

HITACHI

Gigabit Fibre Channel Adapter

USER'S GUIDE

(Windows driver Edition)

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Registered Trademarks and Trademarks

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Information on Support and Service

Missing Parts on Delivery

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When You Need Help

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2Á **Contact us by phone.**Á
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NOTICE

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⚠ WARNING

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Contact failure and tracking of the power plug

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Handling of batteries

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Disposal of batteries

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Storing batteries

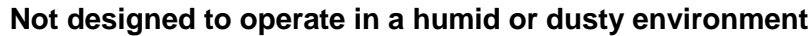
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Not designed to operate in a high-temperature environment

Moving between two locations with a significant temperature gap

Addition and connection of peripheral devices or optional components

Vents

Plastic bags for packaging

Handling the power supply module

Handling of the product

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NOTICE



Implementing a disk array

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- Á QÁ [˘ Á ^!&ŕ^, Ő[]-ā˘!á} ė@Á cāá\ Á q|Á •^á /ááá



Power operation

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Faulty disk

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Connecting a cable to the management module

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N + M cold standby function

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First Aid for Electric Shock

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How to Use the Manuals

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□Á User's guide

Edition	Contents
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Install driver on Windows Server 2012 and 2012 R2.

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Install driver

Á Newly Installation

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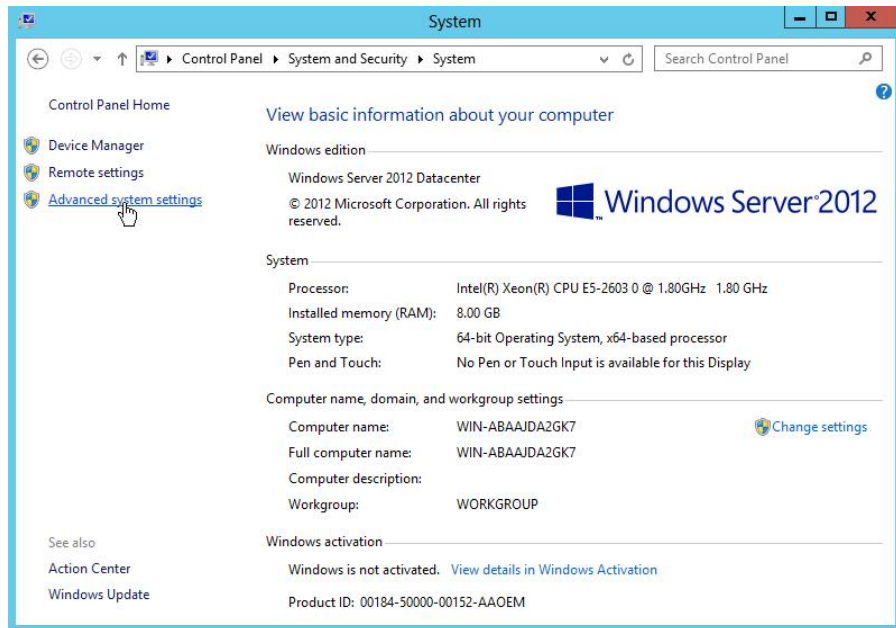
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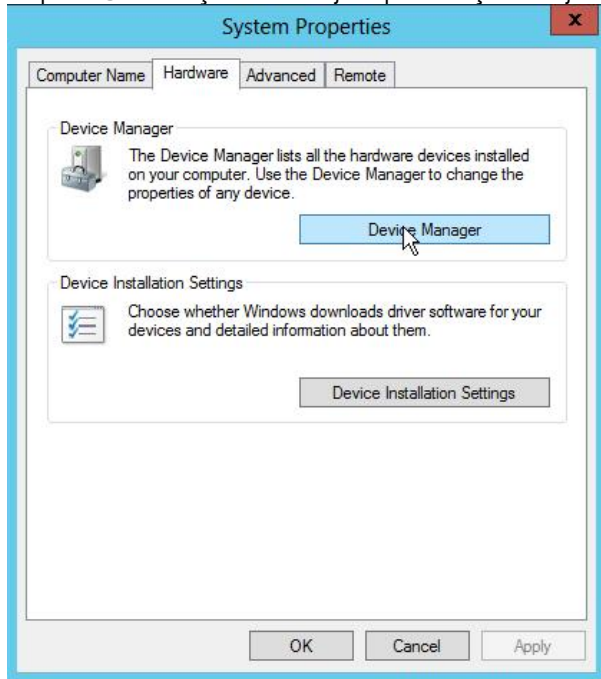
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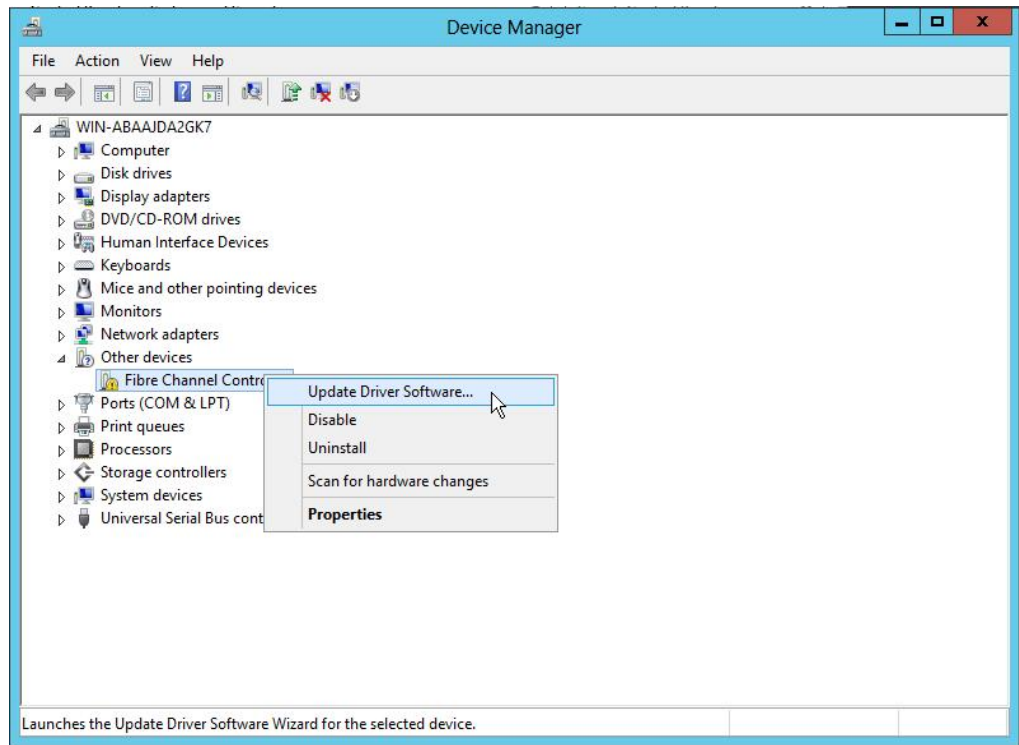


