

Express5800/Scalable HA Server

FC SAN Boot Configuration Guide

Windows Server 2008(x64,SP2)(Hyper-V)

Windows Server 2008 R2(Hyper-V 2.0)

VMware vSphere 5

October 2012
NEC Corporation
First Edition

Trademarks

EXPRESSBUILDER and ESMPRO, SigmaSystemCenter, WebSAM DeploymentManager, WebSAM NetvisorPro, WebSAM StorageManager, and PathManager are registered trademarks or trademarks of NEC Corporation. Microsoft, Windows, Windows Server, Hyper-V, Active Directory, and MS-DOS are registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Intel and Xeon are registered trademarks or trademarks of Intel Corporation and/or its subsidiaries in the United States and/or other countries.

The official name of Windows Server 2008 is Microsoft® Windows® Server 2008 Operating System.

VMware, the VMware logo, Virtual SMP, and Vmotion are registered trademarks or trademarks of VMware, Inc. in the United States and/or other countries.

All other trademarks are the property of their respective owners.

【Notice】

- (1) No part of this document may be copied in whole or in part without permission.**
- (2) The contents of this document may be changed in the future without prior notification.**
- (3) No part of this document may be copied or revised without permission from NEC.**
- (4) Care has been taken to make sure that the contents of this document are correct, but if there are any doubtful items, mistakes or missing items, then please contact your dealer or the NEC sales department.**
- (5) Regardless of (4) above, NEC is not responsible for any damages resulting from using this software.**

Table of contents

1. Overview	5
1.1. Purpose of this document	5
1.2. What is SAN Boot?	5
1.3. Abbreviations.....	5
1.4. SAN Boot Environment Hardware Connection Images	6
1.5. Flow Chart of Operations	7
2. Preparation	8
2.1. Preparation in Advance	9
2.1.1. Management Software and Linkage Image	9
2.1.2. Acquiring Manuals	10
2.1.3. Hardware and Software Specifications	10
2.2. Management LAN Settings	11
2.3. StorageManager Preparation	11
2.3.1. NEC M-series Storage Control Software Installation	11
2.4. FC Switch Preparation	12
2.4.1. Configuration	12
2.4.2. FC Zoning Settings	12
2.5. Confirm WWPN.....	14
3. Storage Settings.....	21
3.1. Storage M Series Settings	22
3.1.1. Creating a Pool and Logical Disks (LDs)	22
3.1.2. Creating an LD Set.....	23
3.1.3. Assigning LDs to an LD Set	24
3.1.4. Changing the Port Access Mode.....	26
3.1.5. Linking the LD Sets and FC Controllers	26
4. Server Setting.....	28
4.1. Advance preparation	29
4.2. Server and FC Controller BIOS Settings	29
4.3. Making Single Path FC Connections	37
5. OS Installation	38

5.1. Overview	38
5.2. Windows	39
5.2.1. Windows Server 2008 and Windows Server 2008 R2 Installation	39
5.2.2. Advanced Preparations	40
5.2.3. OS Installation	40
5.2.4. Service Pack Application	41
5.2.5. NEC Storage PathManager for Windows Installation	41
5.2.6. Hyper-V Installation (only when using Hyper-V).....	42
5.3. VMware ESX/ESXi	49
5.3.1. Precautions for Configuring SAN Boot	49
5.3.2. Precautions for Building SAN Boot	49
6. Confirming Operation and Setting Up Redundant Paths.....	50
6.1. Reconnecting the FC Cable	50
6.2. Checking FC Path Redundancy.....	50
7. Additional Application Settings	51
7.1. DDR (NEC M-series Storage)	51
7.1.1. Backup and Restore Windows Server 2008 Hyper-V with the DDR.....	53
7.1.2. Backup and Restore Windows Server 2008 R2 Hyper-V with the DDR	55
7.1.3. Backup and Restore VMware ESX/ESXi with the DDR	57
7.1.4. Cautions for Backup and Restore Windows Server OS Images with the DDR ..	59
8. Precautions and Restrictions.....	61
8.1. Server	61
8.1.1. Internal HDD	61
8.1.2. Multiple Path Compatibility	61
8.1.3. BIOS Update	61
8.2. Storage.....	62
8.2.1. Connecting Multiple Storage Devices.....	62
8.2.2. Storage Performance and Number of OSs Installed	62
8.3. OS	63
8.3.1. Number of OS Licenses Used	63
8.3.2. OS Memory Dump	63
8.3.3. Redundant Path Connections when Installing the OS	63
8.4. PathManager.....	63

1. Overview

1.1. Purpose of this document

This manual describes the process for implementing the Express5800 Series rack server operating system in a SAN Boot system that is located in storage devices in a Storage Area Network (hereafter referred to as SAN).

Because there are many different reference sources for servers, storage devices, software and other items when creating a SAN Boot system, this manual shows the overall flow of implementation by pointing to and indicating the various manuals to be used. By doing so, this manual is able to provide support when implementing a SAN Boot system.

Because of this, this manual does not guarantee performance and/or availability. When implementing a system, the user must assure performance and availability by following the system design requirements.

1.2. What is SAN Boot?

SAN Boot is a method in which the system is booted through a SAN from an operating system stored in NEC M-series Storage or another storage device in the SAN.

The advantages of SAN Boot are: (1) effective use of storage resources and improved fault tolerance by assigning the boot area to a highly reliable storage system; and (2) adding flexibility to system changes by allowing switching of storage networks and reducing downtime.

The NEC Express5800 Series provides a SAN Boot solution that encompasses the advantages of SAN Boot and provides companies with an optimized and highly available IT system foundation.

1.3. Abbreviations

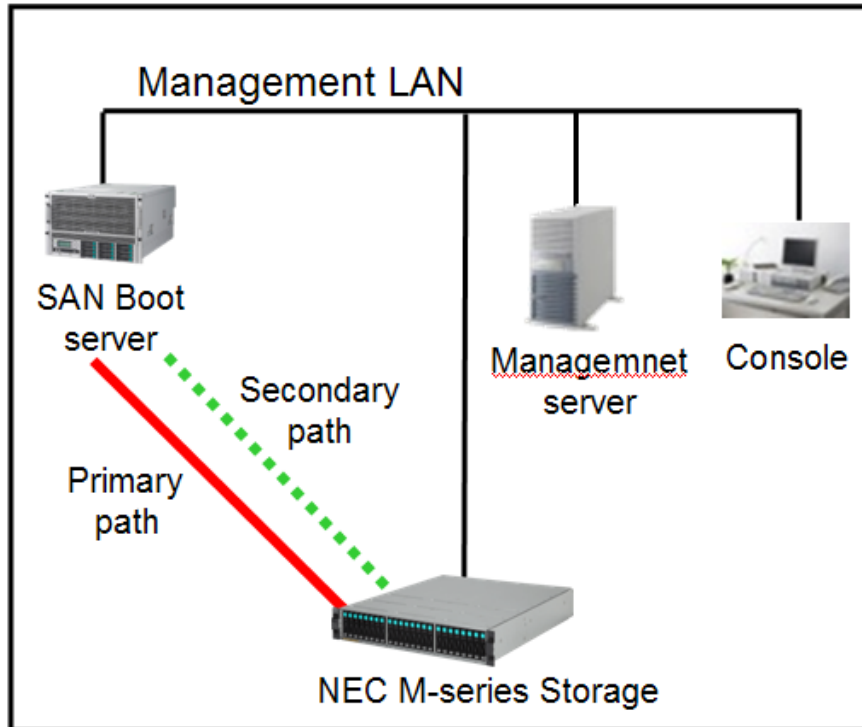
The following table shows the meanings of the abbreviations used in this manual.

Abbreviation	Description	Remarks
FC	Fibre Channel	
HBA	Host Bus Adapter	
WWPN	World Wide Port Name	
WWNN	World Wide Node Name	
WWN	World Wide Name	
LD	Logical Disk	Logical disk
DDR	DynamicDataReplication	Data replication function
iSM	StorageManager	Storage management software
ControlCommand	Storage ControlCommand	Storage software
MV	Master Volume	Working volume
RV	Replication Volume	Backup volume
WG	WG	Logical disk usage format: Windows (GPT disk)
WN	WN	Logical disk usage format: Windows (MBR disk)
LX	LX	Logical disk usage format: Linux/VMware (VMFS)

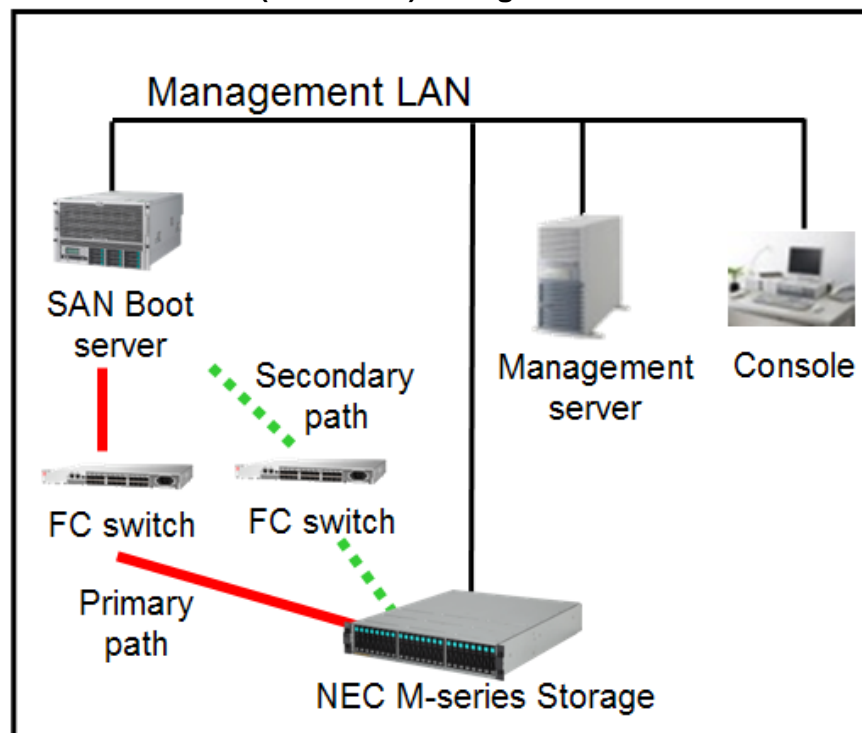
1.4. SAN Boot Environment Hardware Connection Images

The diagrams following show typical hardware configurations for a SAN Boot environment

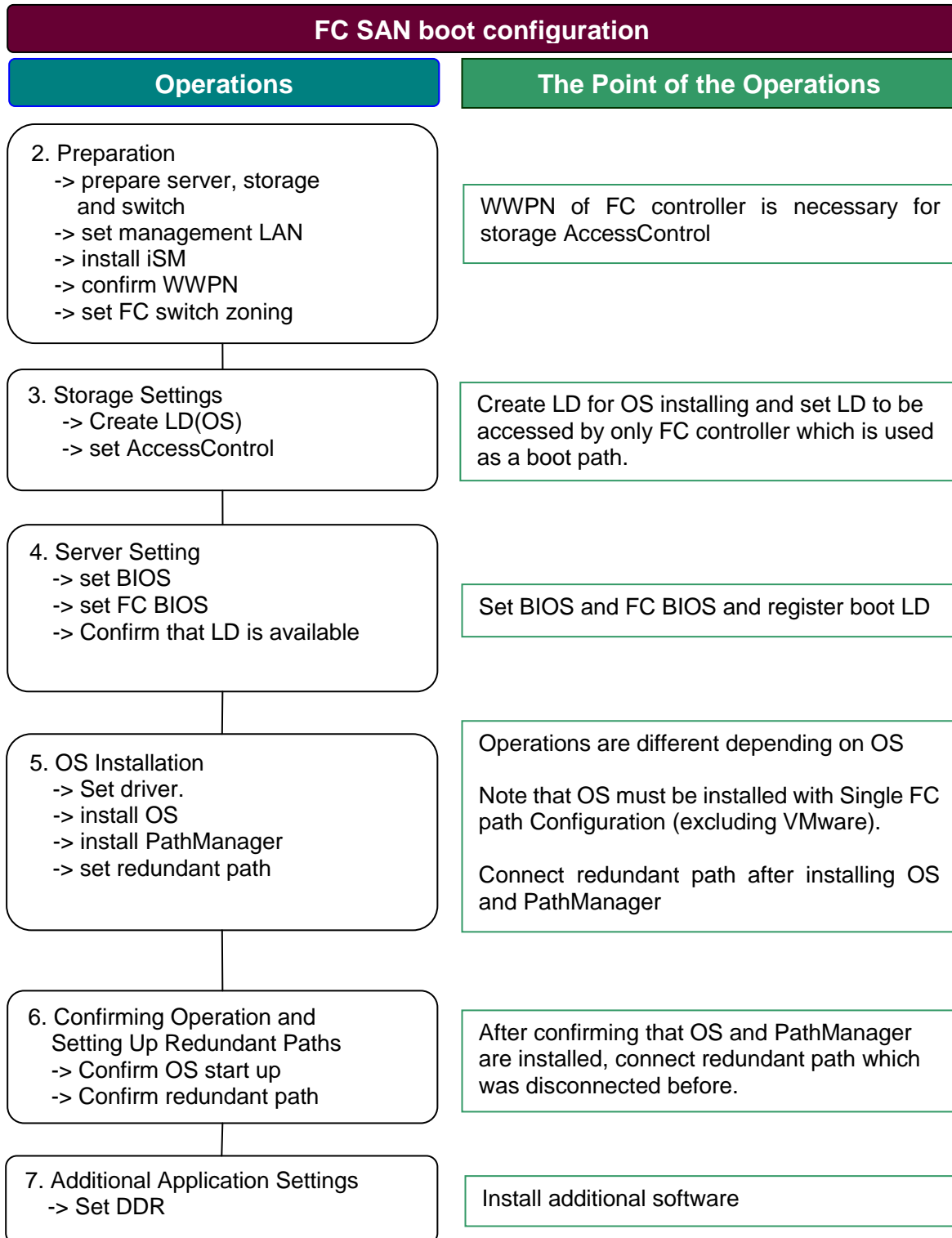
【8G FC SAN Boot (direct) configuration】



【8G FC SAN Boot (via switch) configuration】

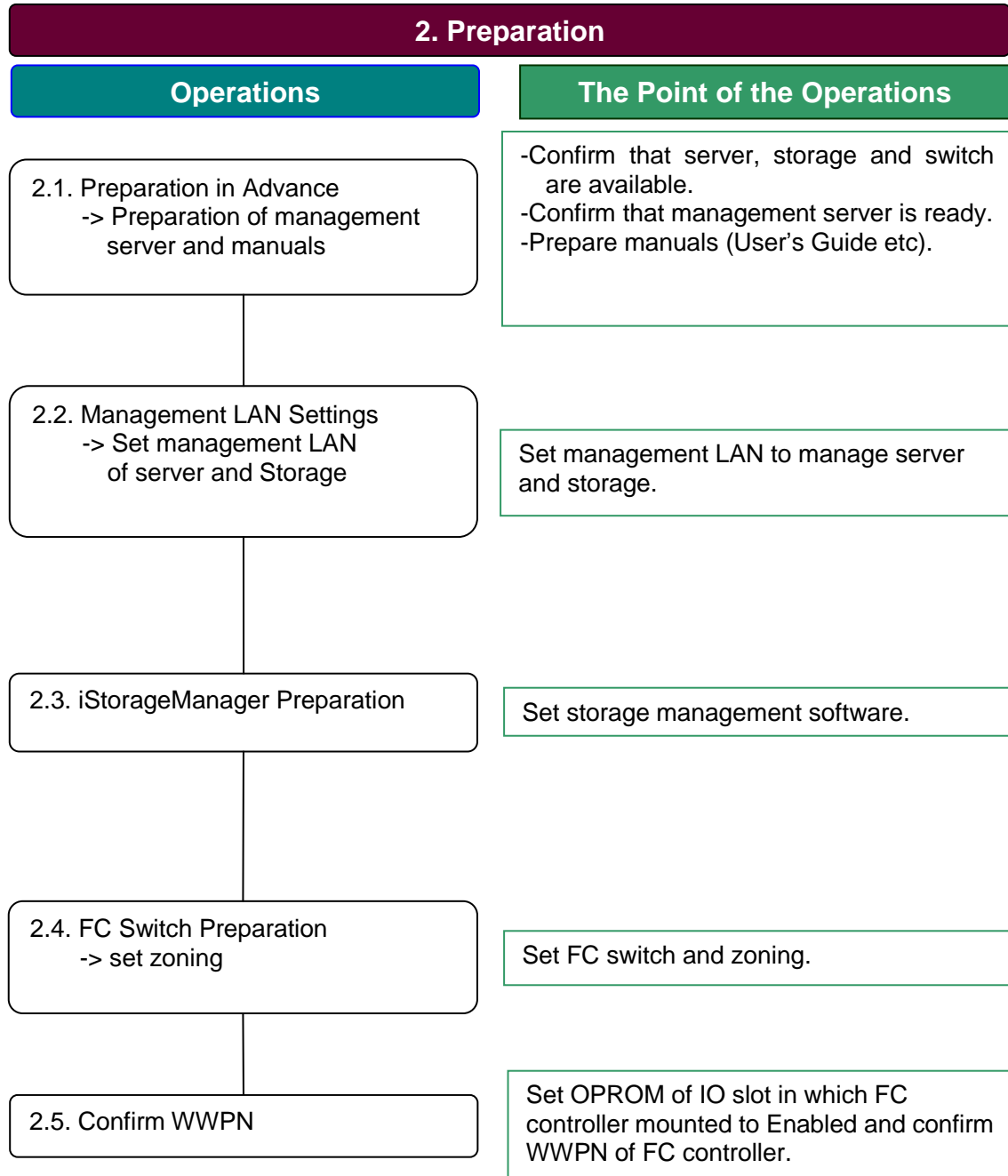


1.5. Flow Chart of Operations



2. Preparation

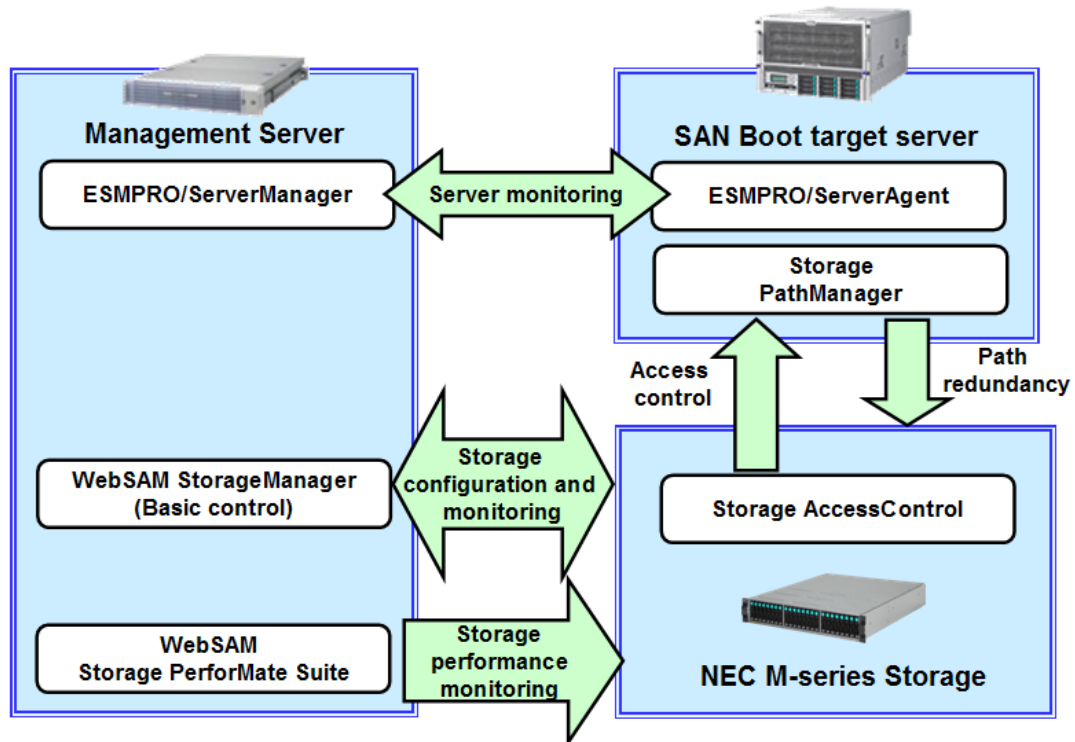
Note the following flow to configure SAN boot system.



