environment - HDLM system eequirements - Storage systems supported by HDLM

When the Dynamic I/O Path Control function is enabled on Hitachi AMS 2000 series, use a microprogram version 08B8/D or later.

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
- HUS VM

The required microprogram versions are listed below:

Storage system	Interface	Microprogram version	Remark
Universal Storage Platform V/VM	FC I/F	60-06-10-XX/XX or later	X: voluntary number
		60-07-11-XX/XX or later (*1)	
Virtual Storage Platform	FC I/F	70-01-42-XX/XX or later	X: voluntary number
		70-03-00-XX/XX or later (*2)	
XP24000/XP20000	FC I/F	60-06-10-XX/XX or later	X: voluntary number
		60-07-11-XX/XX or later (*1)	
P9500	FC I/F	70-01-42-XX/XX or later	X: voluntary number
		70-03-00-XX/XX or later (*2)	
HUS VM	FC I/F	73-03-0X-XX/XX or later	X: voluntary number

*1: If you use the HAM functionality with Microsoft Failover Cluster, apply 60-07-11-XX/XX or later.

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

Operating Systems Requirements

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

- Hitachi Command Suite Dynamic Link Manager User Guide for Windows®
  Chapter 3. Creating an HDLM environment - HDLM system requirements - 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 User Guide for Windows®
  Chapter 3. Creating an HDLM environment - HDLM system requirements - Cluster software supported by HDLM

- Hitachi Command Suite Dynamic Link Manager User Guide for Windows®
  Chapter 3. Creating an HDLM environment - HDLM system requirements - Volume managers supported by HDLM

Supported Oracle RAC version:

OS	Version	DB File
Windows 2008 (x86) no SP	10.2.0.4.0	ASM/ OCFS/ Raw
	11.2.0.3	ASM
Windows 2008 (x86) SP2	11.1.0.7.0	ASM/ Raw
	11.2.0.3(*1)	ASM
Windows 2008 (x64) no SP	10.2.0.4.0	ASM/ OCFS/ Raw
	11.1.0.7.0	ASM/ Raw
	11.2.0.4(*1)	ASM
Windows 2008 (x64) SP2	11.1.0.7.0	ASM
	11.2.0.1.0	ASM/ OCFS
	11.2.0.3.0(*1)	ASM
	11.2.0.4(*1)	ASM
Windows 2008 (x64) R2 no SP	10.2.0.5.0	Raw
	11.2.0.1.0	ASM
	11.2.0.2.0	ASM
Windows 2008 (x64) R2 SP1	10.2.0.2.0	ASM
	11.2.0.1.0	ASM
Windows 2012 (x64) no SP	11.2.0.4.0(*1)	ASM
	12.1.0.2(*1)	ASM
Windows 2012 (x64) R2 no SP	11.2.0.4.0(*1)	ASM
	12.1.0.2(*1)	ASM

*1: It is recommended that you use external redundancy for ASM disk groups. To use normal or high redundancy, contact the Oracle Corporation.

Note:

(1) A configuration where Oracle RAC is installed on OCFS to share Oracle is not supported.

Memory and Disk Space Requirements

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

- Hitachi Command Suite Dynamic Link Manager User Guide for Windows®
  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 User Guide for Windows®
  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) When HDLM 8.2.0-00 or later is used, SNMP traps are no longer sent to HGLM after 248 days pass from the startup of the HDLM manager.

[Conditions]
This problem occurs when all of the following conditions are met:
(a) HGLM 8.2.0-00 or later is used to manage a host on which HDLM 8.2.0-00 to 8.4.1-00 is installed.
(b) In HGLM, the alert notification function for receiving alerts from the host is enabled.
(c) 248 days have passed from the startup of the HDLM manager.

[Case ID]
None.

Known problems

(1) In VSP G200, G400, G600, G800, G1000, G1500, VSP F400, F600, F800, F1500, VSP, USP V/VM, XP7, P9500, XP24000/20000, and Hitachi Unified Storage VM, LUN 0 to 2047 can be assigned, but the support range for HDLM is from 0 to 255. Therefore, HDLM cannot recognize LUs of 256 to 2047.

(2) The Emulex FC Port Driver cannot be used.

(3) In Windows 2008(IPF and x64) and Windows 2012 environment, the output function of performance information using Windows performance monitor console is not supported.

(4) HDLM does not support the Microsoft Cluster Service and Microsoft Failover Cluster in an environment where Veritas Storage Foundation 5.1 for Windows is used.

(5) When executing the DLMgetras (utility for collecting error information), specify an output directory which contains only alphanumeric characters. If it contains characters other than an alphanumeric character, the collected information may be outputted to a wrong directory. And when changing the output directory of DLMgetras utility executed from the Windows Start menu, do not enclose the output directory name in double quotation marks (").

(6) When HDLM performance information is outputted in counter log of Windows performance monitor, counter log file with binary format is not supported. If counter log file with binary format is created, the following phenomenon may occur.

(a) There are cases where counter "0" is displayed in counter list of HDLM object when counter log file created with binary format is specified as "Data source" and "Add counter" is done. This counter "0" cannot be specified as display item of performance information. Even if counter "0" is displayed, it does not affect performance information of instance and other counters obtained.

(b) There are cases where "Disk Write Bytes/Sec" of performance counter offered by HDLM is displayed after substitution by index numbers managed by Windows. At such times it is possible to confirm performance information of "Disk Write Bytes/Sec" by selecting these substituted index numbers as counter.

(7) When HDLM performance information is outputted using system monitor, a value outputted at first record in the system monitor can be a value different from the actual value. Further the same phenomenon may occur when counter log with CSV format is specified. When it occurs, ignore the first record.

