NEC Storage PathManager for VMware

Installation Guide

Preface

This document describes about the installation of the program products in the CD labeled as:

NEC Storage PathManager for VMware

English Version

VERSION: 2.4

This CD includes the setup programs and the PDF manuals of NEC Storage PathManager for VMware.

For further usage after installation and the function of NEC Storage PathManager for VMware, please refer to the PDF manuals in this CD.

Remarks

1. The following descriptions in this text refer to the corresponding products unless otherwise stated.

Description	Corresponding Product
PathManager	NEC Storage PathManager for VMware
vCLI	vSphere Command-Line Interface

2. The NEC Storage series disk array subsystem is referred to as a disk array.

3. In this document, matters to which careful attention needs to be paid will be described as follows:

   Be sure to observe the contents.

   If the indications are ignored and the system is improperly operated, settings which have been already made might be affected.

Type of Indication	
Type	Description
⚠	Describes contents which require special attention during operation.

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The 1st Edition in October 2017

Contents

Chapter 1   Introduction

This chapter will describe the quirements before you start to use PathManager.

1.1   System requirements

If you setup PathManager, please confirm that the system meets the following requirements.

The maximum number of paths to each logical disk (LD) is as follows;

NEC Storage M series (FC)   32

NEC Storage M series (iSCSI)   8

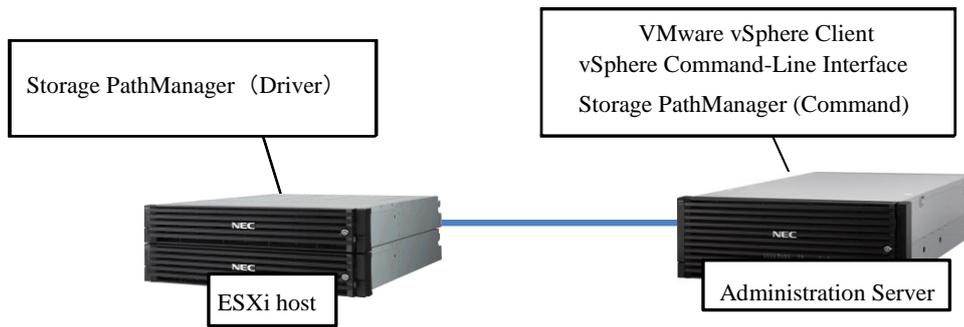NEC Storage M series (SAS)   4

The maximum number of paths to a server is as follows;

NEC Storage M series (FC)   2048

NEC Storage M series (iSCSI)   2048

NEC Storage M series (SAS)   2048

Table 1-1: System requirements

NEC Storage PathManager 2.4 for VMware	

Operating systems	ESXi host server:
	   VMware vSphere 5.x (ESXi 5.x)
	      Enterprise Plus Edition (and Desktop Edition)
	      Enterprise Edition
	
	   VMware vSphere 6.x (ESXi 6.x)
	      Enterprise Plus Edition (and Desktop Edition)
	      Enterprise Edition
	      Standard Edition
	
	   Note: PathManager supports all updates in each ESXi.
	
	Administration server:
	   Follow the requirements with VMware vSphere Client and vSphere Command-Line Interface.

Server	ESXi host server:
	   Express5800/100 Series Rack Servers
	   Express5800/100 Series Tower Servers
	   Express5800 Enterprise Servers
	Administration server:
	   A server supported with VMware vSphere Client and vSphere Command-Line Interface.

Memory	ESXi host server:
	   Memory required by OS + 20 MB or more
	Administration server:
	   Follow the requirements with VMware vSphere Client and vSphere Command-Line Interface.

Disk capacity	ESXi host server:
	   Total capacity of programs :1MB
	   Capacity required to use PathManager: 5MB or more
	Administration server:
	   Follow the requirements with VMware vSphere Client and vSphere Command-Line Interface.

Connection protocols	FC / iSCSI / SAS
	Note:
	   PathManager supports 6Gbps SAS in Update1 or later in case of ESXi5.5.
	   PathManager supports 12Gbps SAS in ESXi5.5 Update2 or later.