2.1. Preparation in Advance

2.1.1. Management Software and Linkage Image

The software installed in the management server is linked in the manner shown in the image below.



See “**7. Additional Application Settings**” with respect to data replication functions (DDR) that must be set after installing the OS.

2.1.2. Acquiring Manuals

This manual describes the various implementation steps while referring to the relevant sections of the various individual product manuals. While the product manuals are included with their products, downloading the latest information from the appropriate website is recommended.

- Express5800/A1080a User's Guide
<http://www.58support.nec.co.jp/global/download/index.html>
 - > **Documents & Software**
 - > **Scalable HA Server**
 - > **NEC Express5800/A1080a**
- Express5800/A1080a System Configuration Guide
<http://itpf.zpf.nec.co.jp/AsQV2/Page/2852/Show>
(User registration is required. NEC Internal Use ONLY)

2.1.3. Hardware and Software Specifications

See the “**SAN Boot Compatibility Table**” for Hardware and Software that can be used for SAN Boot.

Ask your local NEC subsidiary about the availability for our products.

2.2. Management LAN Settings

In order to perform the StorageManager that sets up and manages the NEC M-series Storage disk array, use the management LAN* to connect and setup the network.
(Required)

Also, connecting and setting up the management LAN is strongly recommended in order to facilitate smooth implementation and management of the SAN Boot target servers.

* Independently building the management LAN is recommended, but it is also possible to run it in the same segment as an operating LAN.

If these two are to share a segment, the system should be designed so that access is possible even under heavy loads.

2.3. StorageManager Preparation

2.3.1. NEC M-series Storage Control Software Installation

2.3.1.1. StorageManager Installation

StorageManager controls Storage in the SAN Boot environment. If StorageManager is not installed or the version that is installed cannot be used for SAN Boot, refer to **“Chapter 3 Server Installation (Windows)”** and **“Chapter 4 Client Installation”** of the **“NEC Storage Manager Installation Guide”**.

* See the **“SAN Boot Compatibility Table”** for the StorageManager version that can be used for SAN Boot.

* Refer to the INSTALL.pdf file in the NEC Storage Manager Suite CD-ROM to find the **“Installation Guide.”**

2.3.1.2. Unlocking the AccessControl License

SAN Boot does not support sharing system disks among multiple servers. Therefore, it is necessary to control access from various servers with AccessControl.

Refer to **“11.4 License Unlock”** of the **“NEC Storage Software Configuration Setting Tool User’s Manual (GUI) for the M Series”** with regard to unlocking the AccessControl license.

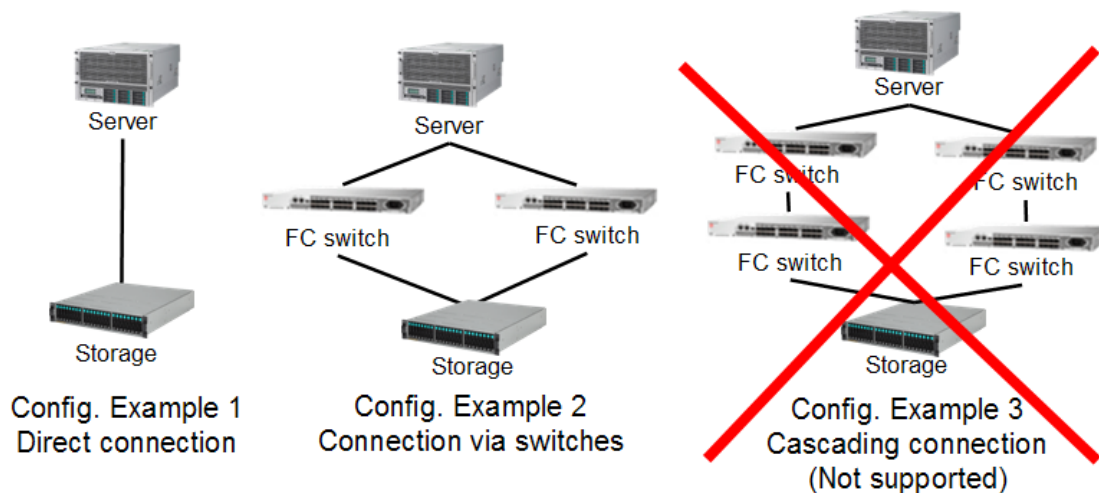
When using additional licenses, refer to **“11.4 License Unlock”** and unlock them. For the M10e and M100, the AccessControl license is unlocked by default. Thus there is no need to unlock it.

* Refer to the manual¥IS051.pdf file in the StorageManager Express Setup and Utility CD-ROM for the **“NEC Storage Software Configuration Setting Tool User’s Manual (GUI) for the M Series.”**

2.4. FC Switch Preparation

2.4.1. Configuration

In a SAN Boot environment, the SAN Boot target servers are connected to storage through FC switches, or servers and storage devices are connected directly. Note that cascading FC switches are not supported in a SAN Boot environment.



FC Switch can be configured with the NEC WB series (WB310A/330A/340A/512A/514A).



WB310A / 330A / 340A



WB512A/514A

2.4.2. FC Zoning Settings

FC Switch Zoning

The purpose of zoning FC switches is to logically separate connected devices that do not have any mutual access, so that they cannot be accessed by connected devices from outside their zones. This improves security.

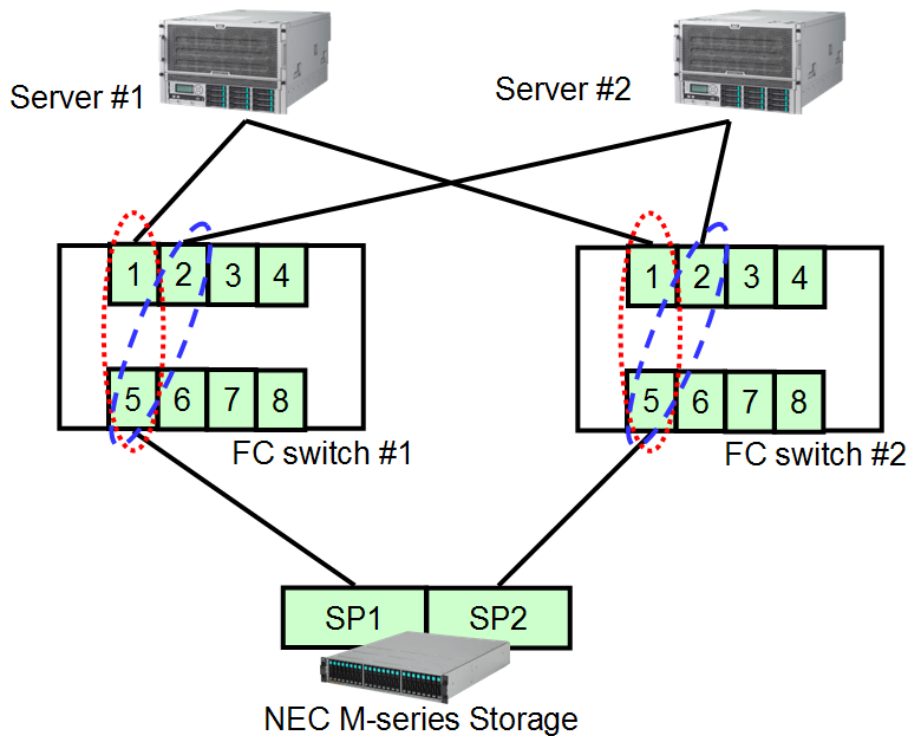
When using SAN Boot, unless zoning is set so that FC controllers connect the servers to the FC switches according to zones differentiated by ports, when another server that belongs to the same zone is linked, a disturbance will occur in which logging in is allowed from another server. Because of this, zoning must be set so that the zones are separated by the ports on the FC controllers.

Conversely, when there are multiple devices in the same zone, a device might be affected by another device. Therefore, it is strongly recommended to divide the devices into zones on a one-to-one basis with the ports.

Refer to the “**User’s Guide**” that is included with the FC switches for details on zoning them.

FC switch zoning configuration example:

The illustration below shows a port zoning example configuration in which two FC switches are connected to two servers with redundant paths.



* In this type of configuration, the zoning settings for FC switches #1 and #2 are recommended so that the following ports are paired.

Server #1 zone pairing: [Port 1] - [Port 5]

Server #2 zone pairing: [Port 2] - [Port 5]



Refer to “**Zoning Settings**” in the FC switch “User’s Guide” for setting details.
This example shows two servers, but Port 3 or higher can also be zoned in preparation for future expansion.

2.5. Confirm WWPN

Confirm the WWPN (World Wide Port Name) of the FC controllers that will be used in FC SAN Boot environment.

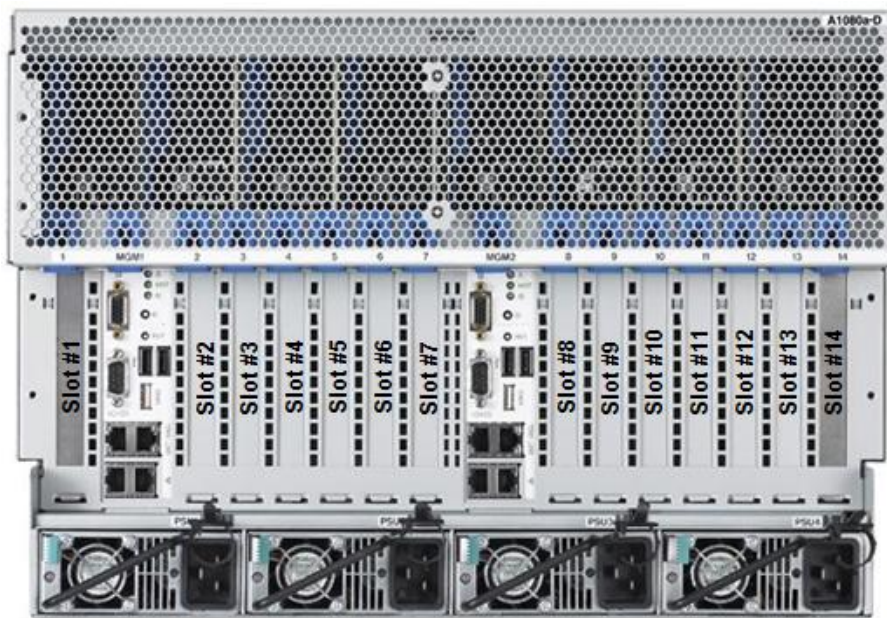


IOH and PCI slot connection

- IOH1--- PCI slot #1,#2,#3,#4
- IOH2--- PCI slot #5,#6,#7
- IOH3--- PCI slot #8,#9,#10,#14
- IOH4--- PCI slot #11,#12,#13

We recommend using PCI slots under different IOH for “Primary” and “Secondary” FC controller.

For example: Primary FC controller is slot#1 and Secondary FC controller is slot#5.



Rear side of A1080a-D

In FC SAN Boot environment, FC controllers on a server need to be linked with the LD sets of NEC M-series Storage by using AccessControl on NEC M-series Storage.

It is necessary to confirm the WWPN before linking the logical disks, because NEC M-series Storage uses the FC controller WWPN for linking.

WWPN can be confirmed by FC BIOS of FC controller.



With the multiple FC controllers mounted, multiple WWPN of the FC controllers are identified with the process described in this document. In order to know only the WWPN of the FC controller to be used as boot path, please set the PCI slot of the other FC controller to “Disabled” through server Web console.

In detail, Please see the User’s Guide;

“Web Console Function”

-> **“Server Web Console”**

-> **“Enable/Disable Component”**

For Example: in case of using FC controller #1,#2 for booting

[1]Set the PCI slot of the FC controller#1 to “Enabled” and the other PCI slots of the FC controller to “Disabled” through server Web console.

[2]Confirm WWPN of FC controller#1

(Please refer to **“Confirm WWPN by FC controller BIOS (1) – (10)” of the next page**).

[3]Power off the server and set the PCI slots of the FC controller #1,#2 to “Enabled” through server Web console.

[4]Power on the server and confirm the WWPN of FC controller #2 (the WWPN of FC controller #1 has been known already).

(Please refer to **“Confirm WWPN by FC controller BIOS (8)-(10)” of the next page**),

[5]Go **“3.Storage Settings”** in this Whitepaper.

NOTE:

The PCI slot of the FC controller not to be used as “boot path” must be set to “Disabled” during the process of this document, and resume to “Enabled”, after all the process completed.



The internal disk in the server is NOT available in SAN boot configuration.

If the RAID controller is mounted, please set RAID controller’s PCI slot to “Disabled” through server Web console.

In detail, Please see User’s Guide

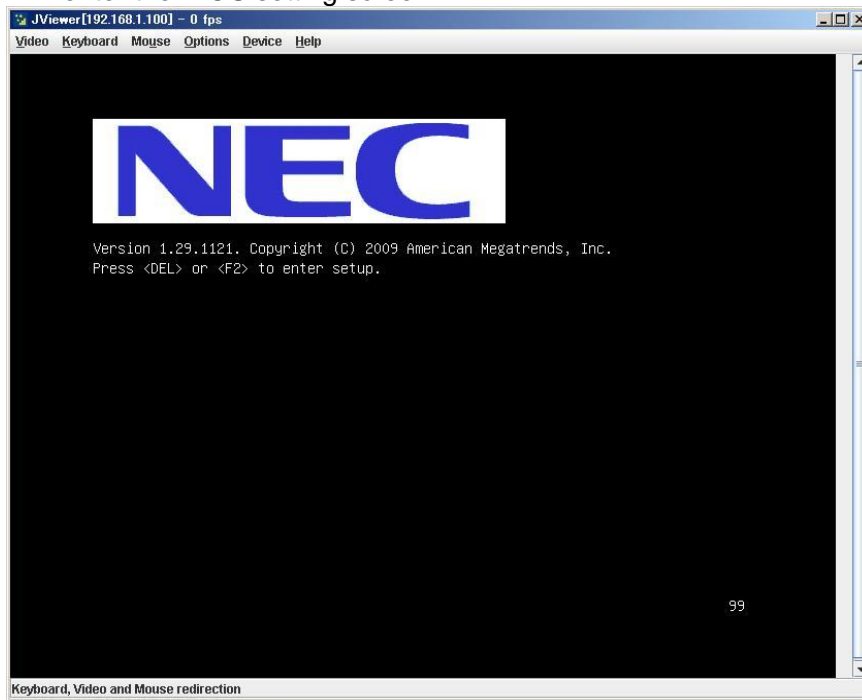
“Web Console Function”

-> **“Server Web Console”**

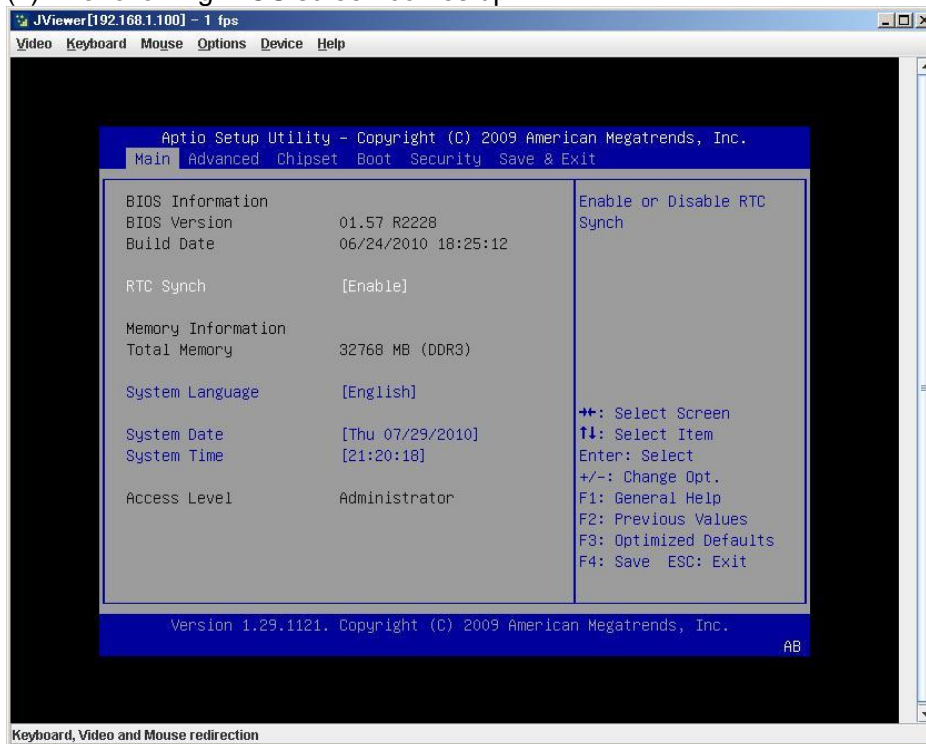
-> **“Enable/Disable Component”**

“Confirm WWPN by FC controller BIOS”

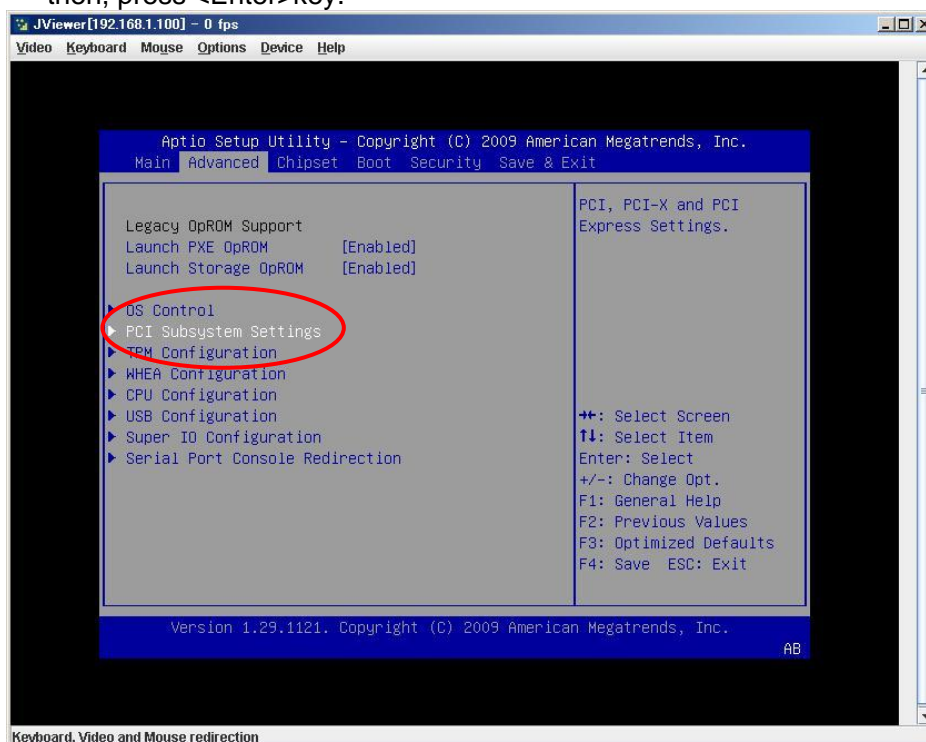
(1) Power on the server, then NEC logo is displayed, Press key or <F2> key to enter the BIOS setting screen.