(8) When the path exists that has an I/O count value or an I/O error count value is 231 (2147483648) or more, the value becomes a negative value. As a result, a path that includes a negative value will not be displayed correctly in the Path List view of the HDLM GUI. In this case, confirm that the correct value of the I/O count or the I/O error count by either of the following methods:

- Display the path information by using the view operation of the HDLM command.

- Calculate the correct value by using the following formula:

  m = 232 (4294967296) + n

  m: The correct value of the I/O count or the I/O error count

  n: The negative value displayed in the Path List view of the HDLM GUI

(9) When HDLM is installed on Windows 2008, the following event may be output to the application event log. However, it does not affect the system or HDLM operations.

```
Faulting application setup.exe_InstallShield, version
15.0.0.498, time stamp 0xNNNNNNNN, faulting module ole32.dll,
version N.N.NNNN.NNNNNN, time stamp 0xNNNNNNNN, exception code
0xc0000005, fault offset 0xNNNNNNNN, process id 0xNNN,
application start time 0xNNNNNNNNNNNNNNNN.
```

```
Log Name:   Application
Source:     Application Error
Event ID:   1000
Level:      Error
```

*1: *N* is a Number or Character.

Installation precautions

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

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

- Hitachi Command Suite Dynamic Link Manager User Guide for Windows®
  Chapter 3. Creating an HDLM environment - Installing HDLM

Additional Precautions

(1) If you removed HDLM 5.4, perform the following procedure to delete the HDLM driver setup information files from the system before restarting the host.

1. Do a search for any setup information files (files with the inf file extension) that satisfy all of the following conditions:

   - The file is stored in the following folder:

     Windows-installation-folder\inf

   - The file contains the text dlmfdrv.sys (a driver file).

   - The file has the name oemn.inf (where n is a number).

2. Delete any setup information files that satisfy all of the above conditions. In addition, delete the files that have the same names as the above files, but with the extension pnf (oemn.pnf).

If you do not delete the correct files, the host might not run properly. Before deleting a file, make sure that it satisfies all of the above conditions.

(2) When you remove HDLM 5.8.0 to 5.9.1, use the user account used to install HDLM. If HiCommand Device Manager (HDvM) Agent 5.0.0 to 5.8.0 was installed before HDLM 5.8.0 to 5.9.1 was installed, remove.

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Updating installation of HDLM precautions

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

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

Remove precautions

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

- Hitachi Command Suite Dynamic Link Manager User Guide for Windows®
  Chapter 3. Creating an HDLM environment - Removing HDLM

Usage precautions

Precaution list at the time of the shift from HDLM 5.4 or before.

No	Items		Summary of precautions	Reference material
1	Applicable equipment	Management -target host	Supported OSs and prerequisite Service Packs and QFE have been changed.	- Manual Chapter 3. Creating an HDLM Environment - HDLM System Requirements - OSs Supported by HDLM - Manual Chapter 3. Creating an HDLM Environment - Notes on Creating an HDLM Environment - Notes on HBAs and HBA Drivers
2		Host Bus Adapter	Supported HBAs and HBA drivers have been changed.	Appendix A Host Bus Adapter (HBA) Support Matrix
3		Storage System	Supported storage systems and support interfaces have been changed.	- Manual Chapter 3. Creating an HDLM Environment - HDLM System Requirements - Storage Systems Supported by HDLM
4	Environment building	Preconditions	Emulex Corporation's FC Port Driver cannot be used.	7.2 Known Issue (2)

No	Items		Summary of precautions	Reference material
5		Storage System settings	You must not change vendor ID and product ID of the storage system. If you change these IDs, HDLM cannot recognize the storage system.	- Manual Chapter 3. Creating an HDLM Environment - HDLM System Requirements - Storage Systems Supported by HDLM - Manual Chapter 4. HDLM Operation - Notes on Using HDLM - Using a Storage Management Program
6			When installing or removing, make sure that there is one path per LU.	- Manual Chapter 3. Creating an HDLM Environment - Notes on Creating an HDLM Environment - Notes on New Installations and Upgrade Installations
7			A period of time exceeding 10 minutes may be required for installing or removing, depending on the environment.	- Manual Chapter 3. Creating an HDLM Environment - Notes on Creating an HDLM Environment - Notes on New Installations and Upgrade Installations - Manual Chapter 3. Creating an HDLM Environment - Removing HDLM
8		Precautions for installing	When HDLM is installed, the existing MPIO driver is overwritten by the MPIO driver that is supplied with HDLM. After confirming that this overwrite will not cause problems, perform the installation.	- Manual Chapter 3. Creating an HDLM Environment - Notes on Related Software
9			An update installation cannot be used to update HDLM version 5.4 or earlier to version 5.5 or later.	- Manual Chapter 3. Creating an HDLM Environment - Notes on Creating an HDLM Environment - Notes on HDLM Versions