HBA/ initiator	FC/SAS-HBAs or NICs (Network Interface Cards) supported by the server and NEC storage.
NEC Storage	M5000 series (PathManager supports ESXi 5.5 or later.) M700 series (and All Flush Storage) M500 series M300 series (and All Flush Storage) M100 series M10 series

Other required software	VMware vSphere Client 5.0 to 6.5.
	VMware vSphere Command-Line Interface 5.0 to 6.5.
	Note: The above software programs are installed to the administration server.
	     The versions of the software programs depend on that of ESXi.
	     VMware vSphere Command-Line Interface 5.5 supports Update2 or later.
	
	The cooperation with the following software is available. (optional)
	- ESMPRO (V4.5 or later)
	- SigmaSystemCenter (V3.3 or later)

The following figure shows where to install PathManager and the other required software programs.

```
┌─────────────────────────────┐        ┌──────────────────────────────────────┐
│                             │        │         VMware vSphere Client          │
│  Storage PathManager（Driver）│        │    vSphere Command-Line Interface      │
│                             │        │                                        │
└─────────────────────────────┘        │     Storage PathManager (Command)      │
                                        └──────────────────────────────────────┘
```

ESXi host

Administration Server

1.2 Before Installation

Read the following notes before starting the installation of PathManager.

(1) Please confirm that vCLI are installed to the administration server.

> If you install the vCLI version 6.5 or later, the perl is not installed. Please install the perl according to vSphere Command-Line Interface 6.5 Release Notes.
> <https://vdc-download.vmware.com/vmwb-repository/dcr-public/51efdd8d-6019-4668-ba75-fc83cec68df0/ad5d9dc3-4435-4d60-b9ac-c2ce98b7ca2d/vsphere-65-vcli-release-notes.html>
> If you use "Active Perl", you need to install the PPM to use PathManager command (spsadmin.pl).

(2) Please confirm that VMware vSphere Client are installed to the administration server.

> vSphere Client where offered installation is possible by the version before vSphere 6.0 is not supported with after 6.5, and it isn't also included in product download.
> New vSphere Client of HTML5 base is offered with vSphere Web Client in vCenter Server in vSphere 6.5, but the function of anything is not mounted. Please check it by a renewal page of the vSphere Client function about the function which isn't supported.
> <http://pubs.vmware.com/Release_Notes/en/vsphere/65/vsphere-client-65-html5-functionality-support.html>

(3) Please confirm connection between storage unit and ESXi host.

(4) Launch VMware vSphere Client and login to target ESXi host.

When VMware vSphere Client before vSphere 6.0

(When using VMware vSphere Web Client, please advance towards (8).)

    (5)   Please click "configuration" and choose an adapter connecting storage unit and ESXi host. If the adapter is connected to NEC Storage unit, device names like "NEC xxx Disk" (xxx depends on transfer protocol) are displayed in "Details."

(6) Please click "Paths" in "View". Information of all paths from the adapter to logical disks in the disk array will be

displayed. Please confirm this information is as you expect.

Details

vmhba2
Model: LPe1150 4Gb Fibre Channel Host Adapter
WWN: 20:00:00:00:c9:f1:b1:fe 10:00:00:00:c9:f1:b1:fe
Targets: 2   Devices: 12   Paths: 24

View: Devices Paths

Runtime Name	Target	LUN	Status
vmhba2:C0:T1:L0	20:00:00:09:95:00:00:15 2a:00:00:09:95:00:00:15	0	◆ Active
vmhba2:C0:T1:L1	20:00:00:09:95:00:00:15 2a:00:00:09:95:00:00:15	1	◆ Active
vmhba2:C0:T1:L2	20:00:00:09:95:00:00:15 2a:00:00:09:95:00:00:15	2	◆ Active
vmhba2:C0:T1:L3	20:00:00:09:95:00:00:15 2a:00:00:09:95:00:00:15	3	◆ Active
vmhba2:C0:T1:L4	20:00:00:09:95:00:00:15 2a:00:00:09:95:00:00:15	4	◆ Active
vmhba2:C0:T1:L5	20:00:00:09:95:00:00:15 2a:00:00:09:95:00:00:15	5	◆ Active
vmhba2:C0:T1:L6	20:00:00:09:95:00:00:15 2a:00:00:09:95:00:00:15	6	◆ Active
vmhba2:C0:T1:L7	20:00:00:09:95:00:00:15 2a:00:00:09:95:00:00:15	7	◆ Active
vmhba2:C0:T1:L8	20:00:00:09:95:00:00:15 2a:00:00:09:95:00:00:15	8	◆ Active
vmhba2:C0:T1:L9	20:00:00:09:95:00:00:15 2a:00:00:09:95:00:00:15	9	◆ Active
vmhba2:C0:T0:L10	20:00:00:09:95:00:00:15 24:00:00:09:95:00:00:15	10	◆ Active