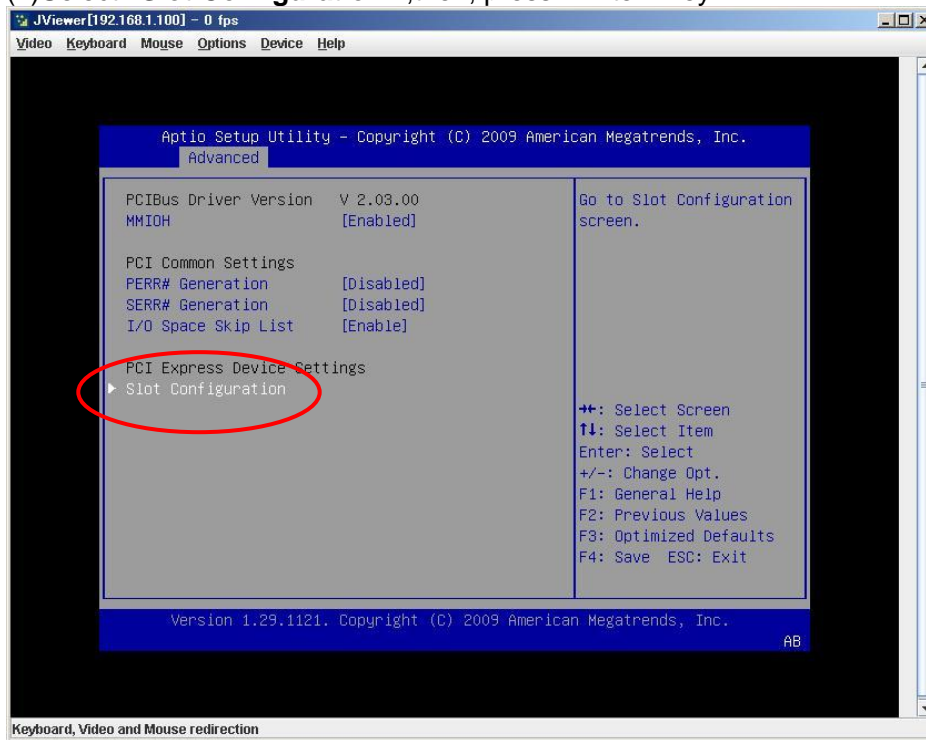
(2) The following BIOS screen comes up.



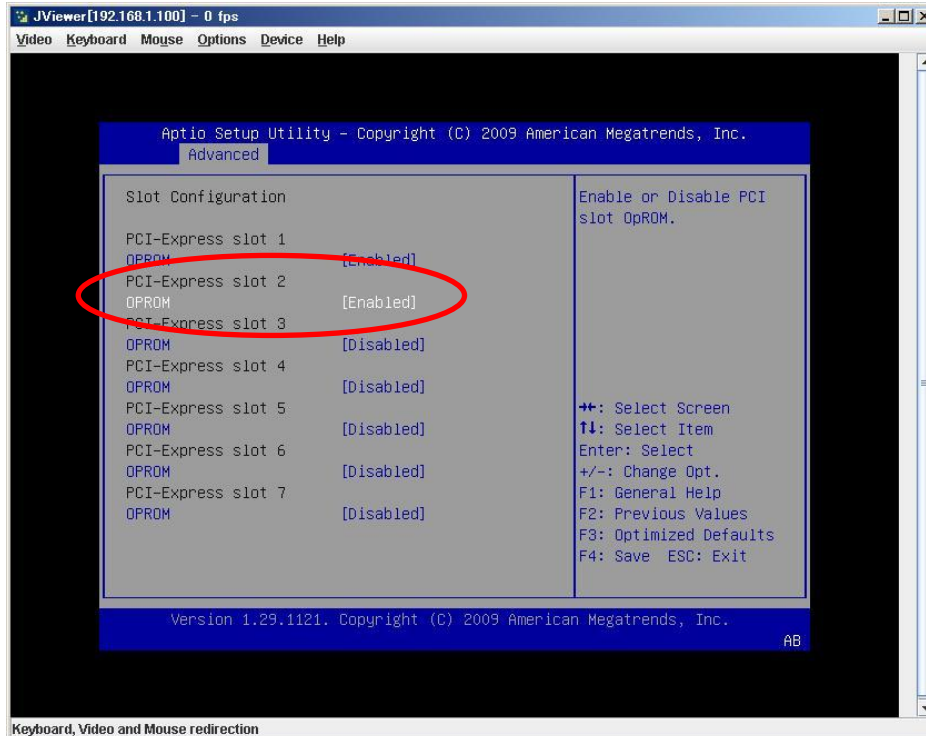
(3) Select "Advanced" (Press <TAB> key) and select "PCI Subsystem Settings", then, press <Enter> key.



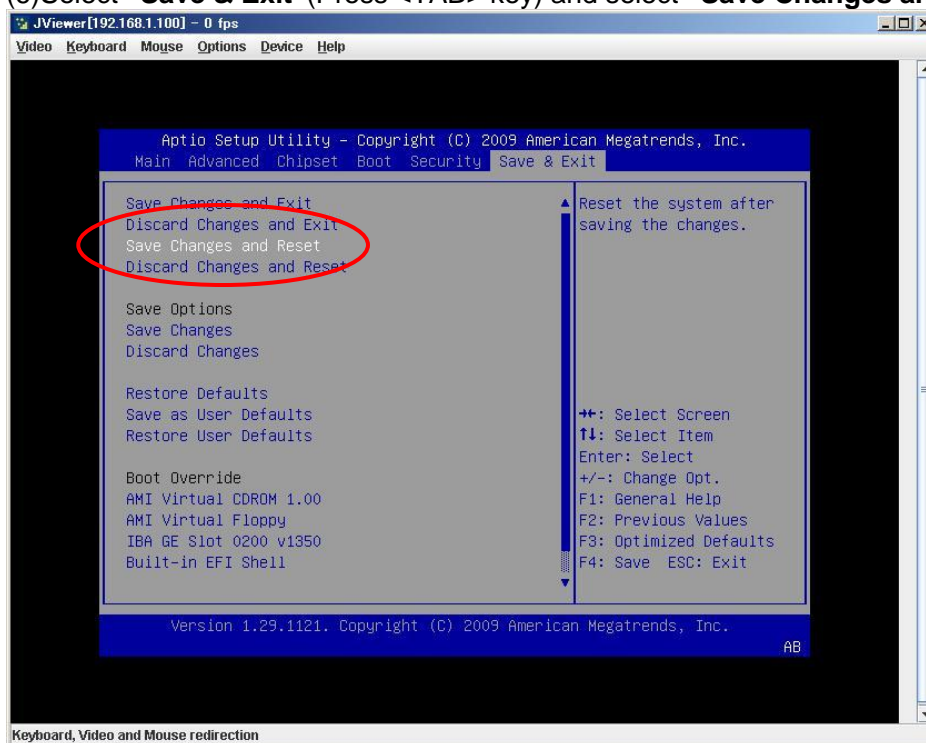
(4) Select "Slot Configuration", then, press <Enter> key.



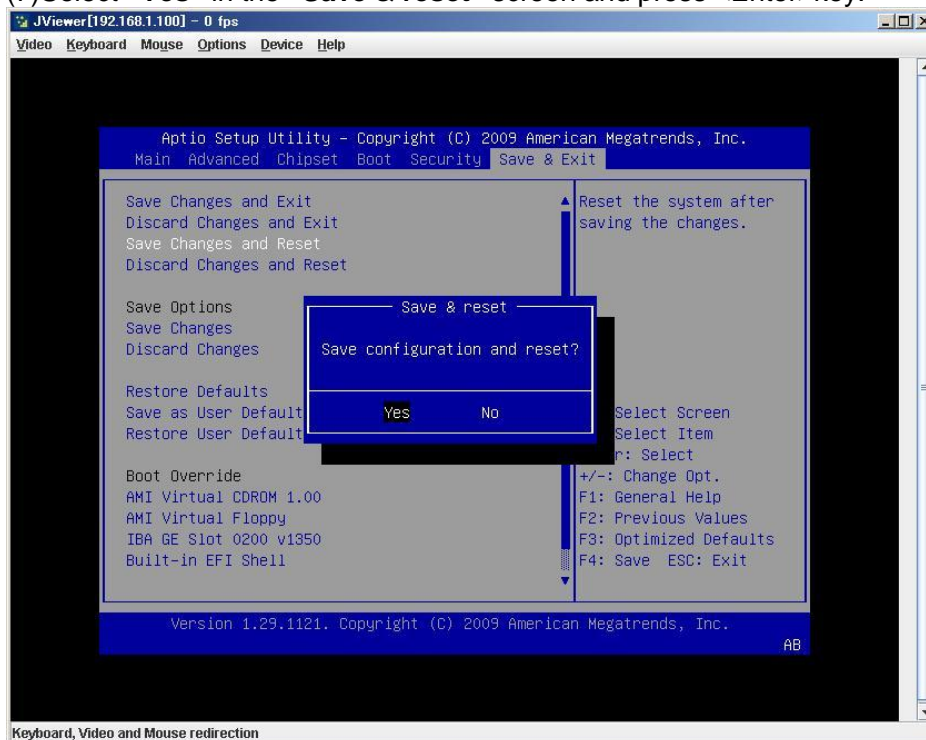
(5) Set OPROM of the PCI Slot in which boot path FC controller is mounted to "Enabled" (for both Primary boot path and Secondary boot path).
Set OPROM of the other PCI Slots to "Disabled".



(6) Select **"Save & Exit"** (Press <TAB> key) and select **"Save Changes and Reset"**.



(7) Select **"Yes"** in the **"Save & reset"** screen and press <Enter> key.



Then, the server will be rebooted.

(8) After rebooted, the following message is displayed, then, press <Alt>+<E> or <Ctrl>+<E> key combination to start the FC controller BIOS configuration utility.

```
!!! Emulex LightPulse x86 BIOS !!!, Version 2.02a2
Copyright (c) 1997-2008 Emulex. All rights reserved.

Press <Alt E> or <Ctrl E> to enter Emulex BIOS configuration
utility. Press <s> to skip Emulex BIOS
```

(9) Once pressed, the following message is displayed. Then the menu screen is shown. If it does not appear, reboot the server and try again.

```
Emulex BIOS configuration utility selected
Bringing the Link up, Please wait...
Bringing the Link up, Please wait...
```

(10) After the menu is displayed, select the number that corresponds to the port that is connected to the storage device in which the OS will be installed, and display the information of that port.

```
Emulex LightPulse BIOS Utility, UB2.02a2
Copyright (c) 1997-2008 Emulex. All rights reserved.

Emulex Adapters in the System:

1. LPe12002-MB:      PCI Bus, Device, Function (05,00,01)
2. LPe12002-MB:      PCI Bus, Device, Function (05,00,00)
```

Port 1

Port 0

Function 00 corresponds to Port 0 and Function 01 corresponds to Port 1.

Port Name means WWPN of FC controller.

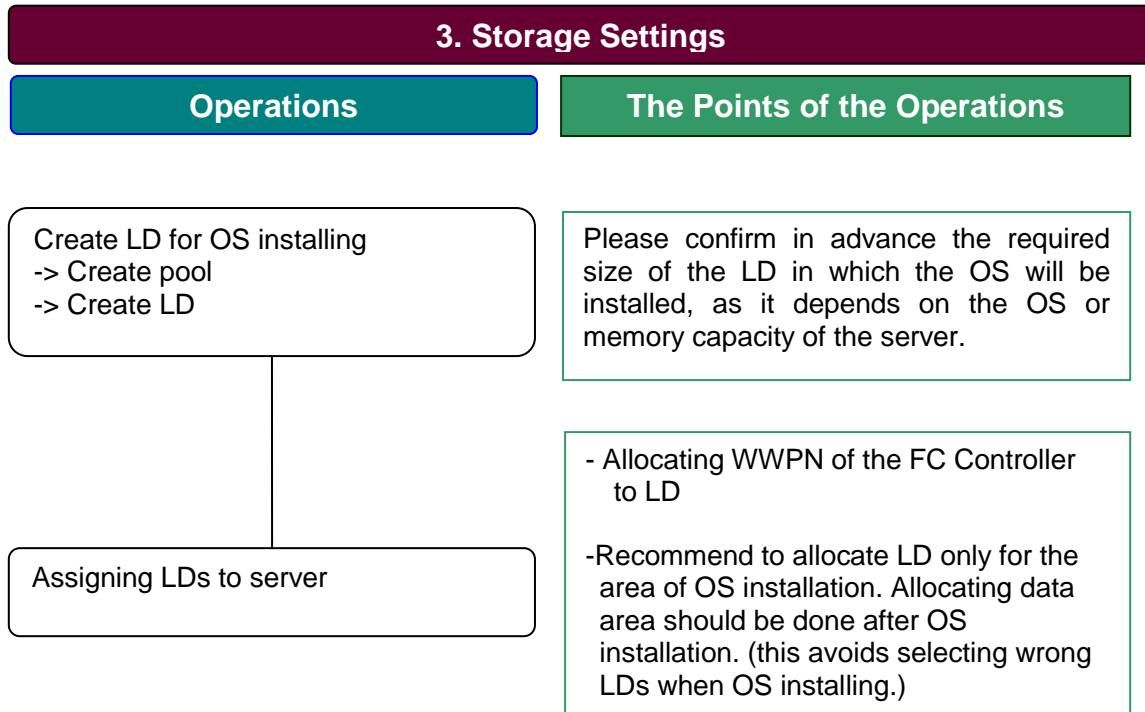
```
Adapter 01:      PCI Bus, Device, Function (05,00,01)

LPe12002-MB:      Mem Base: FBB80000  Firmware Version: US1.11A5
Port Name: 10000000 C98E3121  Node Name: 20000000 C98E3121
Topology: Auto Topology. Loop First (Default)
The BIOS for this adapter is Disabled

1. Configure Boot Devices
2. Configure This Adapter's Parameters
```

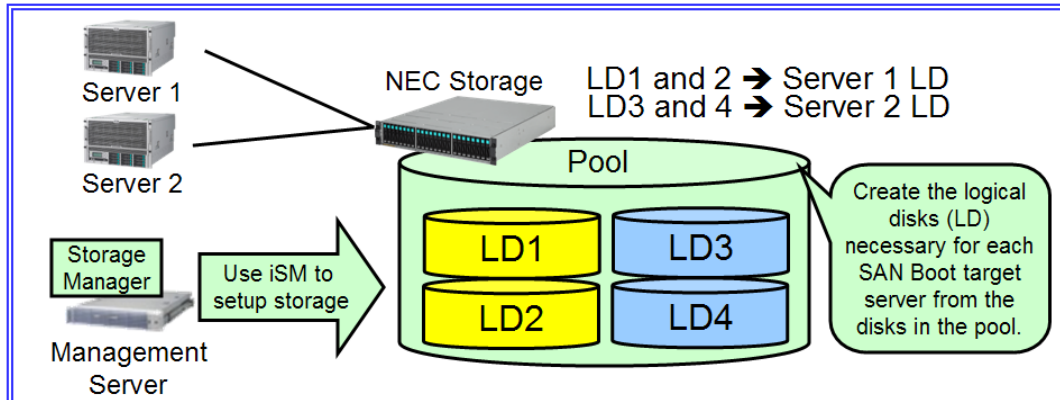
(11) Press <ESC> key and return to "(10) screen" and then, confirm the other WWPNs (redundant path).

3. Storage Settings



3.1. Storage M Series Settings

3.1.1. Creating a Pool and Logical Disks (LDs)



StorageManager creates the pool and logical disks (hereafter referred to as LDs). For the NEC M Series Storage, refer to “7.1 Pool Bind” and “9.1 Logical Disk Bind” in “**NEC Storage Software Configuration Setting Tool User’s Manual (GUI) for the M Series.**”

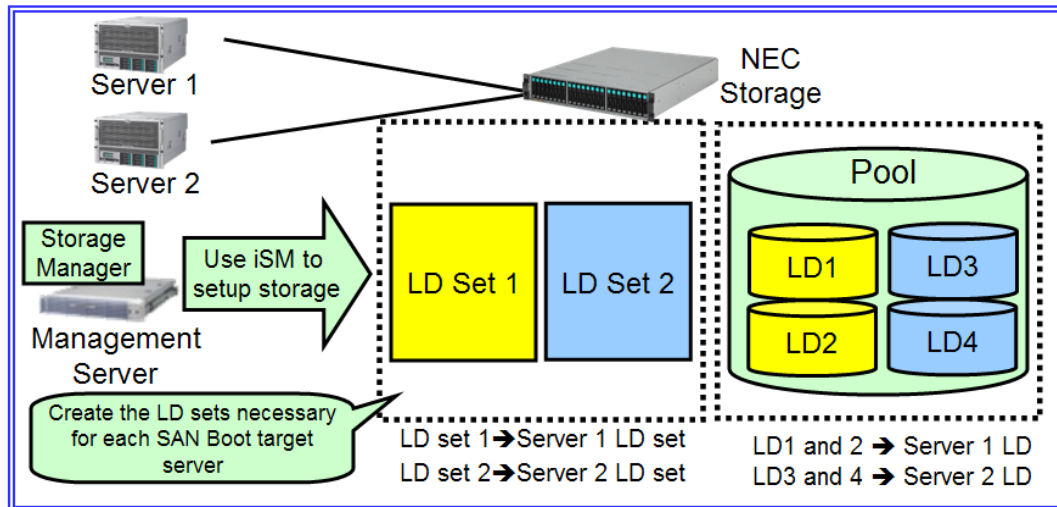
When using the Storage data replication function to create a Windows OS image, set the logical disk format of the LD storing the OS to “WG” so that the disk signature does not change.

See “**7.1.4. Precautions for Backup and Restore from a Windows Server OS Image with the DDR**” for details.

* When the pool has already been created , create the LDs properly.

* It takes long time to format disk according to the capacity and number of LDs.

3.1.2. Creating an LD Set



StorageManager creates an LD set.