No	Items		Summary of precautions	Reference material
10			If a mirror volume of a Windows dynamic disk exists as an HDLM management target, close the management console of the disk.	- Manual Chapter 3. Creating an HDLM Environment - Notes on Creating an HDLM Environment - Notes on Windows
11			If HDLM version 5.5 or later is installed in an environment in which HDLM 5.4 or earlier is installed, then DLMAlertDriver is displayed in Device Manager as a non-Plug and Play driver.	- Manual Chapter 3. Creating an HDLM Environment - Installing HDLM - Migrating from HDLM 5.4 or Earlier to HDLM 5.5 or Later
12			If HDLM version 5.5 or later is installed, a specific error message is output to the event log.	- Manual Chapter 3. Creating an HDLM Environment - Notes on Creating an HDLM Environment - Notes on HDLM Versions
13			When an installation or update installation of HDLM 5.5 or later is executed, after rebooting, make sure that HDLM 5.5 or later is installed correctly and configure a multipath environment.	- Manual Chapter 3. Creating an HDLM Environment - Notes on Creating an HDLM Environment - Notes on New Installations and Upgrade Installations
14		Precautions for removing	Even if HDLM is removed, some specific files might remain undeleted until the machine is restarted.	- Manual Chapter 3. Creating an HDLM Environment - Removing HDLM

No	Items		Summary of precautions	Reference material
15		Other Precautions	Changes have been made with respect to the LU count that HDLM supports, as well as the path count per LU and the total path count.	- Manual Chapter 3. Creating an HDLM Environment - HDLM System Requirements - Number of LUs and Paths That Are Supported in HDLM
16			Precautions for when using IDR function of VERITAS Backup Exec or VERITAS NetBackup have been changed.	- Manual Chapter 4.HDLM Operation - Notes on Using HDLM - Using Symantec Backup Exec for Windows and the Veritas NetBackup Intelligent Disaster Recovery Function
17	Function	Path status	Changes have been made with respect to the status transitions for path statuses.	Manual Appendixes A Functional Differences Between Versions of HDLM
18			Specification changes have been made for the function for dynamic LU deletion.	Manual Appendixes A Functional Differences Between Versions of HDLM
19		Changed operations on Windows	Changes have been made with respect to the drive letter display in Windows for LUs for which all paths result in errors.	Manual Appendixes A Functional Differences Between Versions of HDLM
20			Changes may have been made with disk number that Windows manage.	- Manual Chapter 3. Creating an HDLM Environment - Notes on Creating an HDLM Environment - Notes on Migration or Upgrade Installation

Notes on compatibility between versions of HDLM

For details on compatibility between versions of HDLM, refer to the following manual:

- Hitachi Command Suite Dynamic Link Manager User Guide for Windows®
  Appendixes A Functional differences between versions of HDLM

Notes on Environment Settings

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

- Hitachi Command Suite Dynamic Link Manager User Guide for Windows® Chapter 3. Creating an HDLM Environment - HDLM system requirements - Number of LUs and paths that are supported in HDLM
- Hitachi Command Suite Dynamic Link Manager User Guide for Windows® Chapter 3. Creating an HDLM environment - Notes on creating an HDLM environment
- Hitachi Command Suite Dynamic Link Manager User Guide for Windows® Chapter 3. Creating an HDLM environment - Setting up HDLM

Notes on General procedures

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

- Hitachi Command Suite Dynamic Link Manager User Guide for Windows® Chapter 2. HDLM functions - Performing failovers and failbacks using path switching - Path status transition - Status transitions of a path
- Hitachi Command Suite Dynamic Link Manager User Guide for Windows® Chapter 2. HDLM functions - Monitoring intermittent errors (functionality when automatic failback is used) - Intermittent error monitoring actions
- Hitachi Command Suite Dynamic Link Manager User Guide for Windows® Chapter 3. Creating an HDLM environment - Removing HDLM - Clearing the persistent reservation
- Hitachi Command Suite Dynamic Link Manager User Guide for Windows® Chapter 4. HDLM operation - Notes on using HDLM
- Hitachi Command Suite Dynamic Link Manager User Guide for Windows® Chapter 4. HDLM operation - HDLM operations using the HDLM GUI - Notes on using the HDLM GUI
- Hitachi Command Suite Dynamic Link Manager User Guide for Windows® Chapter 4. HDLM operation - Using commands for HDLM operations - Notes on using commands
- Hitachi Command Suite Dynamic Link Manager User Guide for Windows® Chapter 4. HDLM operation - Reconfiguring the HDLM operating environment
- Hitachi Command Suite Dynamic Link Manager User Guide for Windows® Chapter 5. Troubleshooting - Checking error information in messages
- Hitachi Command Suite Dynamic Link Manager User Guide for Windows® Chapter 6. Command reference - view (displays information)
- Hitachi Command Suite Dynamic Link Manager GUI Help Section 3.1 HDLM operations using the HDLM GUI
- Hitachi Command Suite Dynamic Link Manager GUI Help Section 5.2 Path Management window

Additional Usage Precautions

(1) 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
	Service Pack Version	Blank
	HDLM Manager	8.5.0-00
	HDLM Alert Driver	8.5.0-00
	HDLM Driver	8.5.0-00
HDLM GUI	HDLM version	8.5.0-00
Registry(*1)	TechnicalVersion	8.5.0-00

*1: Version numbers are stored in the following registry key.

[Key]

- When using Windows 2008(x86)

  HKEY_LOCAL_MACHINE\SOFTWARE\HITACHI\DynamicLinkManager

- When using Windows 2008(IPF/x64) or Windows 2012

  HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\HITACHI\DynamicLinkManager

Notes on HAM functionality support

(1) 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.

(2) 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.

(3) 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.

(4) 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 the 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.

(5) If you release a HAM pair to recover the system after a HAM volume failure, do not disconnect or reconnect paths to the RCU while the HAM pair is released.

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

(6) If all the non-owner paths to RCU fail when the status of the owner paths that are connected to MCU is Online(S), a large amount of the following event is output to the system event log.

Source: mpio

Type: Error

Event ID: 32

Description: HDLM Device-Specific Module failed to return a Path to \Device\MPIODisk*N*.

(*N* is a number.)