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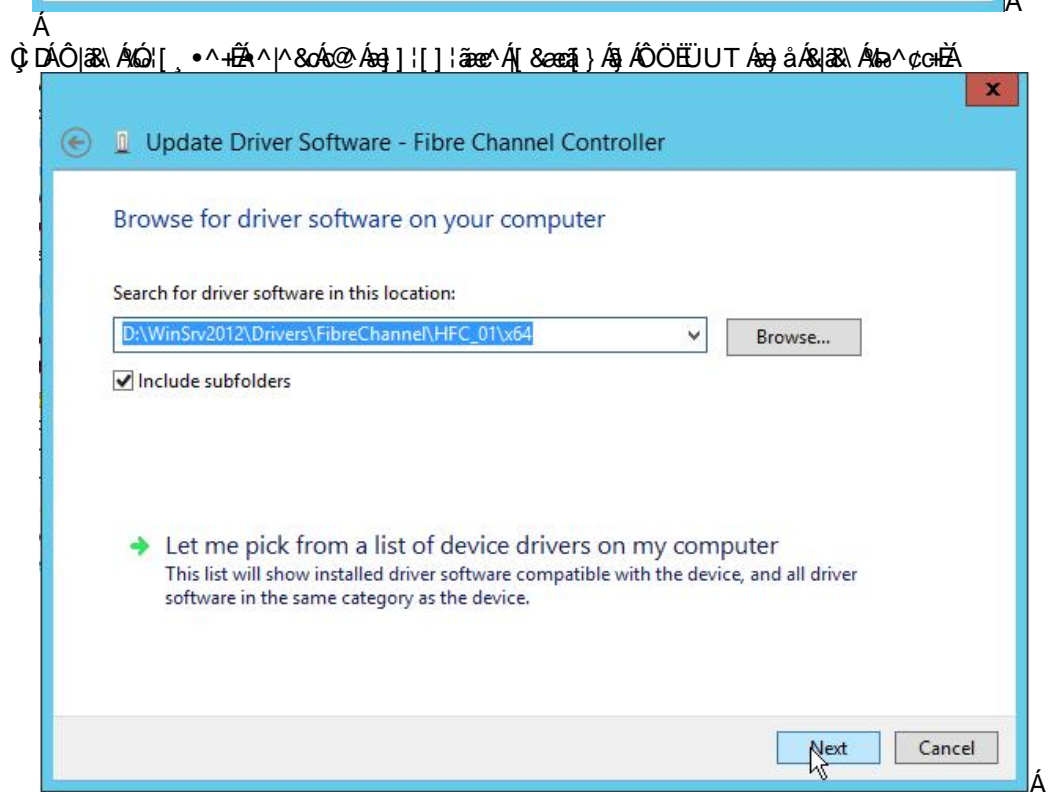
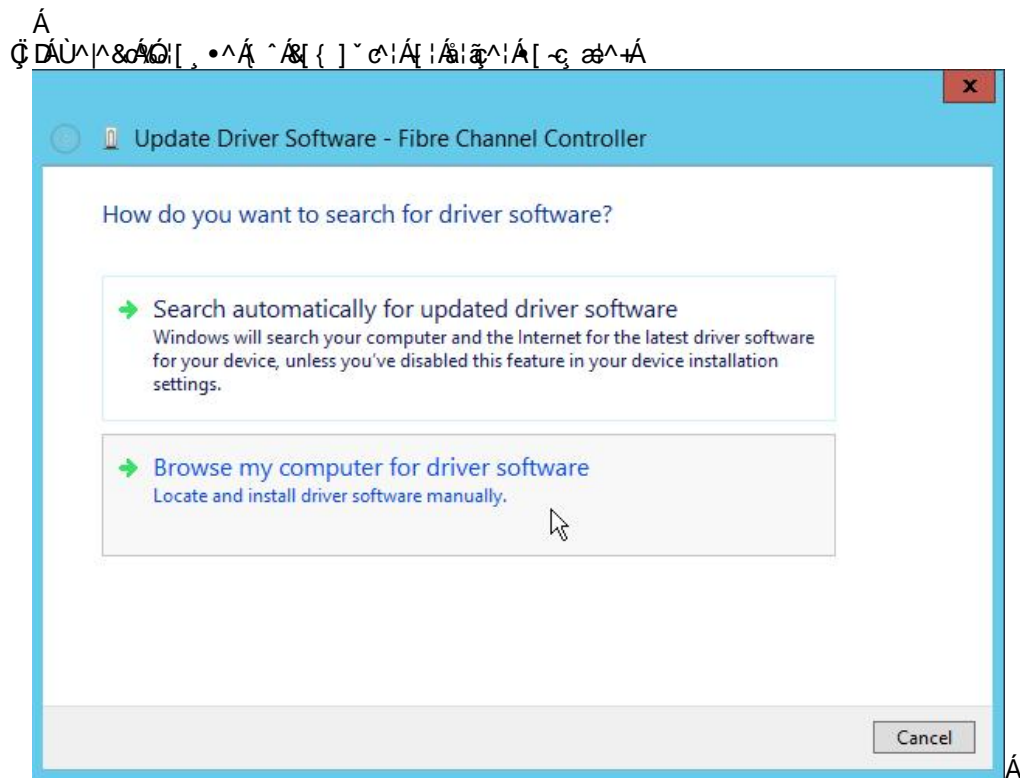