Refer to “**10.3.3.1 Creating a New LD Set/Changing Settings**” in “**NEC Storage Software Configuration Setting Tool User’s Manual (GUI) for the M Series**” for details.

Set the application server platform for the LD set platform.

If the application server OS is VMware ESX/ESXi, set “LX” as the platform.

An LD set is a virtual image that indicates a group of logical disks. The application server can access the LDs by assigning path information (WWN (World Wide Name) of the application server) and LDs.

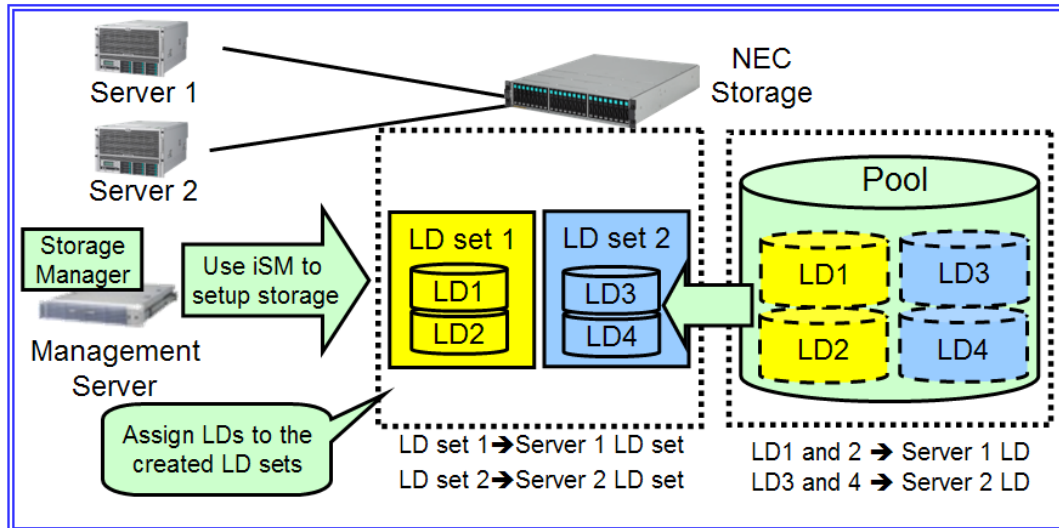
Refer to “**2.3 LD Set**” in “**NEC Storage Software Configuration Setting Tool User’s Manual (GUI) for the M Series**” for details.

3.1.3. Assigning LDs to an LD Set

StorageManager assigns LDs to an LD set.

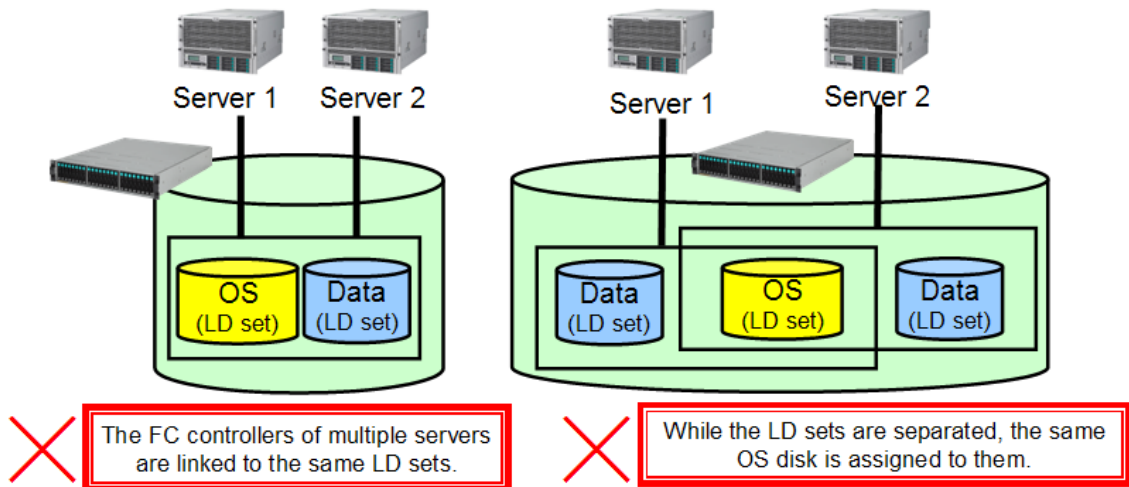
Refer to “10.1 Assignment of Logical Disk” in “**NEC Storage Software Configuration Setting Tool User’s Manual (GUI) for the M Series**” for details.

* Assign LDs to an LD set after formatting in “**3.1.1. Creating a Pool and Logical Disks (LD).**”

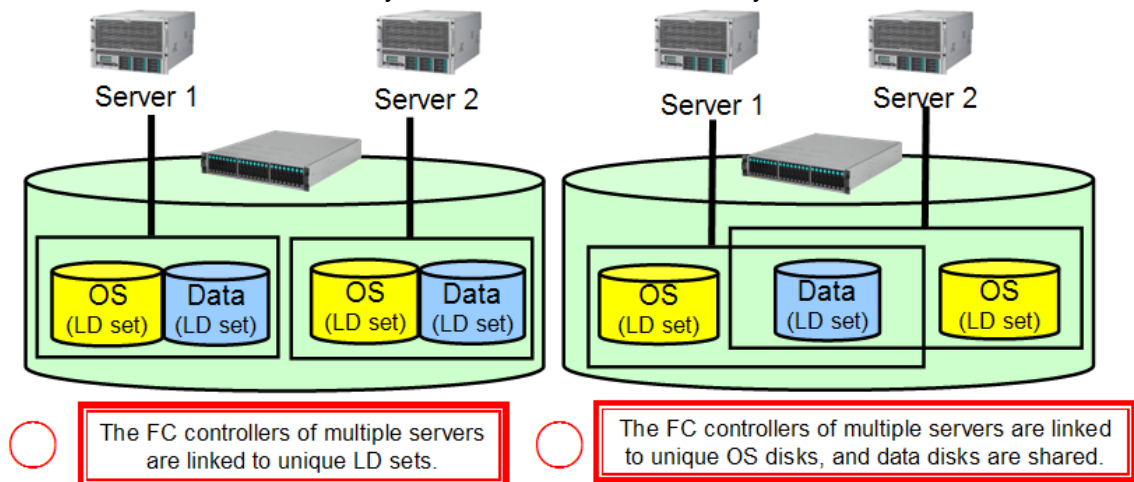


Cautions for Assigning LDs

The following connection configurations are not supported
(Also, two servers in A1080a-D):



Configure the system as multiple server can not access single LD set.
Exclusive access control by cluster software is necessary to share data disks.



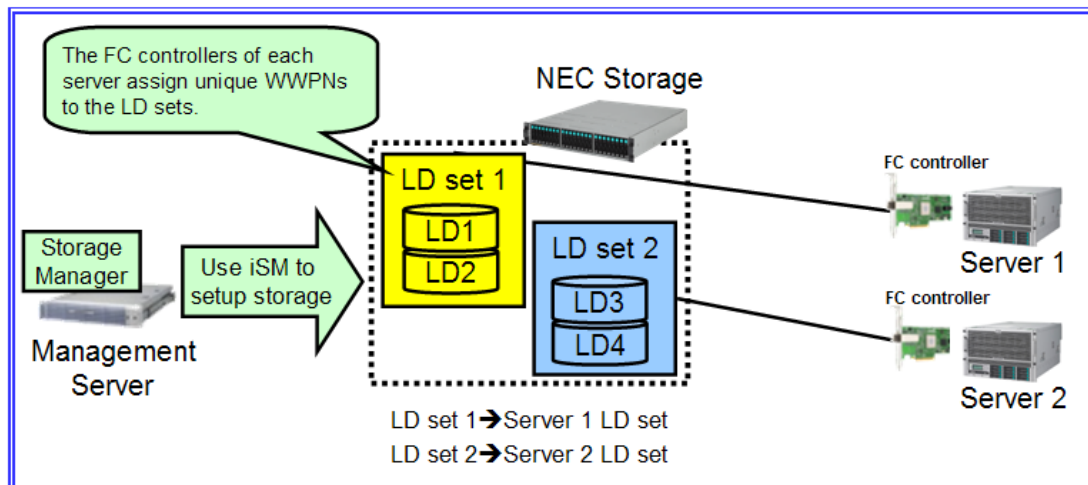
3.1.4. Changing the Port Access Mode

To execute SAN Boot, the access mode of NEC M-series Storage ports must be set to the WWN mode. (WWN mode is set by default.)

Set the port access mode to WWN mode with StorageManager.

Refer to “11.2.7 Port Mode Switching” in “NEC Storage Software Configuration Setting Tool User’s Manual (GUI) for the M Series” for details.

3.1.5. Linking the LD Sets and FC Controllers



Link the WWPNS of the FC controller on the SAN Boot server to the LD sets.

Refer to “10.3.3.1 Creating a New LD Set/Changing Settings” of “NEC Storage Software Configuration Setting Tool User’s Manual (GUI) for the M Series” for details.

Changing LD Set

LD Set Changing > Confirm > Finish

1: Specify the LD Set (host) information.

LD Set Name : sanboot

Platform : Windows(WN)

Action Mode : Normal

2: Specify paths to LD Set (host).

- Paths assignable to the LD Set(host) - (Used connections : 3 Number of Assigned Paths : 0)

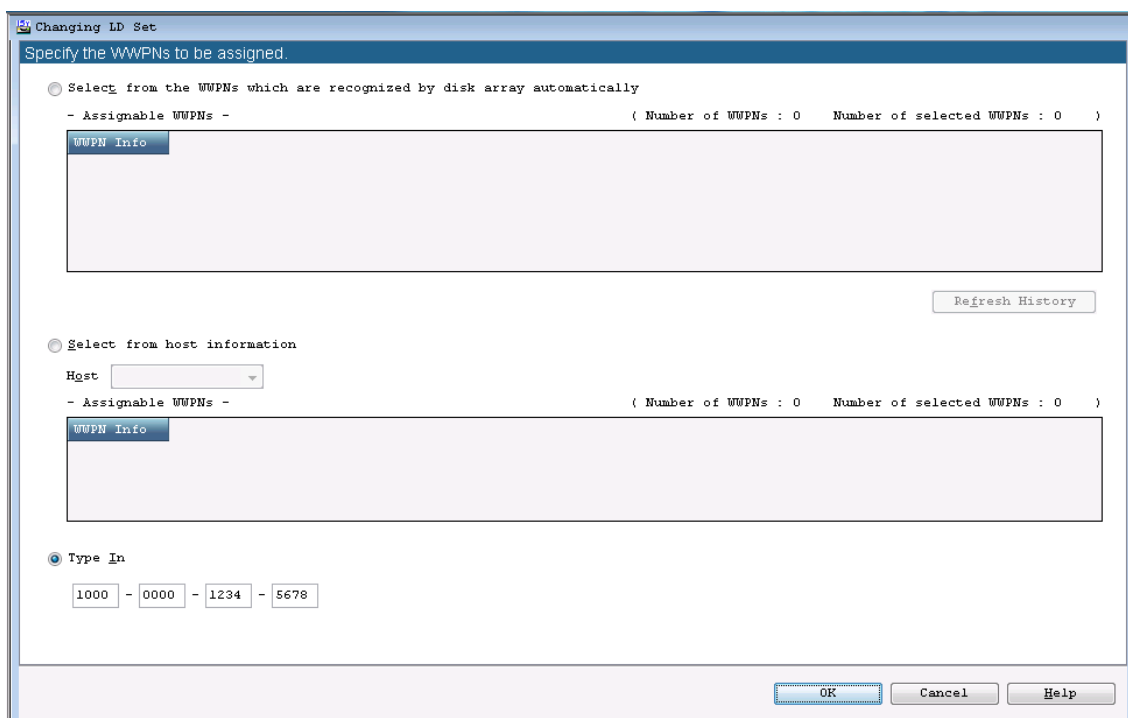
Path Info Path Mode Configuration Lock

Click this

Add WWPN Add Port Change Delete

< Back Next > Cancel Help

To create a redundant configuration, link all FC controller ports in FC SAN Boot to the same LD sets at this time.



The image shows a Windows-style dialog box titled "Changing LD Set". The main heading inside is "Specify the WWPNS to be assigned." There are three radio buttons for selection: "Select from the WWPNS which are recognized by disk array automatically" (selected), "Select from host information", and "Type In". Under the first option, there is a section "- Assignable WWPNS -" with a status "(Number of WWPNS : 0 Number of selected WWPNS : 0)", a "WWPN Info" button, and a large empty list box. A "Refresh History" button is to the right. Under the second option, there is a "Host" dropdown menu, a similar "- Assignable WWPNS -" section with status "(Number of WWPNS : 0 Number of selected WWPNS : 0)", a "WWPN Info" button, and a large empty list box. Under the third option, there are four input boxes containing "1000", "0000", "1234", and "5678" separated by hyphens. At the bottom right are "OK", "Cancel", and "Help" buttons.

User can check WWPNS from the FC controller BIOS.
In detail, see “**2.5 Confirm WWPNS**”

4. Server Setting

4. Server Setting

Each screen may be different depending on the number of port of FC controller, BIOS version, etc., but the operations are basically common.

Operations

The Points of the Operations

4.1. Preparation
-> connect FC cables

FC cables must be connected to FC controllers used as a boot path.

4.2. Server and FC Controller BIOS Settings

Set server BIOS and FC controller BIOS to boot from FC controller.

4.3. Making Single Path FC Connections

Connect only Single FC path before installing OS.

4.1. Advance preparation

Before setting up the BIOS, the ports of the FC controller that will execute FC SAN Boot (including redundant path) must be connected to the FC switches/storage with FC cables.



FC cables should be connected with only two paths used for **FC SAN Boot**.

4.2. Server and FC Controller BIOS Settings

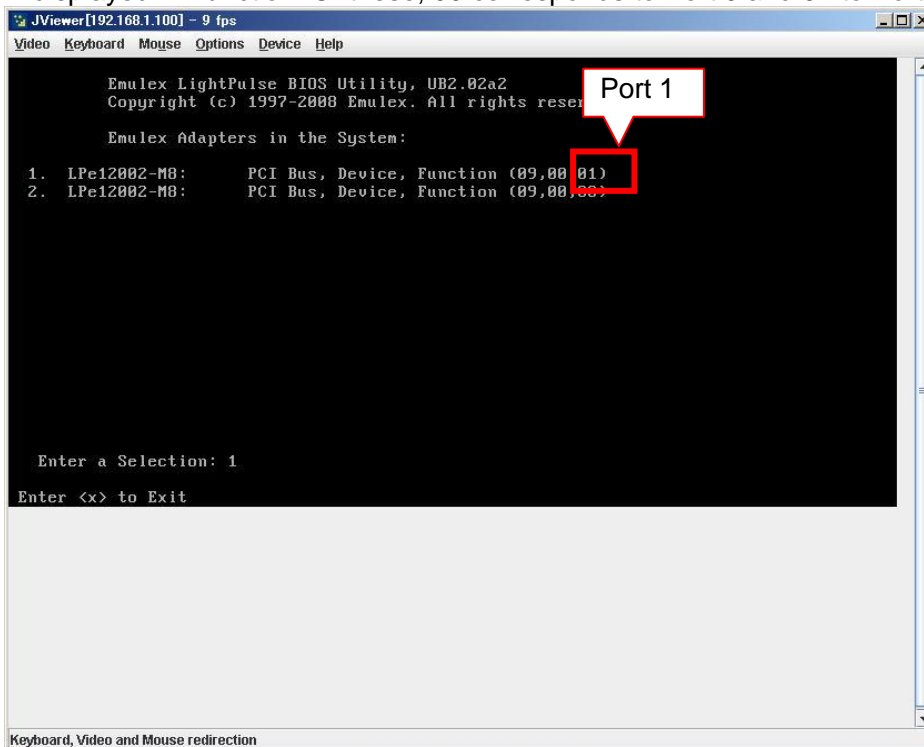
Server and FC Controller BIOS Setting procedure is following.

Note: Set PCI slot OPROM as mentioned in “**2.5.Confirm WWPN**” (1)-(7)

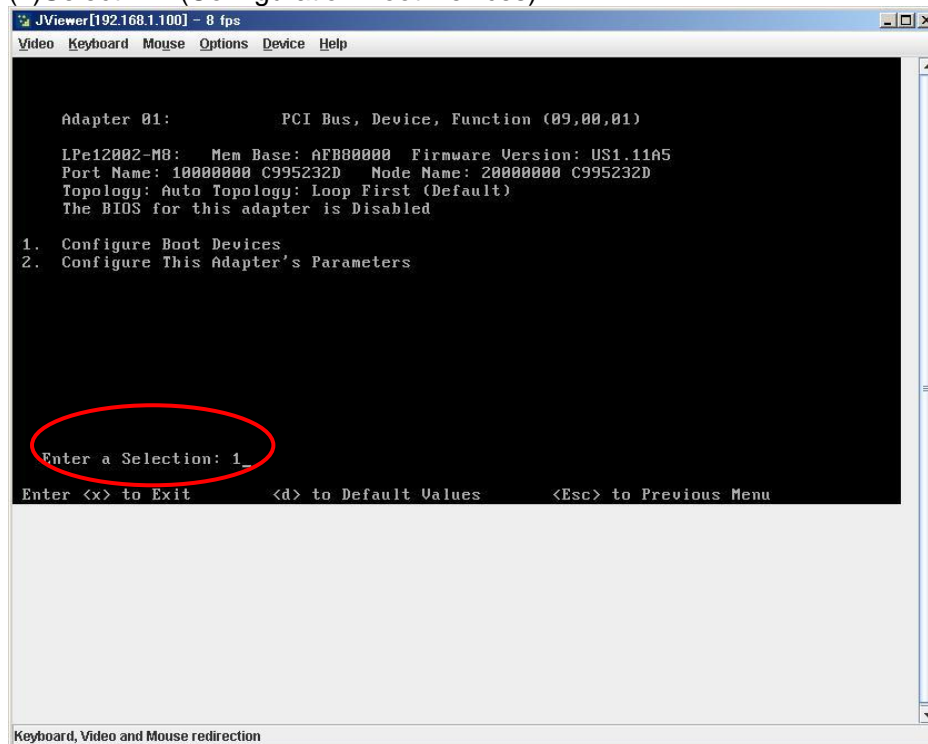
(1)Go to FC controller BIOS screen (“**2.5.Confirm WWPN**” (10)).

Then, select the number that corresponds to the port that is connected to the storage device in which the OS will be installed.

For the 2ch FC controller, the PCI Bus and device are the same and ports 00 and 01 are displayed in Function. Of these, 00 corresponds to Port 0 and 01 to Port 1.