When the status of owner paths is Online(S), do not disconnect the non-owner paths which are connected to the RCU.

(7) When you configure a cluster in an HAM environment, all cluster nodes need to be connected to both the MCU and RCU.

If a path error occurs in a cluster node, do not restart the node before the problem is resolved and the paths recover from the error.

Notes on Using the HDLM GUI

(1) If you manage HDLM by using HGLM, do not set the HDLM operating environment in the Options windows. If you set the operating environment in the Option windows, the load balancing algorithm and the path use times for individual LUs, which were set by using HGLM, will become invalid, and the system value displayed in the Option windows will be applied to the settings for the individual LUs.

Documentation

https://knowledge.hds.com/Documents

Available documents

Document name	Document number	Issue date
Hitachi Command Suite Dynamic Link Manager (for Windows®) User Guide	MK-92DLM129-39	October, 2016

Documentation errata

None.

Appendix A

Host Bus Adapter (HBA) Support Matrix

Use the iSCSI I/F adapter or Fibre Channel I/F adapters listed below. If plural adapters are to be used, all of them must be same type. If it is using mixed types of HBA, that might cause a path switch problem.

(1) For Hitachi storage system (Windows 2008 (no service Pack))

OS	HBA		Driver
Windows 2008 (x86)	Fibre Channel	Emulex (*1)	STOR Miniport 2.00a12 STOR Miniport 2.01a4 STOR Miniport 2.10a7 STOR Miniport 2.20.006 STOR Miniport 2.30.020 STOR Miniport 2.32.002 STOR Miniport 2.33.008 STOR Miniport 2.41.003 STOR Miniport 2.50.007 STOR Miniport 2.74.014.001 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0

OS	HBA		Driver
		QLogic	Bundle STOR Miniport 9.1.7.16 STOR Miniport 9.1.7.18 STOR Miniport 9.1.8.17 STOR Miniport 9.1.8.25 STOR Miniport 9.1.9.49 STOR Miniport 9.1.11.20 STOR Miniport 9.1.11.24 STOR Miniport 9.1.11.28 STOR Miniport 9.1.12.21
		HP	STOR Miniport 2.74.014.001 STOR Miniport 9.1.7.17 STOR Miniport 9.1.8.27
		Brocade	STOR Miniport 1.0.0-06 STOR Miniport 1.1.0.1 STOR Miniport 2.2.0.0
		Hitachi Compute Blade	Bundle (*4)
	iSCSI	Microsoft (*2)	Bundle
		Emulex	STOR Miniport 4.1.334.0 STOR Miniport 4.9.160.0 STOR Miniport 10.0.732.0 STOR Miniport 10.2.370.9 STOR Miniport 10.2.421.0 STOR Miniport 10.4.245.0
		QLogic	STOR Miniport 2.1.5.15 STOR Miniport 2.1.6.10
	Fibre Channel over Ethernet	Emulex	STOR Miniport 2.10a7 STOR Miniport 2.32.002 STOR Miniport 2.70.018 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0
		QLogic	STOR Miniport 2.1.4.19 STOR Miniport 9.1.7.18 STOR Miniport 9.1.9.15 STOR Miniport 9.1.11.16 STOR Miniport 9.1.12.10
		HP	STOR Miniport 10.4.246.0
		Brocade	STOR Miniport 2.2.0.0
Windows 2008 (IPF)	Fibre	Emulex (*1)	STOR Miniport 2.00a12

OS	HBA		Driver
	Channel		STOR Miniport 2.10a7
		QLogic	Bundle STOR Miniport 9.1.8.16
		Hitachi Compute Blade	Bundle (*4)
	iSCSI	Microsoft (*2)	Bundle
Windows 2008 (x64)	Fibre Channel	Emulex (*1)	STOR Miniport 2.00a12 STOR Miniport 2.01a4 STOR Miniport 2.10a7 STOR Miniport 2.20.006 STOR Miniport 2.32.002 STOR Miniport 2.33.008 STOR Miniport 2.41.003 STOR Miniport 2.50.007 STOR Miniport 2.70.014 STOR Miniport 2.70.018 STOR Miniport 2.70.019 STOR Miniport 2.72.012.001 STOR Miniport 2.74.014.001 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.261.4 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0 STOR Miniport 10.7.110.20
		QLogic	Bundle STOR Miniport 9.1.7.16 STOR Miniport 9.1.7.18 STOR Miniport 9.1.8.16 STOR Miniport 9.1.8.17 STOR Miniport 9.1.8.25 STOR Miniport 9.1.9.25 STOR Miniport 9.1.9.26 STOR Miniport 9.1.9.27 STOR Miniport 9.1.9.47 STOR Miniport 9.1.9.49 STOR Miniport 9.1.10.26 STOR Miniport 9.1.11.20 STOR Miniport 9.1.11.28 STOR Miniport 9.1.12.21
		HP	STOR Miniport 2.70.018 STOR Miniport 2.70.019 STOR Miniport 2.74.014.001