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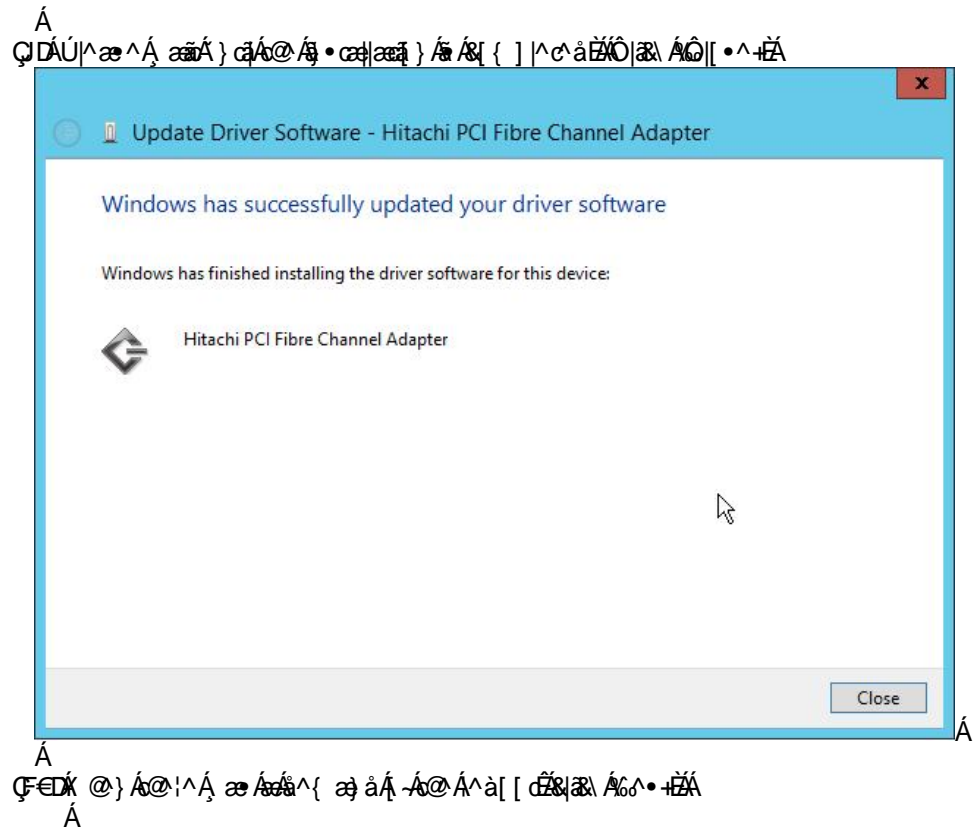