To confirm the information, the following items are also useful;

Targets: Number of ports that are connected from the selected adapter.

Devices: Number of logical disks that are recognized on the selected adapter.

Paths: Usually, this value is the product of "Targets" and "Devices". If not, some logical disks

are not recognized on some targets. Please confirm settings of storage units and so on.

(7) Please repeat (5) and (6) for all adapters connected to the ESXi host.   Conformation for connection between ESXi

host and storage unit is over.

When VMware vSphere Web Client

(8) Please click "configure" and choose an adapter connecting storage unit and ESXi host. If the adapter is connected to NEC Storage unit, device names like "NEC xxx Disk" (xxx depends on transfer protocol) are displayed in "Details."
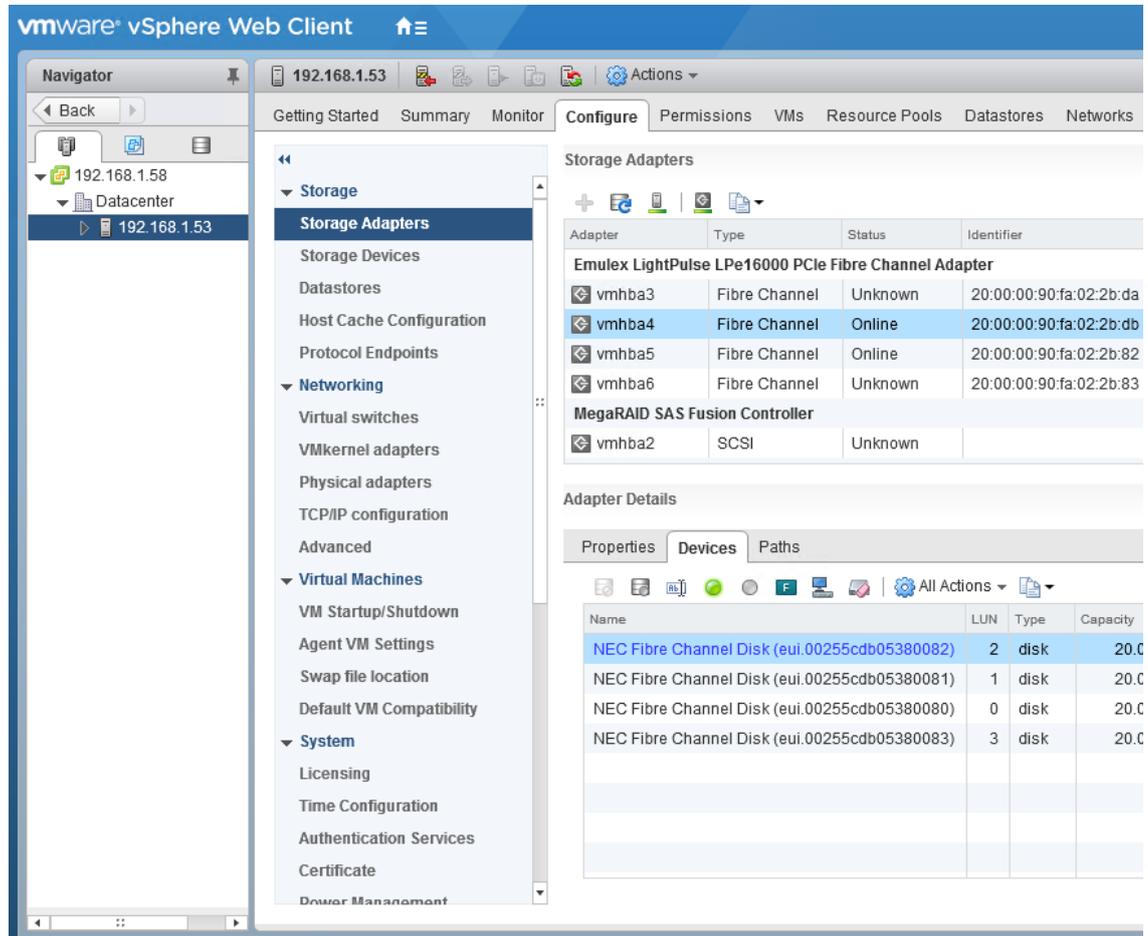