OS	HBA		Driver
			STOR Miniport 9.1.7.17 STOR Miniport 9.1.8.17 STOR Miniport 9.1.9.26 STOR Miniport 9.1.9.45 STOR Miniport 9.1.9.49 STOR Miniport 9.1.11.20 STOR Miniport 10.7.110.20
		Brocade	STOR Miniport 1.0.0-06 STOR Miniport 1.1.0.1 STOR Miniport 2.2.0.0
		Hitachi Compute Blade	Bundle (*4)
	iSCSI	Microsoft (*2)	Bundle
		Emulex	STOR Miniport 4.1.334.0 STOR Miniport 4.9.160.0 STOR Miniport 10.0.732.0 STOR Miniport 10.2.370.9 STOR Miniport 10.2.421.0 STOR Miniport 10.4.245.0
		QLogic	STOR Miniport 2.1.5.15 STOR Miniport 2.1.6.10
	Fibre Channel over Ethernet	Emulex	STOR Miniport 2.10a7 STOR Miniport 2.32.002 STOR Miniport 2.50.007 STOR Miniport 2.70.018 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.261.4 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0 STOR Miniport 10.7.110.20
		QLogic	STOR Miniport 2.1.4.19 STOR Miniport 9.1.7.18 STOR Miniport 9.1.8.26 STOR Miniport 9.1.9.15 STOR Miniport 9.1.11.16 STOR Miniport 9.1.12.10
		HP	STOR Miniport 2.42.002 STOR Miniport 2.50.007 STOR Miniport 2.76.003.001 STOR Miniport 10.2.261.4 STOR Miniport 10.4.246.0

OS	HBA		Driver
			STOR Miniport 10.7.110.20
		Brocade	STOR Miniport 2.2.0.0
	Infini Band	Xsigo Systems BHCA-DDR-PCIE-2P + VP780 (*4)	STOR Miniport 2.6.0.4

(2) For Hitachi storage system (Windows 2008 SP2)

OS	HBA		Driver
Windows 2008 SP2 (x86)	Fibre Channel	Emulex (*1)	STOR Miniport 2.01a4 STOR Miniport 2.10a7 STOR Miniport 2.20.006 STOR Miniport 2.30.020 STOR Miniport 2.32.002 STOR Miniport 2.33.008 STOR Miniport 2.41.002 STOR Miniport 2.41.003 STOR Miniport 2.50.007 STOR Miniport 2.74.014.001 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0
		QLogic	STOR Miniport 9.1.8.17 STOR Miniport 9.1.8.25 STOR Miniport 9.1.9.25 STOR Miniport 9.1.9.49 STOR Miniport 9.1.10.27 STOR Miniport 9.1.11.20 STOR Miniport 9.1.11.24 STOR Miniport 9.1.11.28 STOR Miniport 9.1.12.21
		HP	STOR Miniport 2.74.014.001 STOR Miniport 9.1.8.27 STOR Miniport 9.1.8.28
		IBM	STOR Miniport 9.1.7.55 STOR Miniport 9.1.9.25
		Brocade	STOR Miniport 1.0.0-06 STOR Miniport 1.1.0.1 STOR Miniport 2.2.0.0
		Hitachi Compute Blade	Bundled (*4)
	iSCSI	Microsoft	Bundled
		Emulex	STOR Miniport 4.1.334.0 STOR Miniport 4.9.160.0 STOR Miniport 10.0.732.0 STOR Miniport 10.2.370.9 STOR Miniport 10.2.421.0 STOR Miniport 10.4.245.0

OS	HBA		Driver
		QLogic	STOR Miniport 2.1.6.10
	Fibre Channel over Ethernet	Emulex	STOR Miniport 2.32.002 STOR Miniport 2.70.018 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0
		QLogic	STOR Miniport 9.1.9.15 STOR Miniport 9.1.11.16 STOR Miniport 9.1.12.10
		HP	STOR Miniport 10.4.246.0
		Brocade	STOR Miniport 2.2.0.0
		Cisco	STOR Miniport 2.1.0.11
Windows 2008 SP2 (IPF)	Fibre Channel	Emulex (*1)	STOR Miniport 2.10a7
		QLogic	STOR Miniport 9.1.8.16
		Hitachi Compute Blade	Bundled (*4)
	iSCSI	Microsoft	Bundled
Windows 2008 SP2 (x64)	Fibre Channel	Emulex (*1)	STOR Miniport 2.01a4 STOR Miniport 2.10a7 STOR Miniport 2.20.006 STOR Miniport 2.30.020 STOR Miniport 2.32.002 STOR Miniport 2.33.008 STOR Miniport 2.41.002 STOR Miniport 2.41.003 STOR Miniport 2.50.007 STOR Miniport 2.70.014 STOR Miniport 2.70.018 STOR Miniport 2.70.019 STOR Miniport 2.72.012.001 STOR Miniport 2.74.009.001 STOR Miniport 2.74.014.001 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.261.4 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0 STOR Miniport 10.7.110.20

OS	HBA		Driver
		QLogic	STOR Miniport 9.1.7.18 STOR Miniport 9.1.8.16 STOR Miniport 9.1.8.17 STOR Miniport 9.1.8.25 STOR Miniport 9.1.9.25 STOR Miniport 9.1.9.26 STOR Miniport 9.1.9.27 STOR Miniport 9.1.9.47 STOR Miniport 9.1.9.49 STOR Miniport 9.1.10.26 STOR Miniport 9.1.11.20 STOR Miniport 9.1.11.28 STOR Miniport 9.1.12.21
		HP	STOR Miniport 2.70.018 STOR Miniport 2.70.019 STOR Miniport 2.74.009.001 STOR Miniport 2.74.014.001 STOR Miniport 9.1.7.17 STOR Miniport 9.1.8.17 STOR Miniport 9.1.8.19 STOR Miniport 9.1.9.25 STOR Miniport 9.1.9.26 STOR Miniport 9.1.9.49 STOR Miniport 9.1.11.20 STOR Miniport 10.7.110.20
		IBM	STOR Miniport 9.1.7.55 STOR Miniport 9.1.8.25 STOR Miniport 9.1.9.49
		Brocade	STOR Miniport 1.0.0-06 STOR Miniport 1.1.0.1 STOR Miniport 2.2.0.0
		Hitachi Compute Blade	Bundle (*4)
	iSCSI	Microsoft (*2)	Bundle
		Emulex	STOR Miniport 4.1.334.0 STOR Miniport 4.9.160.0 STOR Miniport 10.0.732.0 STOR Miniport 10.2.370.9 STOR Miniport 10.2.421.0 STOR Miniport 10.4.245.0
		QLogic	STOR Miniport 2.1.6.10