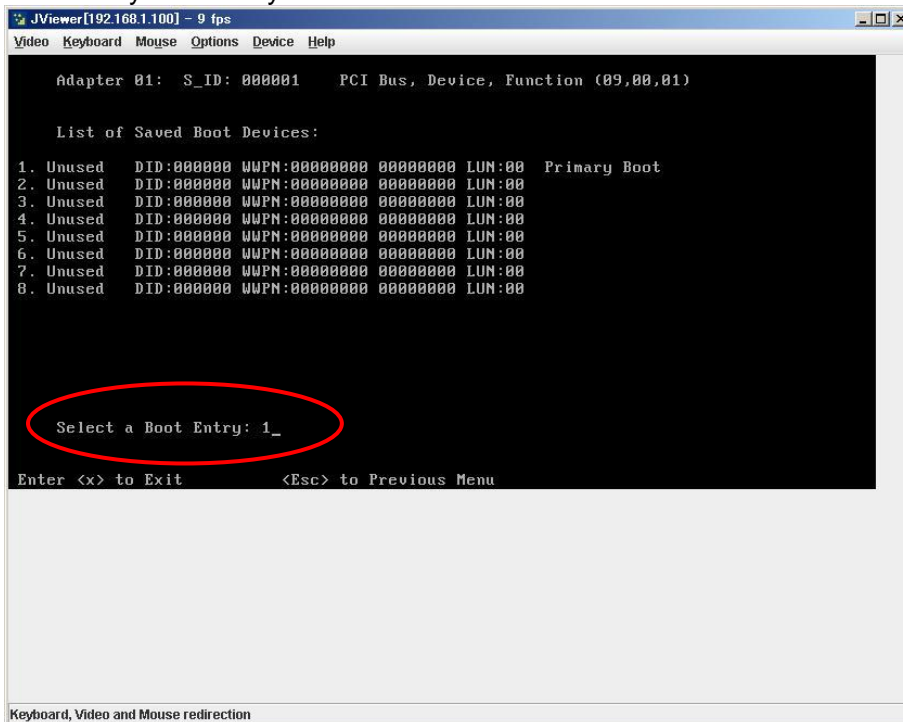


(2) Select "1" (Configuration Boot Devices).



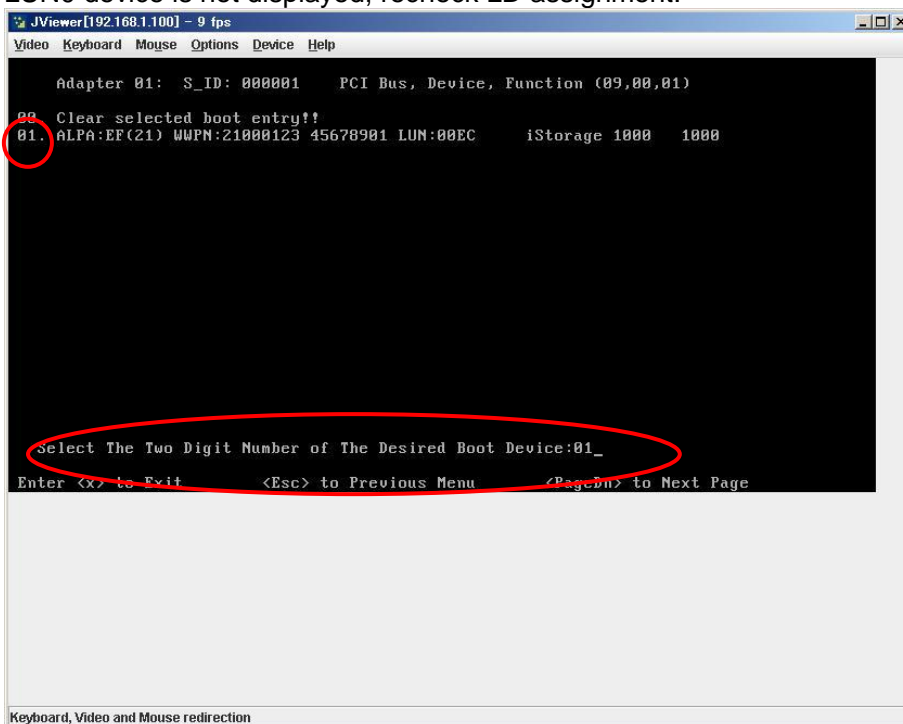
Make sure that the Port Name of the selected port matches the WWPN of the port used for FC SAN Boot. If they do not match, press the <ESC> key, then reselect the port.

- (3) After the boot device list is displayed, enter “1” to display the setup screen for the Primary Boot Entry.

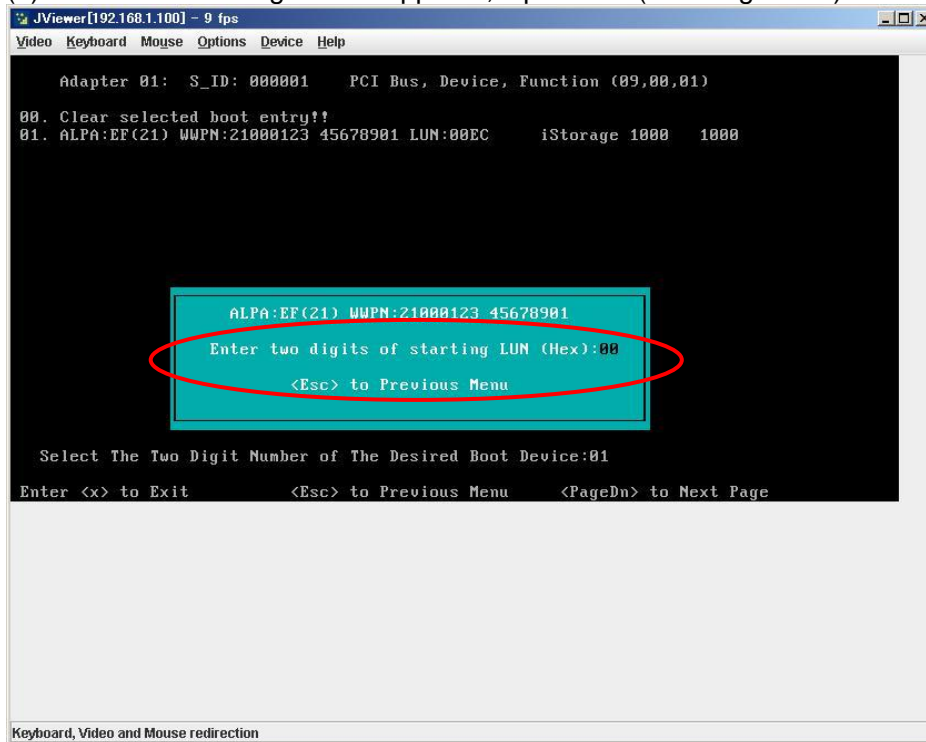


If the boot device is not found through the selected port, the boot device list will not appear, and “This Adapter is not ready, try again!” message will be displayed. Make sure that the correct port is selected. If the port is correct, recheck the storage and FC switch connections and settings, then reboot the server and try again.

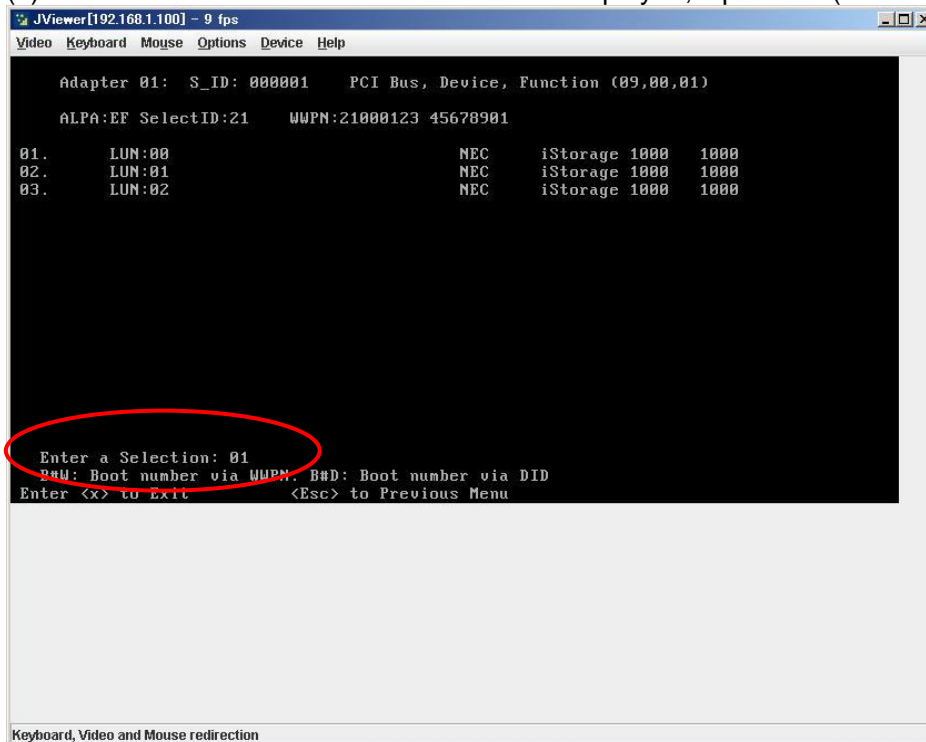
- (4) Input the number of the boot device to be registered.
Be sure to enter the device number that includes LUN0 as the boot device number. If an LUN0 device is not displayed, recheck LD assignment.



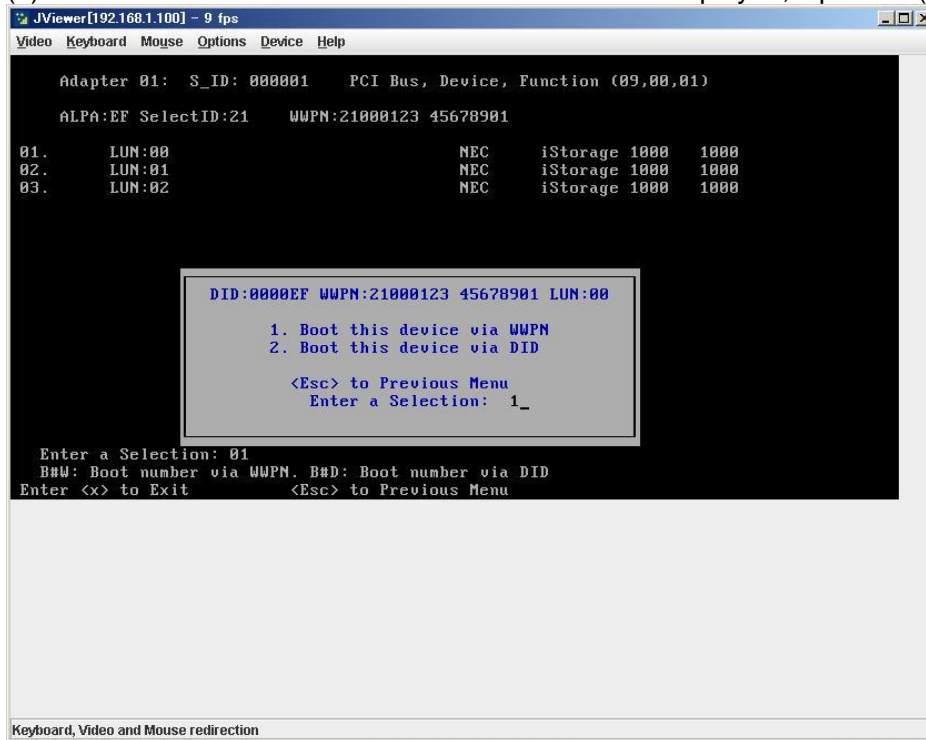
(5) When the following screen appears, input “00” (meaning LUN0).



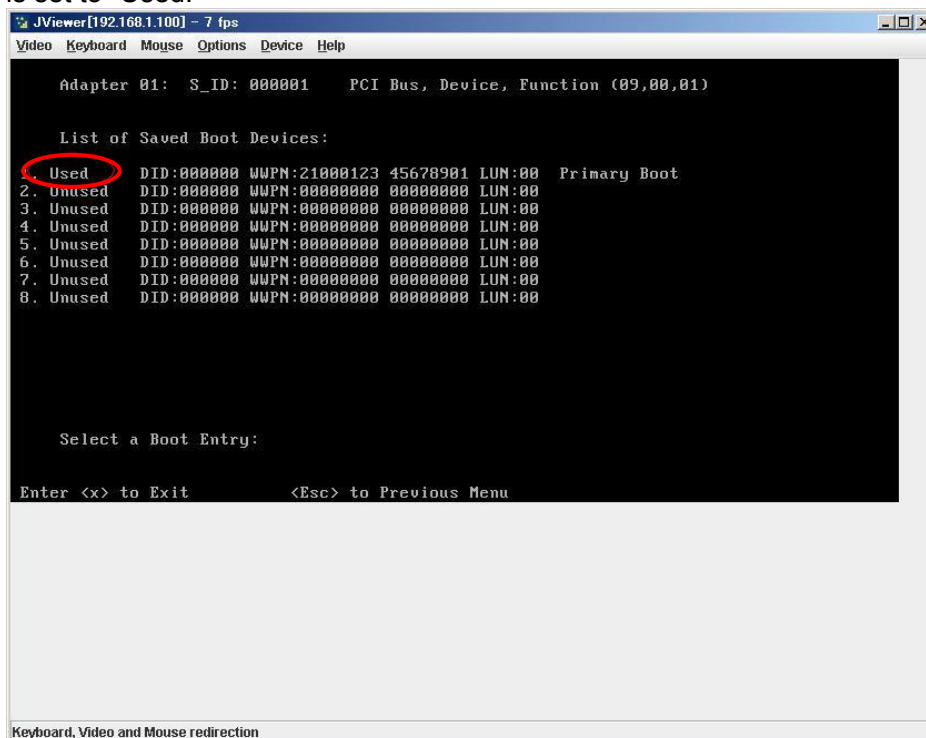
(6) When the device LUN selection screen is displayed, input “01” (LUN:00).



(7) When the device boot method selection screen is displayed, input “1” (boot via WWPN).



(8) The boot device list is displayed again. Make sure that the “Primary Boot” entry at the top is set to “Used.”



After checking the above, press <ESC> to return to the menu below.

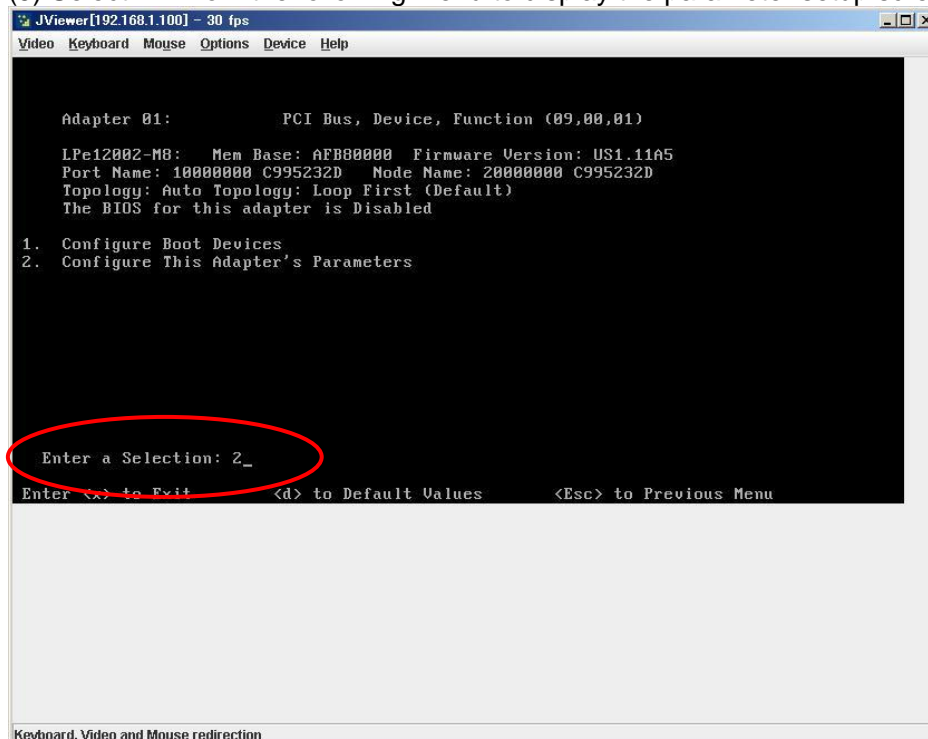
```
Adapter 01:          PCI Bus, Device, Function (05,00,01)

LPe12002-M8:  Mem Base: FBB80000  Firmware Version: US1.11A5
Port Name: 10000000 C98E3121  Node Name: 20000000 C98E3121
Topology: Auto Topology: Loop First (Default)
The BIOS for this adapter is Disabled

1.  Configure Boot Devices
2.  Configure This Adapter's Parameters

Enter a Selection: _
```

(9) Select “2” from the following menu to display the parameter setup screen.



```
JViewer[192.168.1.100] - 30 fps
Video Keyboard Mouse Options Device Help

Adapter 01:          PCI Bus, Device, Function (09,00,01)

LPe12002-M8:  Mem Base: AFB80000  Firmware Version: US1.11A5
Port Name: 10000000 C995232D  Node Name: 20000000 C995232D
Topology: Auto Topology: Loop First (Default)
The BIOS for this adapter is Disabled

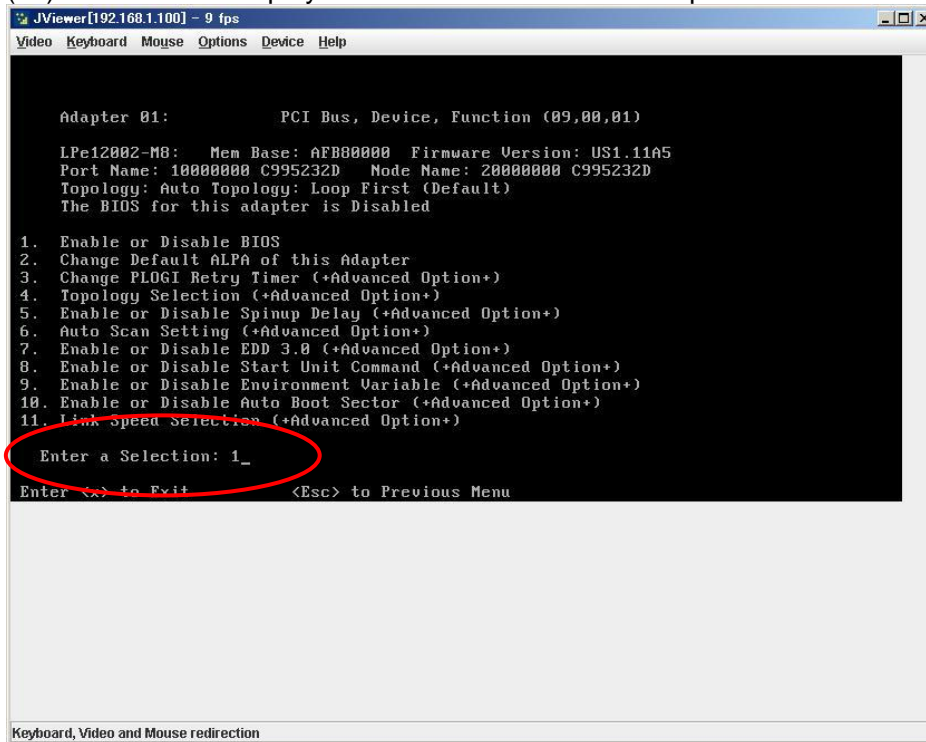
1.  Configure Boot Devices
2.  Configure This Adapter's Parameters

Enter a Selection: 2_

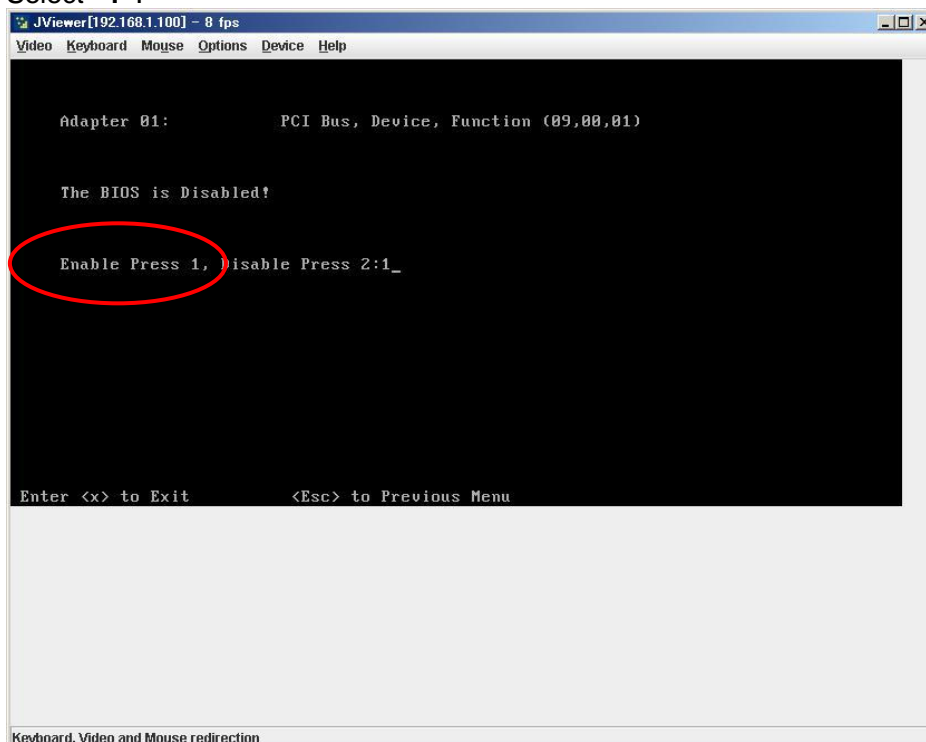
Enter <x> to Exit      <d> to Default Values      <Esc> to Previous Menu

Keyboard, Video and Mouse redirection
```