To confirm the information, the following items are also useful;

Targets: Number of ports that are connected from the selected adapter.

Devices: Number of logical disks that are recognized on the selected adapter.

Paths: Usually, this value is the product of "Targets" and "Devices". If not, some logical disks are not recognized on some targets. Please confirm settings of storage units and so on.
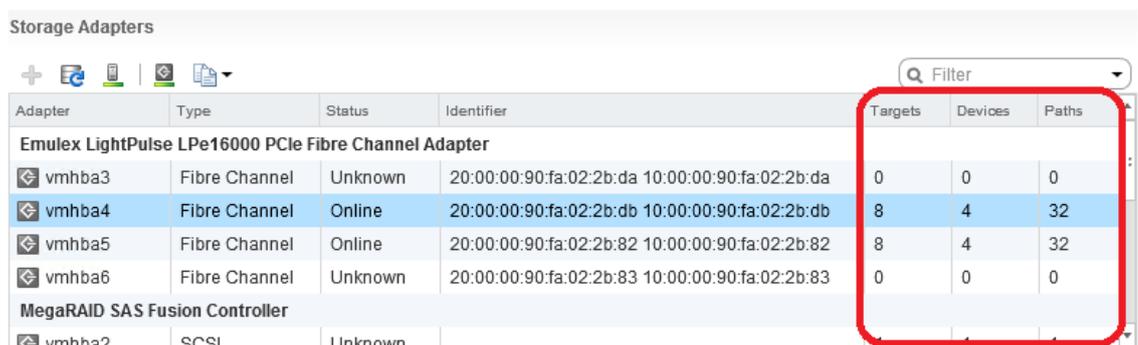
(9) Please click "Paths" in "Adapter Details". Information of all paths from the adapter to logical disks in the disk array will be displayed. Please confirm this information is as you expect.

Adapter Details

Properties   Devices   **Paths**

Enable   Disable

Runtime Name	Target	LUN	Status
vmhba4:C0:T0:L0	20:00:00:25:5c:db:05:38 21:00:00:25:5c:db:05:38	0	◆ Active (I/O)
vmhba4:C0:T0:L1	20:00:00:25:5c:db:05:38 21:00:00:25:5c:db:05:38	1	◆ Active (I/O)
vmhba4:C0:T0:L2	20:00:00:25:5c:db:05:38 21:00:00:25:5c:db:05:38	2	◆ Active (I/O)
vmhba4:C0:T0:L3	20:00:00:25:5c:db:05:38 21:00:00:25:5c:db:05:38	3	◆ Active (I/O)
vmhba4:C0:T5:L0	20:00:00:25:5c:db:05:38 29:00:00:25:5c:db:05:38	0	◆ Active
vmhba4:C0:T5:L1	20:00:00:25:5c:db:05:38 29:00:00:25:5c:db:05:38	1	◆ Active
vmhba4:C0:T5:L2	20:00:00:25:5c:db:05:38 29:00:00:25:5c:db:05:38	2	◆ Active
vmhba4:C0:T5:L3	20:00:00:25:5c:db:05:38 29:00:00:25:5c:db:05:38	3	◆ Active
vmhba4:C0:T4:L0	20:00:00:25:5c:db:05:38 2b:00:00:25:5c:db:05:38	0	◆ Active
vmhba4:C0:T4:L1	20:00:00:25:5c:db:05:38 2b:00:00:25:5c:db:05:38	1	◆ Active
vmhba4:C0:T4:L2	20:00:00:25:5c:db:05:38 2b:00:00:25:5c:db:05:38	2	◆ Active
vmhba4:C0:T4:L3	20:00:00:25:5c:db:05:38 2b:00:00:25:5c:db:05:38	3	◆ Active

(10) Please repeat (8) and (9) for all adapters connected to the ESXi host.   Conformation for connection between ESXi host and storage unit is over.