OS	HBA		Driver
	Fibre Channel over Ethernet	Emulex	STOR Miniport 2.32.002 STOR Miniport 2.50.007 STOR Miniport 2.70.018 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.261.4 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0 STOR Miniport 10.7.110.20
		QLogic	STOR Miniport 9.1.8.26 STOR Miniport 9.1.9.15 STOR Miniport 9.1.11.16 STOR Miniport 9.1.12.10
		HP	STOR Miniport 2.33.008 STOR Miniport 2.42.002 STOR Miniport 2.50.007 STOR Miniport 2.76.003.001 STOR Miniport 7.13.4.0 STOR Miniport 10.2.261.4 STOR Miniport 10.4.246.0 STOR Miniport 10.7.110.20
		Brocade	STOR Miniport 2.2.0.0
		Cisco	STOR Miniport 2.1.0.25

(3) For Hitachi storage system (Windows 2008 R2)

OS	HBA		Driver
Windows 2008 R2 (IPF)	Fibre Channel	Emulex (*1)	STOR Miniport 2.20.006
		HP	STOR Miniport 2.50.007
	iSCSI	Microsoft (*2)	Bundle

OS	HBA		Driver
Windows 2008 R2 (x64)	Fibre Channel	Emulex (*1)	STOR Miniport 2.20.006 STOR Miniport 2.30.018 STOR Miniport 2.30.020 STOR Miniport 2.32.002 STOR Miniport 2.40.005 STOR Miniport 2.41.002 STOR Miniport 2.41.003 STOR Miniport 2.50.007 STOR Miniport 2.70.018 STOR Miniport 2.72.012.001 STOR Miniport 2.74.009.001 STOR Miniport 2.74.014.001 STOR Miniport 2.74.016.001 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.261.4 STOR Miniport 10.2.370.8
		QLogic	STOR Miniport 9.1.8.17 STOR Miniport 9.1.8.19 STOR Miniport 9.1.8.25 STOR Miniport 9.1.8.27 STOR Miniport 9.1.8.28 STOR Miniport 9.1.8.38 STOR Miniport 9.1.9.25 STOR Miniport 9.1.9.26 STOR Miniport 9.1.9.27 STOR Miniport 9.1.9.47 STOR Miniport 9.1.9.49 STOR Miniport 9.1.10.26 STOR Miniport 9.1.10.27 STOR Miniport 9.1.10.28 STOR Miniport 9.1.11.20 STOR Miniport 9.1.11.24 STOR Miniport 9.1.11.26 STOR Miniport 9.1.11.28 STOR Miniport 9.1.12.21 STOR Miniport 9.1.13.20 STOR Miniport 9.1.15.21

OS	HBA		Driver
		HP	STOR Miniport 2.33.005 STOR Miniport 2.33.008 STOR Miniport 2.50.007 STOR Miniport 2.70.018 STOR Miniport 2.70.019 STOR Miniport 2.74.014.001 STOR Miniport 9.1.8.17 STOR Miniport 9.1.8.25 STOR Miniport 9.1.9.25 STOR Miniport 9.1.9.45 STOR Miniport 9.1.9.49 STOR Miniport 9.1.10.27 STOR Miniport 9.1.11.20 STOR Miniport 9.1.11.28 STOR Miniport 9.1.12.22 STOR Miniport 9.1.14.22 STOR Miniport 9.1.15.21
		IBM	STOR Miniport 9.1.7.55 STOR Miniport 9.1.8.25 STOR Miniport 9.1.11.24
		Brocade	STOR Miniport 2.1.0.0 STOR Miniport 2.2.0.0 STOR Miniport 3.0.0.0 STOR Miniport 3.1.0.0 STOR Miniport 3.1.0.1 STOR Miniport 3.2.0.0 STOR Miniport 3.2.4.0
		Hitachi Compute Blade	Bundle (*4)
	iSCSI	Microsoft (*2)	Bundle
		Emulex	STOR Miniport 4.1.334.0 STOR Miniport 4.9.160.0 STOR Miniport 10.0.732.0 STOR Miniport 10.2.370.9 STOR Miniport 10.2.421.0
		QLogic	STOR Miniport 2.1.6.10
		HP	STOR Miniport 4.1.334.0

OS	HBA		Driver
	Fibre Channel over Ethernet	Emulex	STOR Miniport 2.32.002 STOR Miniport 2.41.002 STOR Miniport 2.42.002 STOR Miniport 2.50.007 STOR Miniport 2.70.018 STOR Miniport 2.70.019 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.261.4 STOR Miniport 10.2.370.8
		QLogic	STOR Miniport 9.1.8.26 STOR Miniport 9.1.8.27 STOR Miniport 9.1.9.15 STOR Miniport 9.1.11.16 STOR Miniport 9.1.12.10 STOR Miniport 3.2.5.0
		IBM	STOR Miniport 9.1.8.26 STOR Miniport 9.1.9.36
		HP	STOR Miniport 2.42.002 STOR Miniport 2.50.007 STOR Miniport 2.70.019 STOR Miniport 2.74.009.001 STOR Miniport 2.76.003.001 STOR Miniport 10.2.261.4
		Brocade	STOR Miniport 2.2.0.0 STOR Miniport 2.3.0.2 STOR Miniport 3.0.0.0 STOR Miniport 3.2.4.0 STOR Miniport 3.2.5.0
		Cisco	STOR Miniport 2.1.0.11 STOR Miniport 9.1.8.27