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Confirm the driver version

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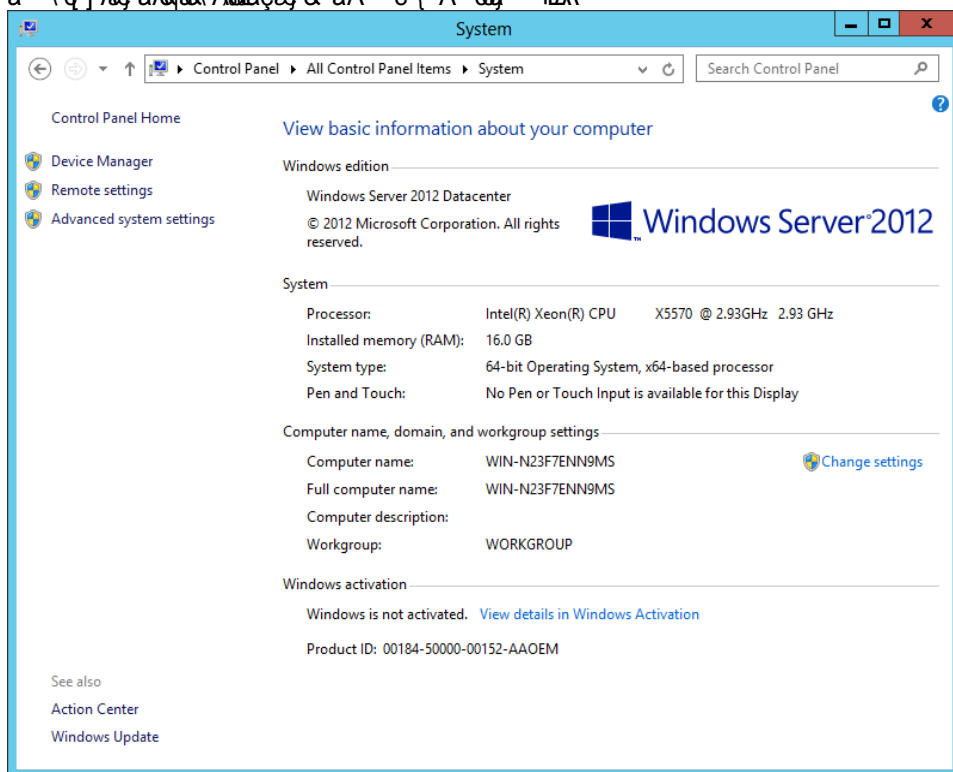
□Á How to confirm the driver version you intended to install

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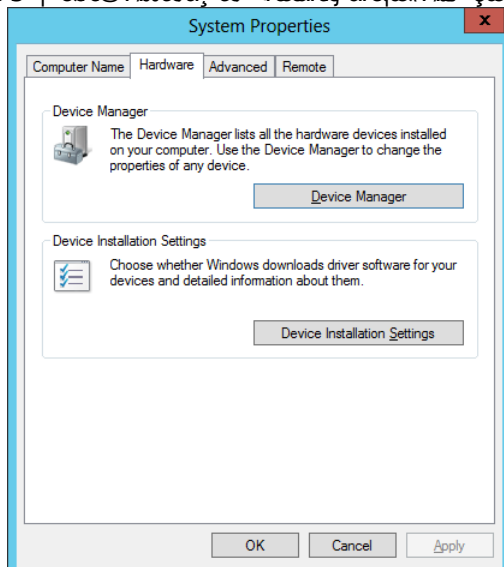
□Á How to confirm the installed driver version on your system