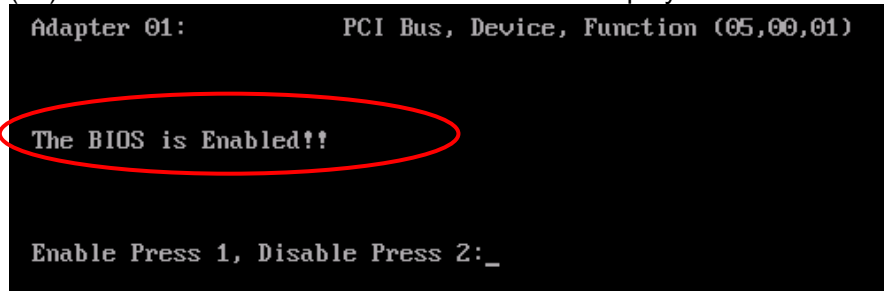
(10) Select “1” to display the BIOS enable/disable setup screen.



(11) Since BIOS is disabled by default, “The BIOS is Disabled!!” is displayed. Select “1”.



(12) Make sure that "The BIOS is Enabled!!" is displayed..



Then press <ESC> key to return to the port selection menu.

Do the (1)-(12) procedure for the remaining FC ports that are connected to storage devices in which OS is to be installed to register the boot devices.

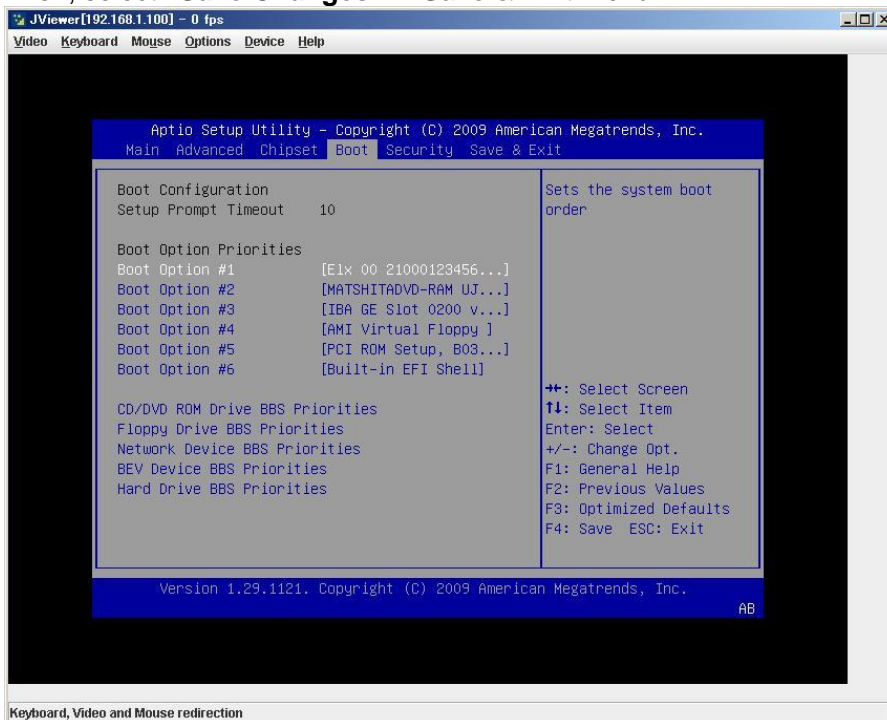


Do not register the boot devices and do not enable the Boot BIOS of FC ports connected to storage devices in which OS will not be installed.

Then reboot.

(13) After displaying BIOS screen below, set "Elx -----"(booting FC port) in **Boot Option#1** and "---- DVD ----" in **Boot Option#2**.

Then, select "Save Changes" in **Save & Exit** menu



When installing OS, set DVD to DVD drive and select "---- DVD ----" in "Boot Override" of **Save & Exit** BIOS menu.

4.3. Making Single Path FC Connections

When installing a Windows, the path connecting to the storage in which the OS is to be installed must be made a single path.

* VMware can be installed with the redundant path connected.



The FC cable disconnected at this time will be reconnected after installing the OS/PathManager. Note for future reference the original connection location.

Reboot the server and go to **"5. OS Installation"**

5. OS Installation

5.1. Overview

After operation is completed through Chapter 4 and the OS installation area (LD) is recognized by the FC BIOS, OS installation can be initiated.

Installation method will differ depending on the OS. Please read carefully the procedures and precautions in each chapter before proceeding.

Windows Server :	“5.2 Windows”
VMware :	“5.3 VMware ESX/ESXi”



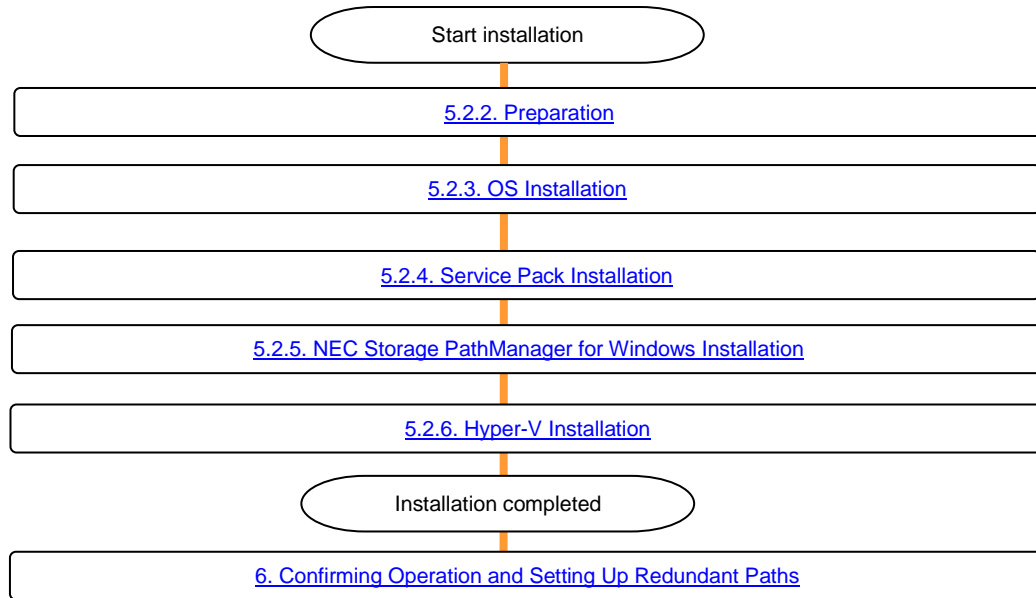
BIOS settings are different from installing OS.
BIOS settings in each OS are written in User's Guide “**appendix C**”

5.2. Windows

5.2.1. Windows Server 2008 and Windows Server 2008 R2 Installation

This section describes the installation of Windows Server 2008 and Windows Server 2008 R2.

The Windows OS is installed according to the following flow.



5.2.2. Advanced Preparations



Do not make the path between the server and NEC M-series Storage redundant without installing PathManager. Doing so can lead to OS installation failure.

Items necessary for installation

- EXPRESSBUILDER DVD (Ver.6.80-001.01 or later)
- OS installation media
 - NEC OS installation media (hereafter referred to as “**backup DVD**”)
- User's Guide (in the EXPRESSBUILDER DVD)
 - User can get from following URL.
<http://www.58support.nec.co.jp/global/download/index.html>
 - > Documents & Software
 - > Scalable HA Server
 - > NEC Express5800/A1080a
- Installation Guide (in the EXPRESSBUILDER DVD)

5.2.3. OS Installation

Following the instructions in Installation Guide (Windows), install the OS with OS Standard Installer.

5.2.4. Service Pack Application

5.2.4.1. Windows Server 2008

See the information on the following website and install Service Pack 2.

About Windows Server 2008 Service Pack 2

<http://www.58support.nec.co.jp/global/download/w2008sp2/index.html>

5.2.4.2. Windows Server 2008 R2

See the information on the following website and install Service Pack 1.

This step can be skipped if Service Pack 1 is not to be installed.

About Windows Server 2008 R2 and Windows 7 Service Pack 1

<http://www.58support.nec.co.jp/global/download/w2008r2/sp1.html>



In the A1080a-E with Intel® Xeon® processor E7-8800 Product Family,
Service Pack 1 must be installed.
In detail, see server User's Guide.

5.2.5. NEC Storage PathManager for Windows Installation

Install NEC Storage PathManager that makes NEC M-series Storage path redundant.
Do not make the path between the server and NEC M-series Storage redundant until
installation is completed.

To use NEC Storage PathManager, install it according to “**Installation**” in the
“**Installation Guide**” provided with the product.

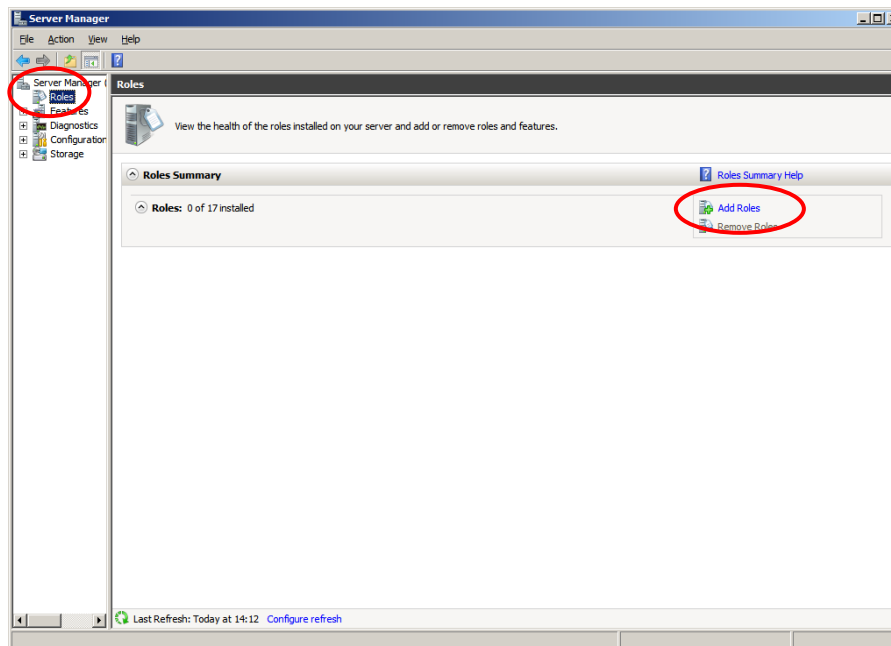
When using the NEC Storage PathManager that comes with an NEC M10e or M100
series unit, install the software according to “**NEC Storage PathManager Installation**”
in the “**Disk Array Unit User's Guide**” that comes with the unit.

5.2.6. Hyper-V Installation (only when using Hyper-V)

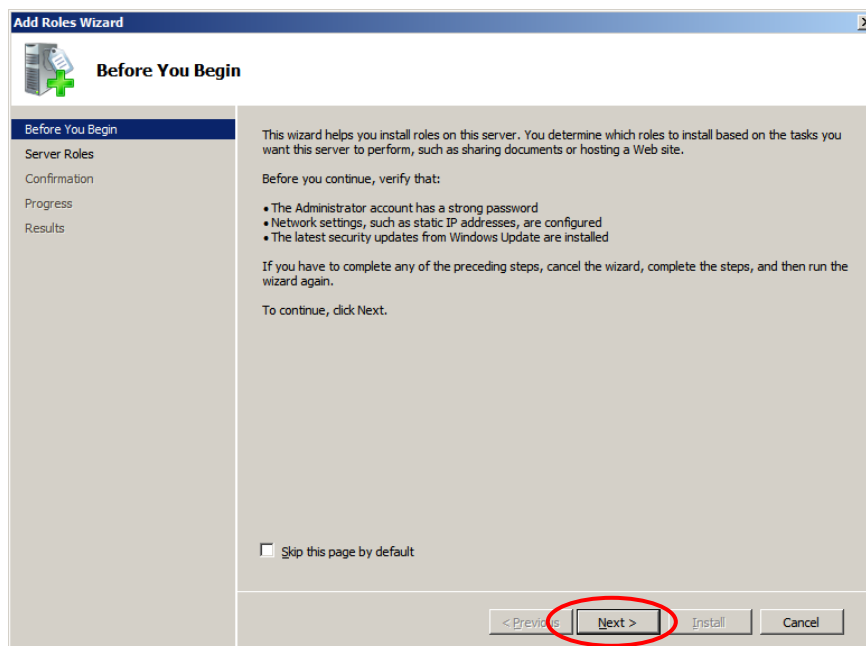
Follow the steps below in order to use Hyper-V with Windows Server 2008 or Windows Server 2008 R2. This section can be skipped if Hyper-V is not used.

(1) Start the Server Manager.

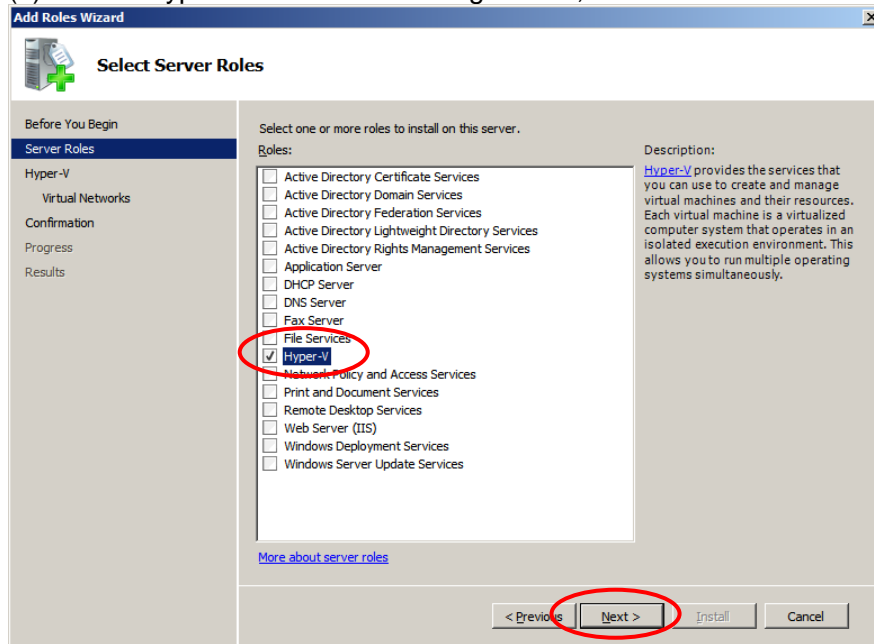
(2) Select “Roles” from the menu at left, then click “Add Roles”.



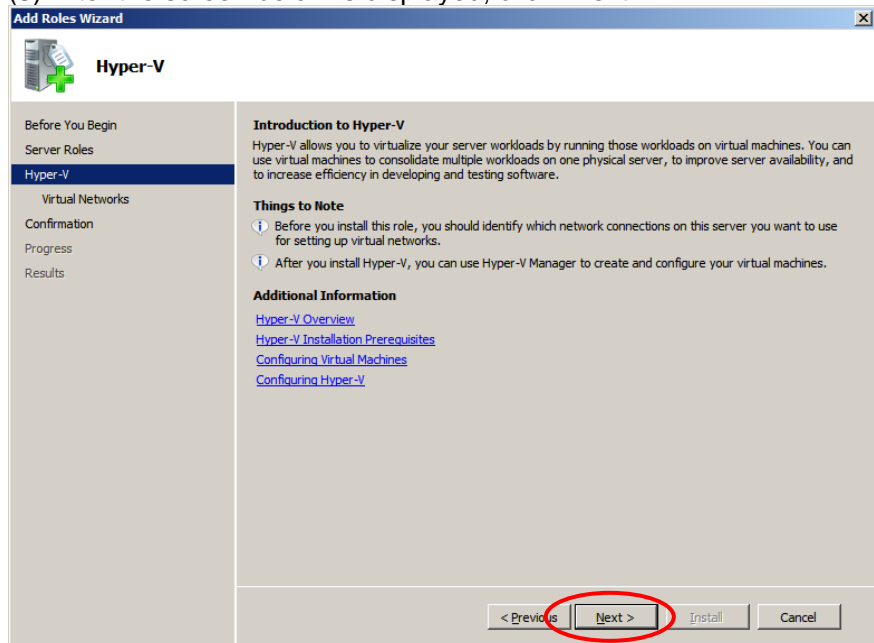
(3) After the screen below is displayed, click “Next”.