(4) For Hitachi storage system (Windows 2008 R2 SP1)

OS	HBA		Driver
Windows 2008 R2 SP1 (IPF)	Fibre Channel	Emulex (*1)	STOR Miniport 2.20.006 STOR Miniport 2.40.005
	iSCSI	Microsoft (*2)	Bundle
Windows 2008 R2 SP1 (x64)	Fibre Channel	Emulex (*1)	STOR Miniport 2.20.006 STOR Miniport 2.30.018 STOR Miniport 2.30.020 STOR Miniport 2.32.002 STOR Miniport 2.40.005 STOR Miniport 2.41.002 STOR Miniport 2.41.003 STOR Miniport 2.50.007 STOR Miniport 2.70.018 STOR Miniport 2.74.009.001 STOR Miniport 2.74.014.001 STOR Miniport 2.74.016.001 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.261.4 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0 STOR Miniport 10.7.110.20
		QLogic	STOR Miniport 9.1.8.27 STOR Miniport 9.1.9.25 STOR Miniport 9.1.9.26 STOR Miniport 9.1.9.27 STOR Miniport 9.1.9.47 STOR Miniport 9.1.9.49 STOR Miniport 9.1.10.26 STOR Miniport 9.1.10.27 STOR Miniport 9.1.10.28 STOR Miniport 9.1.11.20 STOR Miniport 9.1.11.24 STOR Miniport 9.1.11.26 STOR Miniport 9.1.11.28 STOR Miniport 9.1.12.21 STOR Miniport 9.1.13.20 STOR Miniport 9.1.15.21

OS	HBA		Driver
		HP	STOR Miniport 2.33.005 STOR Miniport 2.50.007 STOR Miniport 2.70.018 STOR Miniport 2.70.019 STOR Miniport 2.74.009.001 STOR Miniport 2.74.014.001 STOR Miniport 3.0.0.0 STOR Miniport 9.1.9.26 STOR Miniport 9.1.9.45 STOR Miniport 9.1.9.49 STOR Miniport 9.1.10.26 STOR Miniport 9.1.10.27 STOR Miniport 9.1.11.20 STOR Miniport 9.1.11.28 STOR Miniport 9.1.12.22 STOR Miniport 9.1.14.22 STOR Miniport 9.1.15.21 STOR Miniport 10.4.246.0 STOR Miniport 10.7.110.20
		IBM	STOR Miniport 2.70.018 STOR Miniport 9.1.9.25 STOR Miniport 9.1.9.27 STOR Miniport 9.1.9.49 STOR Miniport 9.1.10.26 STOR Miniport 9.1.11.24
		Brocade	STOR Miniport 2.1.0.0 STOR Miniport 2.2.0.0 STOR Miniport 2.3.0.2 STOR Miniport 3.0.0.0 STOR Miniport 3.1.0.0 STOR Miniport 3.1.0.1 STOR Miniport 3.2.0.0 STOR Miniport 3.2.4.0
		Hitachi Compute Blade	Bundle (*4)
	iSCSI	Microsoft (*2)	Bundle
		Emulex	STOR Miniport 4.1.334.0 STOR Miniport 4.9.160.0 STOR Miniport 10.0.732.0 STOR Miniport 10.2.370.9 STOR Miniport 10.2.421.0 STOR Miniport 10.4.245.0

OS	HBA		Driver
		QLogic	STOR Miniport 2.1.6.10
		HP	STOR Miniport 4.1.334.0
	Fibre Channel over Ethernet	Emulex	STOR Miniport 2.50.007 STOR Miniport 2.70.018 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.261.4 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0 STOR Miniport 10.7.110.20
		QLogic	STOR Miniport 9.1.11.16 STOR Miniport 9.1.12.10 STOR Miniport 3.2.5.0
		HP	STOR Miniport 2.50.007 STOR Miniport 2.70.018 STOR Miniport 2.70.019 STOR Miniport 2.74.009.001 STOR Miniport 2.76.003.001 STOR Miniport 7.12.4.0 STOR Miniport 7.12.41.0 STOR Miniport 7.13.4.0 STOR Miniport 10.2.261.4 STOR Miniport 10.4.246.0 STOR Miniport 10.7.110.20
		Brocade	STOR Miniport 3.2.4.0 STOR Miniport 3.2.5.0
		Cisco	STOR Miniport 2.1.0.11 STOR Miniport 2.1.0.17 STOR Miniport 2.1.0.20 STOR Miniport 2.1.0.25 STOR Miniport 2.1.0.27 STOR Miniport 2.1.0.31 STOR Miniport 9.1.8.27

(5) For Hitachi storage system (Windows 2012 with no service Pack)