Following table is the list of files in the setup CD

Table 1- 2 Files in the setup CD.

Directory / File	description

Manual
  + EN
  | + INSTALL.pdf
  | + IS206_PathManager_VMware.pdf
  |
  + JP
    + INSTALL.pdf
    + IS206_StoragePathSavior_VMware .pdf
	Manuals
	 English version
	
	  Japanese version

StoragePathSavior
 + esx50_55
     + NEC-nec_satp_sps-500-020100-offline_bundle-3067091.zip
 + esx60_65
     + NEC-nec_satp_sps-500-020100-offline_bundle-3069991.zip
	Installation file of
	PathManager Driver

Tools + AlertTable_SA | + setup_alert_vm.sh | + SPMVME.inf | + SPMVME.tbl | + SPSVMJ.inf | + SPSVMJ.tbl |	ESMPRO alert table
+ AlertTable_MG | + SPSVMMGE.MTB | + SPSVMMGJ.MTB |	Do not use.
+ prevent_hd | + README.txt | + README_E.txt | + prevent_hd.pl |	Maintenance tool (I/O switching tool)

+ spsadmin
    + lib_spsadmin.pl
    + spsadmin.pl
	PathManager CLI

README.txt README_E.txt	README (Japanese) README (English)

Chapter 2　　Installation

This chapter will describe how to install PathManager.

(1)　Installation

　　Installs the program on the server (refer to "2.1 Installation").

This document describes about the installation procedures. For procedures of version upgrade and uninstallation, please refer to the "NEC Storage PathManager User's Manual (VMware version)."

2.1　　Installation of PathManager Driver

　　Use the Setup CD and the following procedures to install PathManager Driver.

> ⚠ If you use the vCLI, change the current directory to where esxcli exists. The default directory of esxcli is
> 　　shown as below.
> 　[Windows]
> 　　　<Install folder of vSphere CLI>\bin
> 　[Linux]
> 　　　/usr/bin

　　The leading [Administration server]/[ESXi host] for each procedure means to which server you should execute the procedure.

(1)　**[Administration server]** Upload (CD media drive): NEC-nec_satp_sps-<aaaaaa>-offline_bundle-<bbbbbb>.zip to the datastore of the ESXi host which will be installed PathManager using VMware vSphere Client (Datastore Browser) or ssh.

　　StoragePathSavior

　　　　+ "esx50_55"

　　　　|　　+ NEC-nec_satp_sps-<aaaaaa>-offline_bundle-<bbbbbb>.zip

　　　　+ "esx60_65"

　　　　　　+ NEC-nec_satp_sps-<aaaaaa>-offline_bundle-<bbbbbb>.zip

(2) **[ESXi host or Administration server]** Execute the following command. (The following example is inserted line feeds for convenience, but you must execute the command in one line.)

For ESXi Shell or SSH

```
# esxcli software vib install -d "/vmfs/volumes/datastore1/NEC-nec_satp
_sps-<aaaaaa>-offline_bundle-<bbbbbb>.zip"
```

For vCLI

```
# esxcli --server <IP address or host name of ESXi host> software vib
install -d  "/vmfs/volumes/datastore1/NEC-nec_satp_sps-<aaaaaa>-offline_
bundle-<bbbbbb>.zip"
```

In this case, specify root as the username, and enter the root password of the ESXi host.

(3) **[ESXi host or Administration server]** Confirm the following message is displayed when the installation is finished. (It may take some minutes to install).

```
Installation Result
Message: The update completed successfully, but the system needs to be
rebooted for the changes to be effective.
Reboot Required: true
VIBs Installed: NEC_bootbank_nec_satp_sps_<Ver>-<version/revision of
PathManager>
VIBs Removed:
VIBs Skipped:

.
```

Note: In the case of ESXi5.x, <Ver> is "500.2.1".

In the case of ESXi6.x, <Ver> is "600.2.1".

Confirm that "The update completed successfully, but the system needs to be rebooted for the changes to be effective." is displayed in the Message line.

If the above message is not displayed or the other content is shown in Message line, please confirm the following things;

・   The filename that you entered is correct.