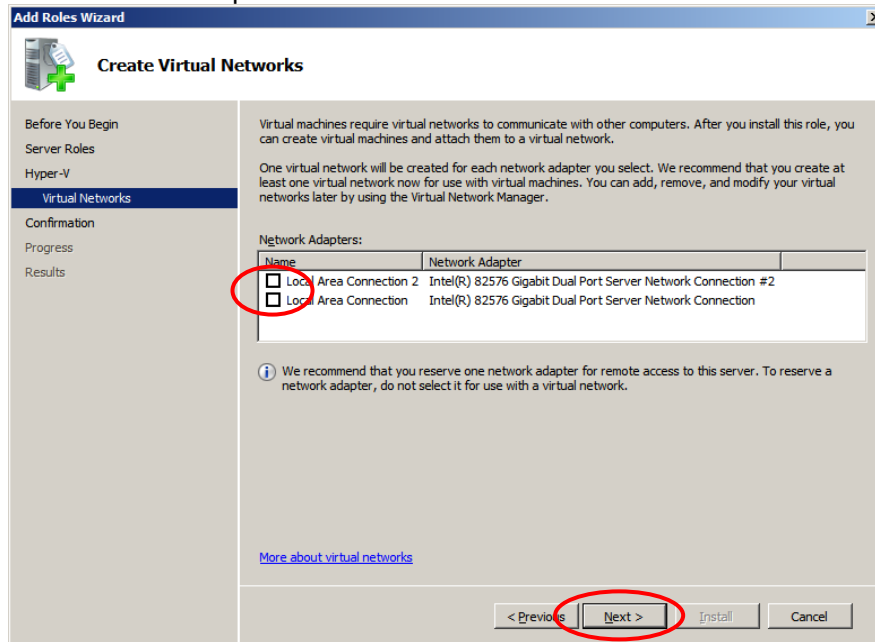
(4) Select “Hyper-V” from the following screen, then click “Next”.



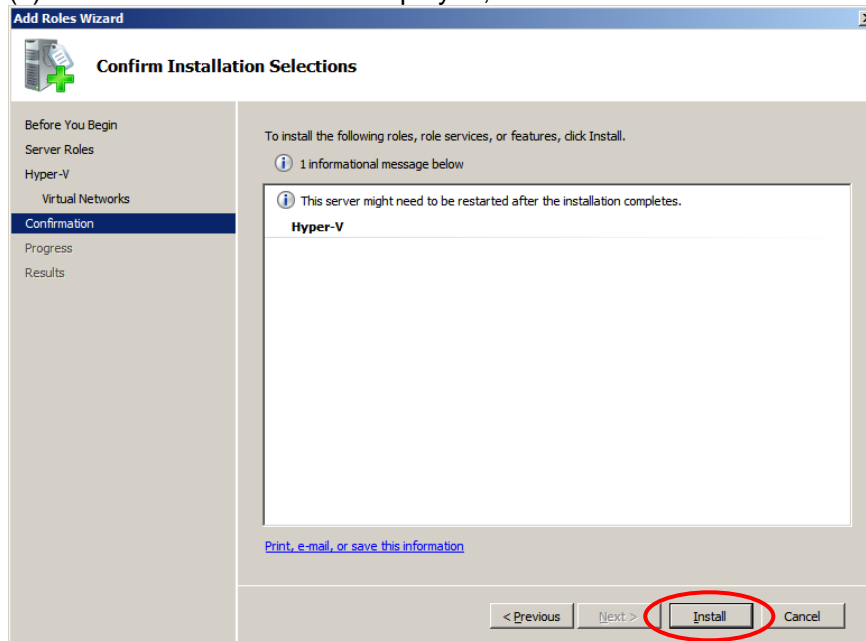
(5) After the screen below is displayed, click “Next”.



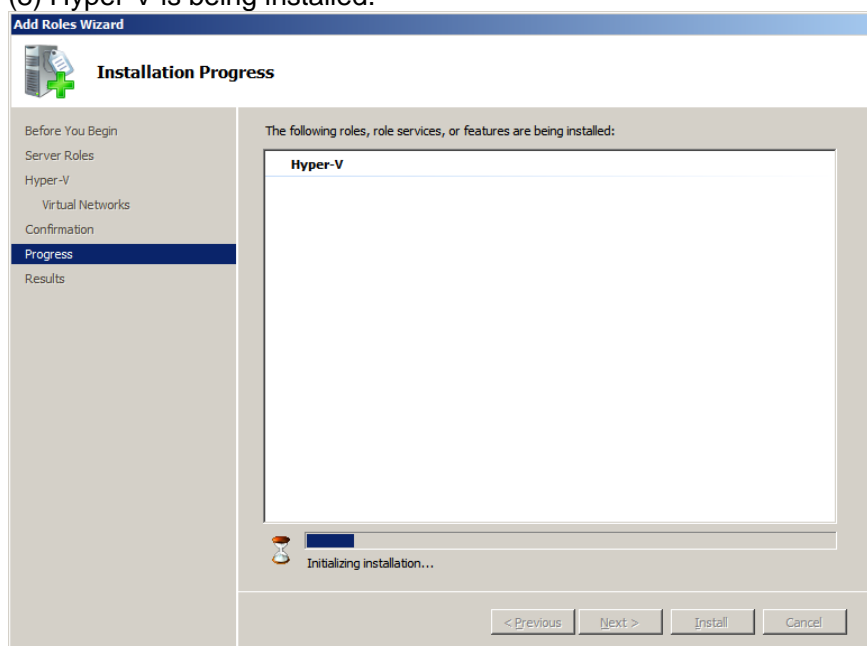
- (6) After the screen below is displayed, select the network adapter to connect the virtual network switch if necessary, then click “Next.”
The virtual network switch is necessary for the virtual machine to communicate with other computers.



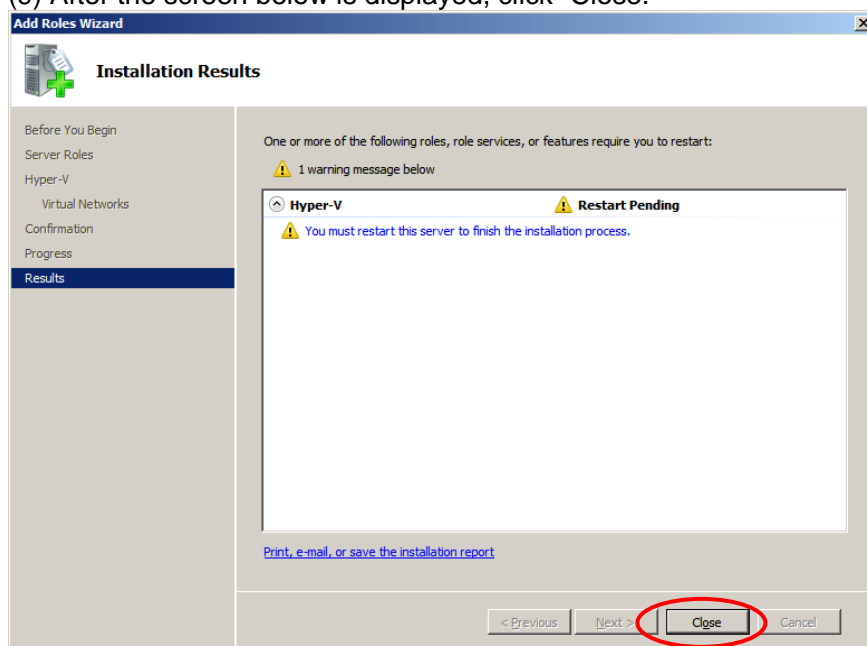
- (7) After the screen below is displayed, click “Install.”



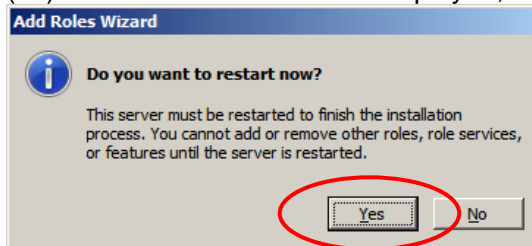
(8) Hyper-V is being installed.



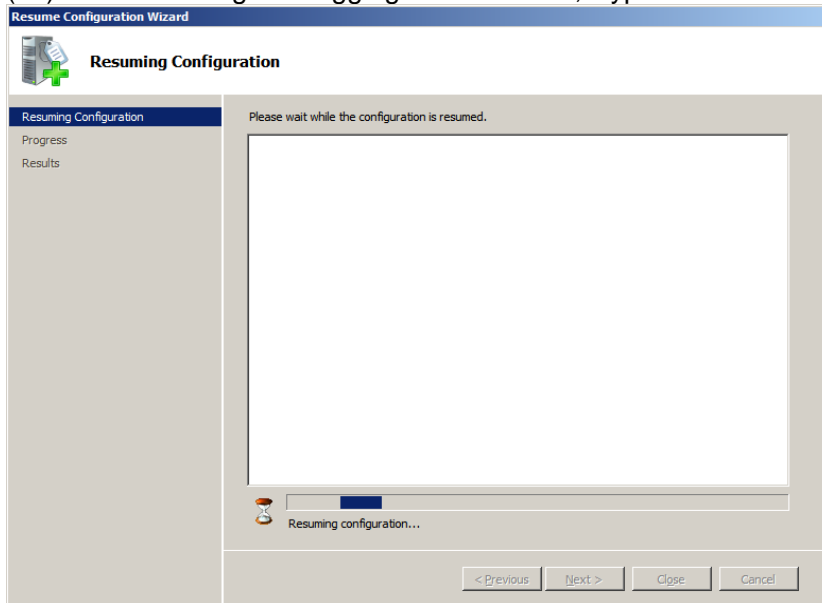
(9) After the screen below is displayed, click "Close."



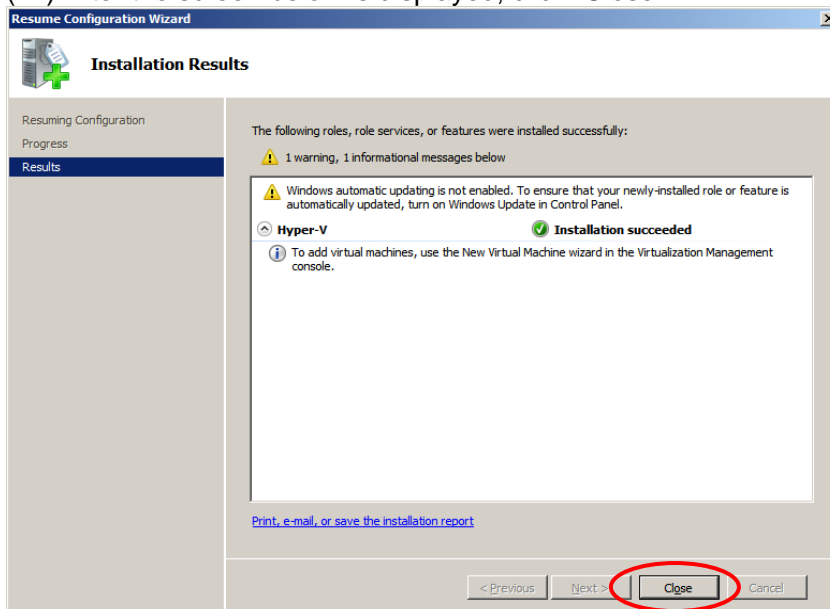
(10) After the screen below is displayed, click “Yes” and reboot the server.



(11) After rebooting and logging into Windows, Hyper-V installation will continue.



(12) After the screen below is displayed, click “Close.”



(13) Install a hotfix program if necessary.

- Windows Server 2008

KB981791: <http://support.microsoft.com/kb/981791>

Install a hotfix program if any of the following devices is applied.

A1080a-S	Using Intel® Xeon® processor E7-8800/4800 Product Family
A1080a-D	Using Intel® Xeon® processor E7-8800/4800 Product Family

- Windows Server 2008 R2

KB2264080: <http://support.microsoft.com/kb/2264080>

If Service Pack 1 is not installed, install a hotfix program if any of the following devices is applied.

If Service Pack 1 is installed, the updates are not necessary.

A1080a-S	Using Intel® Xeon® processor E7-8800/4800 Product Family
A1080a-D	Using Intel® Xeon® processor E7-8800/4800 Product Family



Please note the following, when you use Intel PROSet teaming function in Hyper-V environment.

Windows Server 2008

- When binding teaming adapter created by Intel PROSet to Hyper-V, “Client for Microsoft Networks” of the virtual network adapter which is newly created may not be enabled.

In order to bind teaming adapter to Hyper-V, do the following operation.

1. Select [Control Panel] -> [Network and Sharing Center] -> [Change adapter settings]
2. Select teaming adapter, then select [Properties](Right click of the mouse)
3. Display [Networking] and uncheck all protocol. Then, click [OK].
4. Bind teaming adapter to Hyper-V.
5. Display [Networking] of virtual network adapter which is newly created. Check correspond protocol, then click [OK].

Both Windows Server 2008/Windows Server 2008 R2

- Reboot server after binding teaming adapter to Hyper-V.
- In case of binding teaming adapter which is set to ALB (Adaptive Load Balancing) to Hyper-V, RLB (Receive Load Balancing) is not available.

Set RLB to disabled as following operation before binding Hyper-V.

1. Select [Server Manager] -> [Device Manager]
2. Select teaming adapter, then select [Properties](Right click of the mouse)
3. Select [Advanced] and change “Receive Load Balancing” to “Disabled”.
4. Click [OK].
5. Reboot server.

After completing all of the above, go to “**6. Confirm Operation and Setting Up Redundant Paths.**”

5.3. VMware ESX/ESXi

Refer to the following website for details on VMware ESX/ESXi:
<https://www.vmware.com/>

5.3.1. Precautions for Configuring SAN Boot

Be aware of the following points when making a VMware ESX/ESXi SAN Boot configuration.

Check the "**SAN Boot Compatibility Table**" for the supported hardware and software.

Network	Separating the NIC used by vMotion service console and the NIC used by the virtual machine is recommended.
FC path redundancy	If multiple paths are configured in the ESXi environment, the ESXi functions will allow HBA failover and SP (Storage Port) failover, but the NEC Storage PathManager will manage and control redundant paths tuned for NEC storage products. PathManager can be used with VMware vSphere5 Enterprise Edition or higher, and the supported target disk array is the M series.

<Precautions (Restrictions)>

If VMware ESX/ESXi is made into a SAN Boot configuration, the following functions are not available.

Autonomous restoration to a spare VMware ESX (host OS) server through

SigmaSystemCenter

Backup and restore of VMware ESX (host OS) through DeploymentManager

5.3.2. Precautions for Building SAN Boot

Install VMware ESX/ESXi after executing "**4.2 Server and FC Controller BIOS Settings**" in this manual.

In order to install NEC Storage PathManager, install VMware ESXi5 first, then install PathManager according to the Installation Guide that comes with it.

If the FC cable has not been reconnected in "5 OS Installation," then reconnect the FC cable and set it up as a redundant path.

6. Confirming Operation and Setting Up Redundant Paths

6.1. Reconnecting the FC Cable

Reconnect the disconnected FC cable to its original FC controller.

6.2. Checking FC Path Redundancy

[Windows]

In the Windows OS, FC path redundancy can be checked by executing the control command "spsadmin /lun."

Refer to "**3.1.2 Path List Display**" in the "**NEC Storage PathManager User's Manual (Windows version)**" for details.

[VMware ESX/ESXi]

The steps in this section are not necessary if VMware ESX/ESXi is installed in redundant FC path configuration.

If Storage PathManager is installed, then VMware FC path redundancy can be checked through the VMware vSphere Client.

Refer to "**4.1.2 Checking Operation Status**" in the "**NEC Storage PathManager User's Manual (VMware version)**" for details.

7. Additional Application Settings

7.1. DDR (NEC M-series Storage)

By the NEC M series storage data replication function (DDR), it is possible to back up and restore Windows (including Hyper-V) and VMware ESX/ESXi OS images, Hyper-V and VMware virtual machine images, and the data areas of physical and virtual machines.

User can execute backup and restore with the data replication function by the replication control screen of StorageManager on the management server or by using the ControlCommand on the management server or on the backup server. Also user can execute backup and restore by iSMCLI on the disk array..

In order to use the data replication function, it is necessary to unlock DynamicDataReplication license. For the M series, refer to "**11.4 License Unlock**" of the "**NEC Storage Software Configuration Setting Tool User's Manual (GUI) for the M Series**" for details on unlocking the license.

In order to use ControlCommand, user needs to install Storage ControlCommand in the environment used.

Refer to the "**Installation Guide (INSTALL.PDF)**" on the "**NEC Storage ControlCommand CD-R**" for the installation process.

In order to use ControlCommand on the management server, user needs operations combined with StorageManager. Refer to "**4.2.2 Using ReplicationControl with iSM**" in the "**NEC Storage Software Data Replication User's Manual (Function Guide)**" and "**Chapter 8. Operation Setting**" in the "**NEC Storage Software ControlCommand Command Reference**."

When user executes iSMCLI provided by the Storage M series, it is necessary to execute commands on the disk array. User must log in the disk array by ssh/telnet/rsh protocol, or execute commands remotely. Refer to "**Appendix D. Disk Backup and Data Restoration with Use of Data Replication Function**" in the "**NEC Storage Software NEC Storage Manager Command Reference**" for backup and restore procedures by iSMCLI.

All references to "Windows Server 2008" in this chapter are also applicable to revisions after Windows Server 2008 (R2, etc.) unless noted.

Manuals

Storage ControlCommand installation guide

Source: INSTALL.PDF in the Storage ControlCommand on Windows CD-ROM

“Storage Series Configuration Settings Guide (GUI)”

M Series source: manual¥IS051.pdf in the WebSAM StorageManager Suite CD-ROM

“Storage Software Data Replication Usage Guide - Functions”

Source: manual¥IS015.pdf in the Storage ControlCommand on Windows CD-ROM

“Storage Software ControlCommand Command Reference”

Source: manual¥IS041.pdf in the Storage ControlCommand on Windows CD-ROM

“Storage Software StorageManager Command Reference”

M Series source: manual¥IS052.pdf in the WebSAM StorageManager Suite CD-ROM

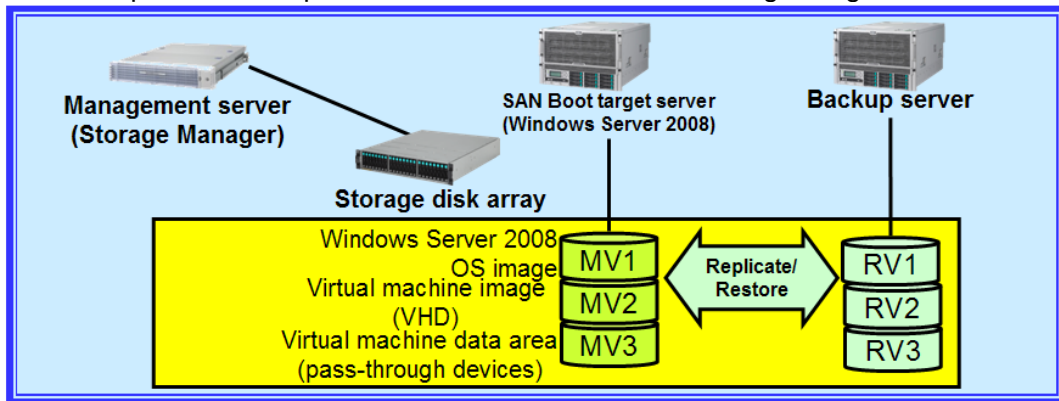
7.1.1. Backup and Restore Windows Server 2008 Hyper-V with the DDR

This section describes the cautions and restrictions when user executes the M-series Storage data replication function to back up and restore OS images of Windows Server 2008 with Hyper-V installed, virtual machine images (VHD) in Hyper-V, and virtual machine data areas (pass-through devices).