OS	HBA		Driver
Windows 2012(x64)	Fibre Channel	Emulex (*1)	Bundle STOR Miniport 2.72.012.001 STOR Miniport 2.72.205.004 STOR Miniport 2.74.009.001 STOR Miniport 2.74.014.001 STOR Miniport 2.74.016.001 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.261.4 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0 STOR Miniport 10.6.114.0 STOR Miniport 10.7.110.20
		QLogic	Bundle STOR Miniport 9.1.9.205 STOR Miniport 9.1.10.26 STOR Miniport 9.1.10.27 STOR Miniport 9.1.11.20 STOR Miniport 9.1.11.24 STOR Miniport 9.1.11.26 STOR Miniport 9.1.11.28 STOR Miniport 9.1.12.21 STOR Miniport 9.1.15.21 STOR Miniport 9.1.17.22
		HP	STOR Miniport 2.74.009.001 STOR Miniport 9.1.10.27 STOR Miniport 9.1.11.20 STOR Miniport 9.1.11.24 STOR Miniport 9.1.15.21 STOR Miniport 9.1.17.22 STOR Miniport 10.7.110.20
		Brocade	Bundle STOR Miniport 3.0.2.21 STOR Miniport 3.1.0.1 STOR Miniport 3.2.4.0
		Hitachi Compute Blade	Bundle (*4)
	iSCSI	Microsoft (*2)	Bundle

OS	HBA		Driver
		Emulex	STOR Miniport 4.9.160.0 STOR Miniport 10.0.732.0 STOR Miniport 10.2.370.9 STOR Miniport 10.2.421.0 STOR Miniport 10.4.245.0
		QLogic	STOR Miniport 2.1.6.10
	Fibre Channel over Ethernet	Emulex (*1)	Bundle STOR Miniport 2.72.012.001 STOR Miniport 2.72.205.004 STOR Miniport 2.74.014.001 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.261.4 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0 STOR Miniport 10.7.110.20
		QLogic	STOR Miniport 9.1.10.15 STOR Miniport 9.1.11.16 STOR Miniport 9.1.12.10 STOR Miniport 3.2.5.0
		Brocade	STOR Miniport 3.2.4.0 STOR Miniport 3.2.5.0
		HP	STOR Miniport 2.74.014.001 STOR Miniport 2.76.003.001 STOR Miniport 7.13.4.0 STOR Miniport 10.2.261.4 STOR Miniport 10.4.246.0 STOR Miniport 10.7.110.20
		Cisco	STOR Miniport 2.3.0.12 STOR Miniport 2.4.0.11

(6) For Hitachi storage system (Windows 2012 R2 with no service Pack)

OS	HBA		Driver
Windows 2012 R2(x64)	Fibre Channel	Emulex (*1)	Bundle STOR Miniport 2.76.002.001 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.261.4 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0 STOR Miniport 10.6.114.0 STOR Miniport 10.7.110.20
		QLogic	Bundle STOR Miniport 9.1.11.24 STOR Miniport 9.1.11.28 STOR Miniport 9.1.12.21 STOR Miniport 9.1.13.20 STOR Miniport 9.1.15.21 STOR Miniport 9.1.17.22
		Brocade	STOR Miniport 3.2.4.0
		HP	STOR Miniport 9.1.11.24 STOR Miniport 9.1.11.28 STOR Miniport 9.1.12.22 STOR Miniport 9.1.14.22 STOR Miniport 9.1.15.21 STOR Miniport 9.1.17.22 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0 STOR Miniport 10.6.114.0 STOR Miniport 10.7.110.20
		Hitachi Compute Blade	Bundle (*4)
	iSCSI	Microsoft (*2)	Bundle
		Emulex	STOR Miniport 4.9.160.0 STOR Miniport 10.0.732.0 STOR Miniport 10.2.370.9 STOR Miniport 10.2.421.0 STOR Miniport 10.4.245.0
		QLogic	STOR Miniport 2.1.5.38 STOR Miniport 2.1.6.10

OS	HBA		Driver
	Fibre Channel over Ethernet	Emulex	STOR Miniport 2.76.002.001 STOR Miniport 2.76.003.001 STOR Miniport 10.0.720.0 STOR Miniport 10.2.261.4 STOR Miniport 10.2.370.8 STOR Miniport 10.4.246.0 STOR Miniport 10.7.110.20
		QLogic	STOR Miniport 9.1.11.12 STOR Miniport 9.1.11.16 STOR Miniport 9.1.12.10 STOR Miniport 3.2.5.0
		Brocade	STOR Miniport 3.2.3.1 STOR Miniport 3.2.4.0 STOR Miniport 3.2.5.0
		HP	STOR Miniport 2.76.003.001 STOR Miniport 7.10.31.0 STOR Miniport 7.12.41.0 STOR Miniport 7.13.4.0 STOR Miniport 10.2.261.4 STOR Miniport 10.4.246.0 STOR Miniport 10.7.110.20
		Cisco	STOR Miniport 2.3.0.20 STOR Miniport 2.4.0.8 STOR Miniport 2.4.0.9 STOR Miniport 2.4.0.11 STOR Miniport 2.4.0.13

(7) For EMC CX Series and HP EVA Series (Windows 2008)

Check to a storage vendor about connectable HBA and its driver.

Notes:

*1: The following tables show the values for Emulex Driver.

For Emulex SCSI Miniport driver:

Item	Sub Item	Emulex Default Setting	HDLM Setting (FC-AL)	HDLM Setting (Fabric)
Driver Parameters	Reset TPRLO	0	0	0
	Topology	2	0	1

For Emulex STOR Miniport driver:

Item	Sub Item	Emulex Default Setting	HDLM Setting (FC-AL)	HDLM Setting (Fabric)
Driver Parameters	Topology	2	0	1

*2: Network Interface Card in which Ethernet connection is possible is required.

*3: Delete the following registry when using HDLM.

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\ql2300\Parameters\Device
Value  :  DriverParameter
Data   :  buschange=0
```

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

*5: OS version of VP780 is as follows:

OS version: XgOS 2.6.0 (2.6.22.10-xg-04)

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