・   [vCLI] ESXi host and Administration server are connected with IP network and can communicate with each other.

・   [vCLI] The versions of ESXi, VMware vSphere Client and vCLI are supported with PathManager.

(4) **[ESXi host or Administration server]** Reboot the ESXi host which is installed PathManager from the console or VMware vSphere Client

(5) **[ESXi host or Administration server]** Execute the following command and confirm that PathManager is installed correctly.

For ESXi Shell or SSH

```
# esxcli software vib list | grep nec_satp_sps
nec_satp_sps   <Ver>-yyyyyy-xxxx   NEC   VMwareAccepted   yyyy-mm-dd
```

For vCLI

```
# esxcli --server <IP address or host name of ESXi host> software vib list
nec_satp_sps   <Ver>-yyyyyy-xxxx   NEC   VMwareAccepted   yyyy-mm-dd
```

2.2 Installation of PathManager Command

Use the Setup CD and the following procedures to install PathManager Command.

> ⚠ Before you use PathManager command and prevent_hd.pl on Linux Administration server, please set the executable permission to "*.pl" files.

(1)   **[Administration server]** Put "spsadmin command file (spsadmin.pl)" and "library file (lib_spsadmin.pl)" to the directory in which esxcli command of vCLI exists. These files are in \Tools\spsadmin folder of the setup CD.

(2)   **[Administration server]** Execute the following command and confirm that PathManager command is installed correctly.

```
# spsadmin.pl --help
spsadmin.pl : 1.4.0.xxx
Syntax:
...
```

"1.4" is the correct version.

(3)   **[Administration server]** When using spsadmin command with vSphere CLI6.0 or later, the following error message might be displayed.

```
Cannot connect to the specified server: HOSTNAME
Please check the thumbprint: XX:XX:XX:XX:XX:XX:XX:XX:XX:XX:XX:XX:XX:XX:X
X:XX:XX:XX:XX:XX
```

   Note: "HOSTNAME" is the target host of the spsadmin command.

When this error was displayed, it is necessary to install a certificate of the target host.

See the following VMware document to install a certificate.

<http://pubs.vmware.com/vsphere-
60/index.jsp?topic=%2Fcom.vmware.vcli.getstart.doc%2Fcli_run_remote.6.6.html>

(4)   **[Administration server]** If you needed, put the maintenance tool (prevent_hd.pl) to the directory in which esxcli command of vCLI exists. prevent_hd.pl is in \Tools folder of the setup CD.

       Note: prevent_hd.pl is the script file to use for non-disruptive update of control software of NEC storage. prevent_hd.pl can be used without PathManager.

The installation of PathManager is now complete.

Proceed to "3.1 Checking operation status." to check if PathManager works correctly.

Chapter 3   Starting Operation

This chapter will describe the procedures when you start the operations of PathManager.

3.1   Checking operation status

This section will show how to check if the server and NEC Storage are connected with multiple paths and PathManager works correctly.

3.1.1   Checking with PathManager Command

Execute PathManager command (spsadmin.pl command) with "--pathstate" option.

Please refer to "NEC Storage PathManager User's Manual (VMware version)" for details.

3.1.2   Checking with VMware vSphere Client

Follow the procedures below to check the operation status using VMware vSphere client.

(1)   Execute VMware vSphere Client and confirm connections between ESXi host and storage unit. See "1.2 Before Installation" or detail.

(2)   Select a device and "Manage paths" in right click menu.

(3)   In the "Manage Paths" dialog box, confirm the following items;

・   *[Policy: Path Selection]* is **Most Recently Used (VMware)**.

・   *[Policy: Storage Array Type]* is **NEC_SATP_SPS**.

・   In *[Paths: Target]*, the number of targets in is as same as the number of paths connected with the storage array.