Be sure to also refer to "**7.1.4. Cautions for Backup and Restore Windows Server OS Images with the DDR**" in this manual.

(1) Configuration

The backup and restore procedures are based on the following configuration.



(2) Logical disk format

1. Be sure to set "WG" as the usage format for Windows Server OS image logical disk that has Hyper-V installed in it.
2. Set the usage format of the logical disks accessed by Hyper-V (virtual machine images in Hyper-V (VHD)) and virtual machine data areas (pass-through devices) according to the actual partition style as shown below:
 - For use as a MBR format disk: "WN"
 - For use as a GPT format disk: "WG"

(3) Backup and restore of Windows Server 2008 OS images:

The following instructions show how to use the NEC M-series Storage data replication function to backup and restore OS images of Windows Server 2008 with Hyper-V installed.

Backup Procedure

- (1)Execute replication (Management server):
Execute the replication process from the StorageManager and synchronize MV and RV for the following:
 - Windows Server 2008 OS image
 - Virtual machine image in Hyper-V
 - Virtual machine data area
- (2)Shut down Windows Server 2008 (Windows Server 2008):
Shut down the Windows Server 2008 that uses the MV to be backed up.
- (3)Execute separation (Management server):
Execute the separation process from the StorageManager and separate MV and RV for the following:
 - Windows Server 2008 OS image
 - Virtual machine image in Hyper-V
 - Virtual machine data area
- (4)Restart Windows Server 2008 (Windows Server 2008):
Restart Windows Server 2008 shut down in (2), then restart operations.

Restore Procedure

- (1)Shut down Windows Server 2008 (Windows Server 2008):
Shut down the Windows Server 2008 that uses the MV to be restored.
- (2)Reconstruct MV (Management server):
If it is necessary to reconstruct MV because of a physical error, execute the following procedure:
 1. Set the MV AccessControl (Access prohibited).
 2. Reconstruct the LDs.
 3. Execute pair reset.
 4. Set the MV AccessControl (Access allowed).
- (3)Execute restore (Management server).
Execute the restore process from the StorageManager, then restore the RV data in MV.
- (4)Restart Windows Server 2008 (Windows Server 2008).
Restart Windows Server 2008 that was shut down in (1), then restart operations.

7.1.2. Backup and Restore Windows Server 2008 R2 Hyper-V with the DDR

This section describes the cautions and restrictions when user executes M-series Storage data replication function to back up and restore virtual machine data areas (pass-through devices) from Windows Server 2008 R2 virtual machines with Hyper-V installed.

Be sure to also refer to "**7.1.4. Cautions for Backup and Restore Windows Server OS Images with the DDR**" in this manual.

This function is supported for Hyper-V in Windows Server 2008 R2 or later, not for Hyper-V in Windows Server 2008.

manual

Backup and restore procedures:

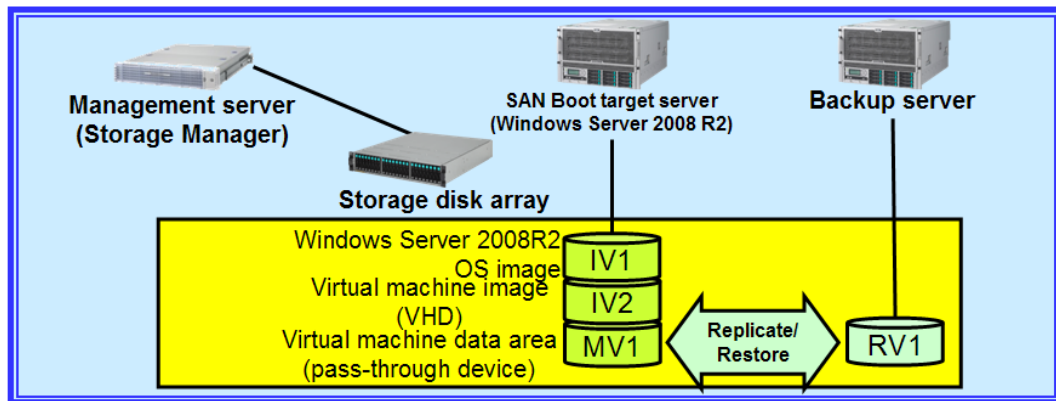
**"Storage Software Data Replication Usage Guide
Installation and Operation"**

Source: manual¥IS016.pdf in Storage ControlCommand on Windows CD-ROM

(1) Configuration

The backup and restore procedures are based on the following configuration
A virtual machine must have ControlCommand installed in order to use the data replication function from it.

In an M series disk array, iSMCLI on the disk array can be used to execute data replication. In this case, ControlCommand does not have to be installed in the virtual machine. But ssh/telnet/rsh protocol must be used from a virtual machine to log into the Storage M series disk array, otherwise the environment that allows remote iSMCLI to execute commands is necessary.



(2) Backup and restore data areas from virtual machines:

The following instructions show how to use the M series Storage data replication function to back up and restore the data areas (pass-through disks) from virtual machines of Windows Server 2008 R2 with Hyper-V installed.

Preparation

(1) Execute iSMpassthrough_enabler (Windows Server 2008 R2):

In order to use ControlCommand to replicate data on a virtual machine, the virtual machine must recognize the data area as an M-series Storage disk array.

The iSMpassthrough_enabler command must be executed one time in the Windows Server 2008 R2 host OS after the virtual machine is created. (Another command is necessary if new virtual machine is added after the operation starts.)

The iSMpassthrough_enabler command is included in the ControlCommand package.

This step is not necessary if data is replicated with iSMCLI provided by the NEC M-series Storage.

Backup Procedure

By executing the iSMpassthrough_enabler command, user can use ControlCommand in the virtual machine to back up the data area in the same manner as DDR operations on a regular physical server.

Refer to "**3.1.1. Example of Backup Operation**" in the "**NEC Storage Software Data Replication User's Manual (Installation and Operation Guide for Windows)**."

Refer to "**Appendix D: Disk Backup and Data Restore with Use of Data Replication Function**" in the "**NEC Storage Software NEC Storage Manager Command Reference**" when backing up data areas with iSMCLI provided by the NEC M-series Storage

Restore Procedure

By executing the iSMpassthrough_enabler command, user can use ControlCommand in the virtual machine to restore the data area in the same manner as DDR operations on a regular physical server.

Refer to "**3.1.2. Example of Restoring Master Volume Data**" in the "**NEC Storage Software Data Replication User's Manual (Installation and Operation Guide for Windows)**" for restoration instructions.

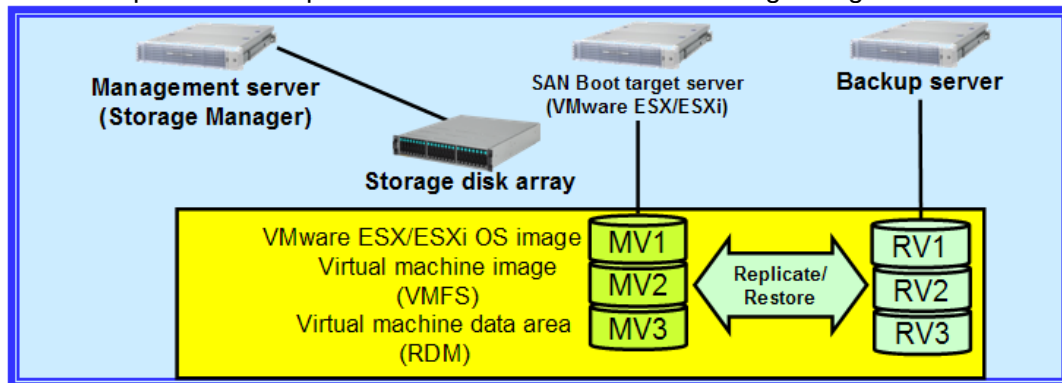
Refer to "**Appendix D: Disk Backup and Data Restore with Use of Data Replication Function**" in the "**NEC Storage Software NEC Storage Manager Command Reference**" when restoring data areas with iSMCLI provided by the NEC M-series Storage.

7.1.3. Backup and Restore VMware ESX/ESXi with the DDR

This section describes the cautions and restrictions when user executes the NEC M-series Storage data replication function to back up and restore OS images of VMware ESX/ESXi, virtual machine images (VMFS) on VMware ESX/ESXi, and virtual machine data areas (RDM (Raw Device Mapping)).

(1) Configuration

The backup and restore procedures are based on the following configuration.



(2) Logical disk format

Be sure to set "LX" as the usage format for the logical disk in which the VMware ESX/ESXi OS image is installed and the logical disk in which the VMware ESX/ESXi virtual machine image (VMFS) is stored.

Set the usage format of the data area (RDM (Raw Device Mapping)) logical disk of the virtual machine according to the actual partition style as shown in the below examples:

For use as a Windows MBR format disk: "WN"

For use as a Windows GPT format disk: "WG"

(3) Backup and restore VMware ESX/ESXi OS images:

The following instructions show how to back up and restore VMware ESX/ESXi OS images with the M-series Storage data replication function.

Backup Procedure

1. Execute replication (Management server).

Execute the replication process from the StorageManager and synchronize MV and RV for the following:

- VMware ESX/ESXi OS image
- Virtual machine image in VMware ESX/ESXi
- Virtual machine data area

2. Shut down VMware ESX/ESXi.

Shut down the VMware ESX/ESXi system which uses the MV to be backed up.

3. Execute separation (Management server).

Execute the separation process from the StorageManager and separate MV and RV for the following:

- VMware ESX/ESXi OS image
- Virtual machine image in VMware ESX/ESXi
- Virtual machine data area

4. Restart VMware ESX/ESXi.

Restart VMware ESX/ESXi shut down in 2., then restart operations.

Restore procedure

1. Shut down VMware ESX/ESXi.
Shut down the VMware ESX/ESXi system that uses the MV to be restored.
 2. Reconstruct MV (Management server).
If it is necessary to reconstruct MV because of a physical error, execute the following procedure
 - 1) Set the MV AccessControl (Access prohibited).
 - 2) Reconstruct the LDs.
 - 3) Execute pair resetting.
 - 4) Set the MV AccessControl (Access allowed).
 3. Execute restore (Management server).
Execute the restore process from the StorageManager, then restore the RV data in MV.
 4. Restart VMware ESX/ESXi.
Restart the virtual machine that was shut down through the vCenter Server
Restart VMware ESX/ESXi , then restart operations.
- (4) Backup and restore virtual machine images (VMFS):
The following instructions show how to back up and restore virtual machine images by the NEC M-series Storage data replication function.

Backup Procedure

1. Execute replication (Management server).
Execute the replication process from the StorageManager and synchronize MV and RV for the virtual machine image and RDM.
2. Shut down the virtual machine (VMware ESX/ESXi).
From the vCenter Server (vSphere client) or service console, shut down all virtual machines that use the MV to be backed up.
3. Execute separation (Management server).
Execute the separation process from the StorageManager and separate MV and RV for the virtual machine image and RDM.
4. Restart the virtual machine (VMware ESX/ESXi).
Restart the virtual machine that was shut down through the vCenter Server (vSphere client) or the service console, then restart operations.

Restore Procedure

1. Shut down and delete the virtual machine (VMware ESX/ESXi).
From the vCenter Server (vSphere client) or service console, shut down all virtual machines that use the MV to be restored, then delete the virtual machines (delete inventory).
2. Reconstruct MV (Management server).
If it necessary to reconstruct MV because of a physical error, execute the following procedure:
 - 1) Set the MV AccessControl (Access prohibited).
 - 2) Reconstruct the LDs.
 - 3) Execute pair reset.
 - 4) Set the MV AccessControl (Access allowed).
3. Execute restore (Management server).
Execute the restore process from the StorageManager, then restore the RV data in MV.
4. Recognize the recovered VMFS (VMware ESX/ESXi).
From the vCenter Server (vSphere client) or service console, rescan with the "Storage adapter."
5. Restart the virtual machine (VMware ESX/ESXi).
Restart the virtual machine shut down in 1., then restart operations.

7.1.4. Cautions for Backup and Restore Windows Server OS Images with the DDR

Please note the following when user executes the NEC M-series Storage DDR (data replication) function to back up a Windows Server OS image.

(1) Logical disk format

When the logical disk is "WN" format, the Windows disk signatures will differ for the master volume(MV) and replication volume(RV).

Then, when a logical disk is restored from RV, the OS will not be able to start.

Therefore, the usage format for the logical disk that stores the Windows OS must be set to "WG" regardless of the actual disk format (MBR, GPT) used by the Windows server.

* When ControlCommand from a management server is used to back up an OS image in NEC M-series Storage that is FC connected, it is necessary to add "GPTDISK=USE" to the [CHECK] section of the operation option setup file (%SystemRoot%\ismvol\SMrpl.ini) in order to manipulate a logical disk in the "WG" usage format.

(2) BitLocker drive encoding

When handling an OS image (MV, RV backed up from MV, or MV restored from RV) that has been encoded with BitLocker, the operation will differ as shown below depending on whether the server that executed the encoding is used or another server is used.

- Using the server that executed encoding

- [OS startup] : Possible

- [Enable/Disable BitLocker encoding] : Possible

- [Unlocking BitLocker encoding] : Possible

- Other servers

- [OS startup]

- need recovery key for startup.

- The following actions are executed after starting with a recovery key.

- [Enable/Disable BitLocker encoding]

- Encoding can be disabled, but cannot be re-enabled after disabling.

- [Unlocking BitLocker encoding]

- Possible

8. Precautions and Restrictions

8.1. Server

8.1.1. Internal HDD

The internal disk in the server is NOT available in SAN boot configuration.

If the RAID controller is mounted, please set RAID controller's PCI slot to "Disabled" in server Web console.

In detail, Please see user's guide

"Web Console Function"

-> **"Server Web Console"**

-> **"Enable/Disable Component"**

8.1.2. Multiple Path Compatibility

Linking multiple servers to the same logical system disk is not allowed.

Multiple servers cannot share the same OS system disk.

(Including 2 servers in A1080a-D).

8.1.3. BIOS Update

Use latest BIOS version.

Latest BIOS is gettable in following URL

<http://www.58support.nec.co.jp/global/download/index.html>

-> **Documents & Software**

-> **Scalable HA Server**

-> **NEC Express5800/A1080a**

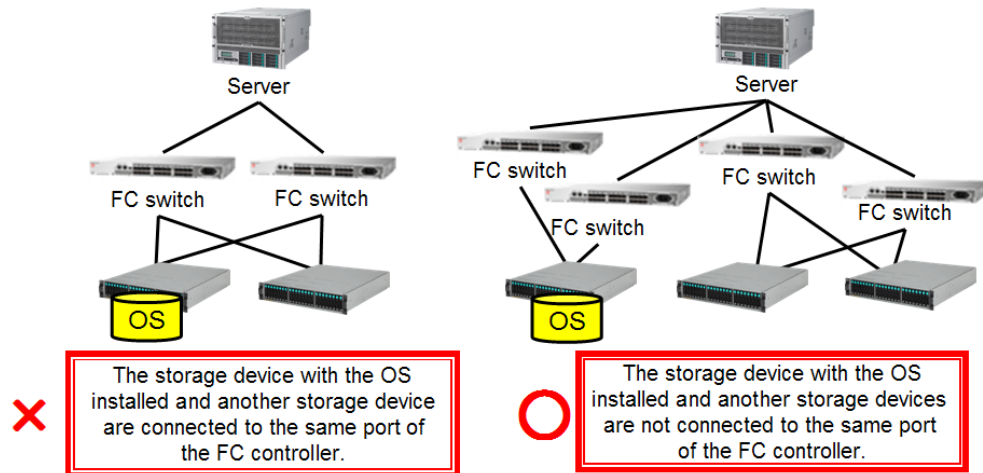
BIOS setting in each OS is written in User's Guide **"appendix C"**

8.2. Storage

8.2.1. Connecting Multiple Storage Devices

Connections cannot be made to access multiple storage devices through the FC switches under the FC controller ports that implement FC SAN Boot. Only the ports that are not used for FC SAN Boot should be selected to access multiple storage devices.

While one of the ports of 2ch FC controller is used for FC SAN Boot, the other port can access multiple storage.



8.2.2. Storage Performance and Number of OSs Installed

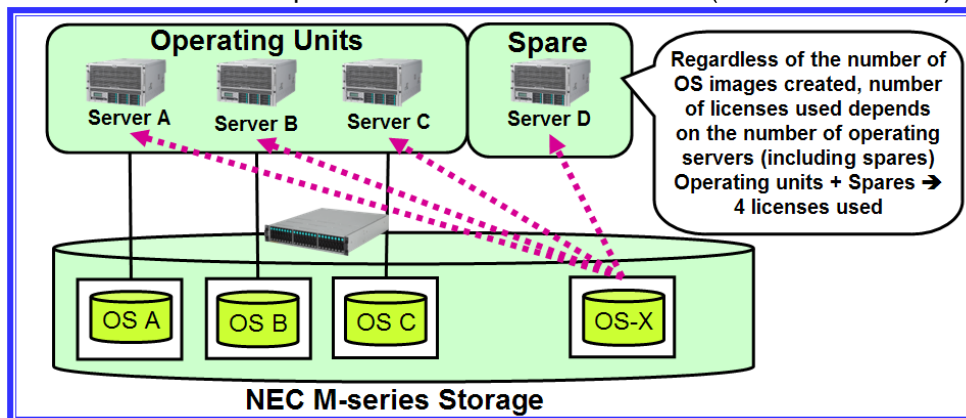
AS for the numbers of OSs used per storage device, consider the estimation based on required performance with responsibility of system management department.

8.3. OS

8.3.1. Number of OS Licenses Used

Windows Server 2008/Windows Server 2008 R2

Number of Windows Server 2008 and Windows Server 2008 R2 licenses used for FC SAN Boot will depend on the number of instances (number of servers).



In a configuration such as that shown above in which OS-X is automatically used when there is a problem, the number of licenses used are the same as the number of servers used (including spares); i.e., four licenses in this case.

Refer to the Windows Server 2008 and/or Windows Server 2008 R2 software end user's license agreement for a definition of instances.

8.3.2. OS Memory Dump

Using M Series with Windows Server 2008 and Windows Server 2008 R2

The path used to acquire the dump (hereafter called the dump path) is the path used to boot the OS. If the dump path is lost to PnP because of an error, the dump path will switch to an alternative path.

In an environment in which multiple paths exist for each FC port, dump extraction may not be possible if there is a path error.

Configure two paths between servers and storage so that dump extraction is assured.

8.3.3. Redundant Path Connections when Installing the OS

If there are redundant paths between the server and storage when Windows is being installed, installation will fail. Disable redundant configurations before installing these systems.

When installing VMware ESX/ESXi, OS installing with Redundant path configurations is available.

8.4. PathManager

The PathManager versions referred to in this manual are as follows (Oct. 2012):

NEC Storage PathManager for Windows : Ver. 5.0

NEC Storage PathManager for VMware : Ver. 1.0

Express5800/scalable HA server
FC SAN Boot Configuration Guide

Oct. 2012, first edition

NEC Corporation
5-7-1 Shiba, Minato-ku, Tokyo

© NEC Corporation 2012