・   In *[Path: Status]*, all paths are "Active" or "Active (I/O)".
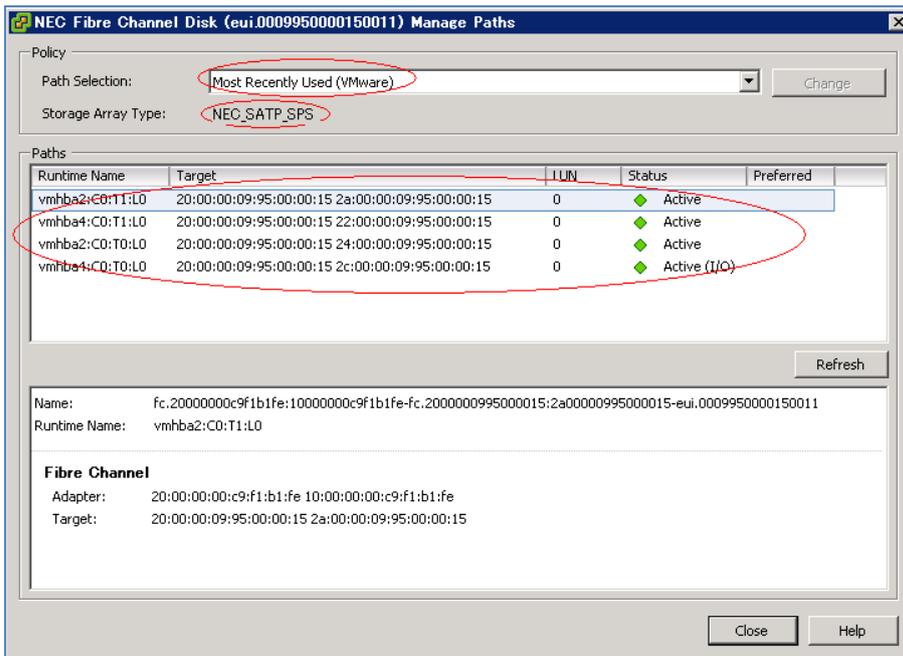
(4) Repeat the procedure (2) and (3) above for all logical disks in the storage unit.

3.1.3 Checking with VMware vSphere Web Client

Follow the procedures below to check the operation status using VMware vSphere Web client.

(1) Execute VMware vSphere Web Client and confirm connections between ESXi host and storage unit. See "1.2 Before Installation" or detail.

(2) Select a device and "Devices" in "Adapter Details".

(3) In the "Device Details", confirm the following items;

- *[Properties: Path Selection Policies]* is **Most Recently Used (VMware)**.

- *[Properties: Storage Array Type Policy]* is **NEC_SATP_SPS**.

- In *[Paths: Target]*, the number of targets in is as same as the number of paths connected with the storage array.
- In *[Path: Status]*, all paths are "Active" or "Active (I/O)".

(4) Repeat the procedure (2) and (3) above for all logical disks in the storage unit.

3.2 Setting of an alert report

PathManager reports important events via vSphere Client. PathManager does not require any setting for this reporting function.

When using SigmaSystemCenter, an event of PathManager is also notified via SigmaSystemCenter.

If using Linux syslog server and ESMPRO Linux Edition, events of PathManager are also notified via ESMPRO in ESXi5.5 or later. When you use the ESMPRO and Linux syslog server, please see the "syslog Liaison" section of " NEC Storage PathManager User's Manual (VMware version)".

3.3 FAQs and troubleshooting

The following table shows the frequently asked questions and answers about after the installation of PathManager and before starting the operations. Refer to the descriptions in the table before making inquiries.

Inquiry (event)	Points to check	Handling
The number of paths shown in esxcli and VMware vSphere Client is not as expected.	Is NEC Storage connected with the server correctly?	Confirm the connection between NEC Storage and the server
	Are NEC Storage and FC fabrics turned on?	Confirm NEC Storage and FC fabrics are turned on.
	Is the configuration of Access Control of NEC Storage correctly set?	Confirm the configuration of Access Control of NEC Storage. Confirm also the server and NEC Storage connected logically.
	Is the configuration of zoning of the FC fabric correctly set?	Confirm the configuration of zoning of the FC fabric.
	If you use the iSCSI connections, you must configure the iSCSI Initiator. Can you access to the NEC Storage from the server?	Confirm whether the setting of iSCSI Initiator is correct. Confirm whether ping command to the IP addresses of the port of NEC Storage successes.
NEC_SATP_SPS event is registered in VMware vSphere Client	Does the hardware work correctly?	Refer to "PathManager User's Manual" and deal with the hardware problem.