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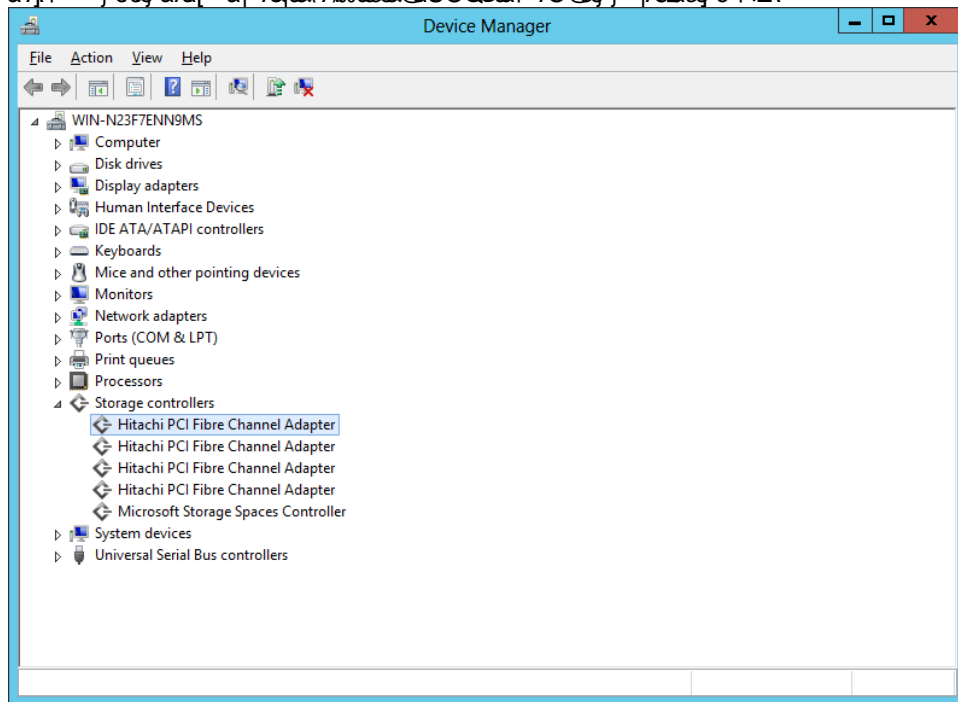


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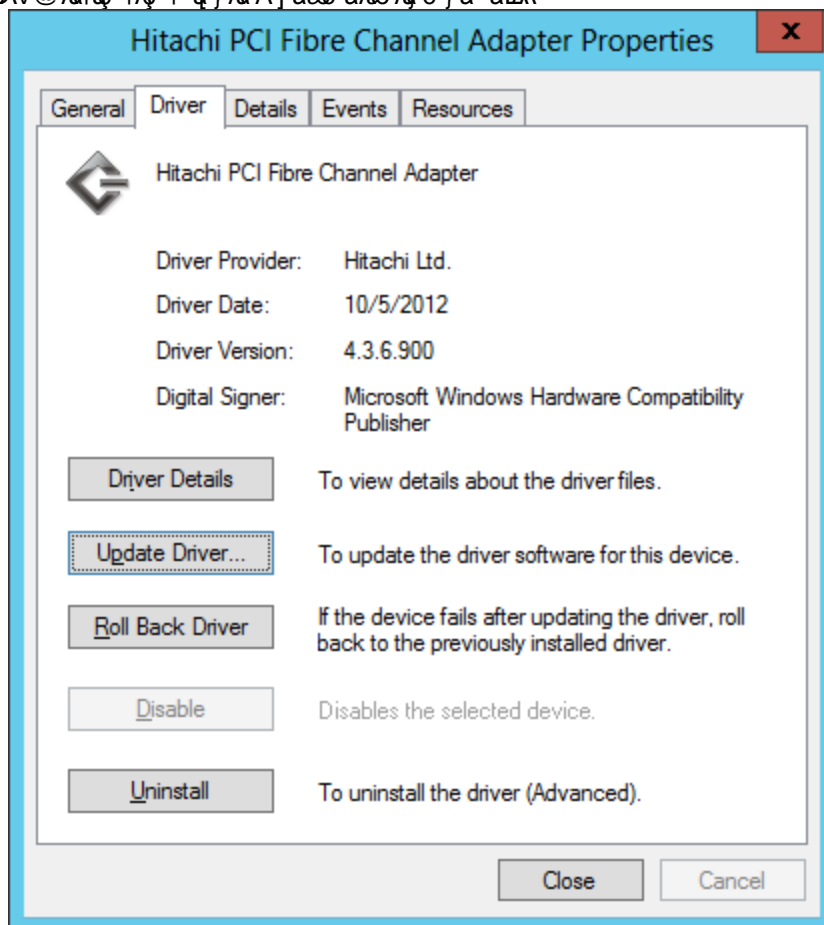
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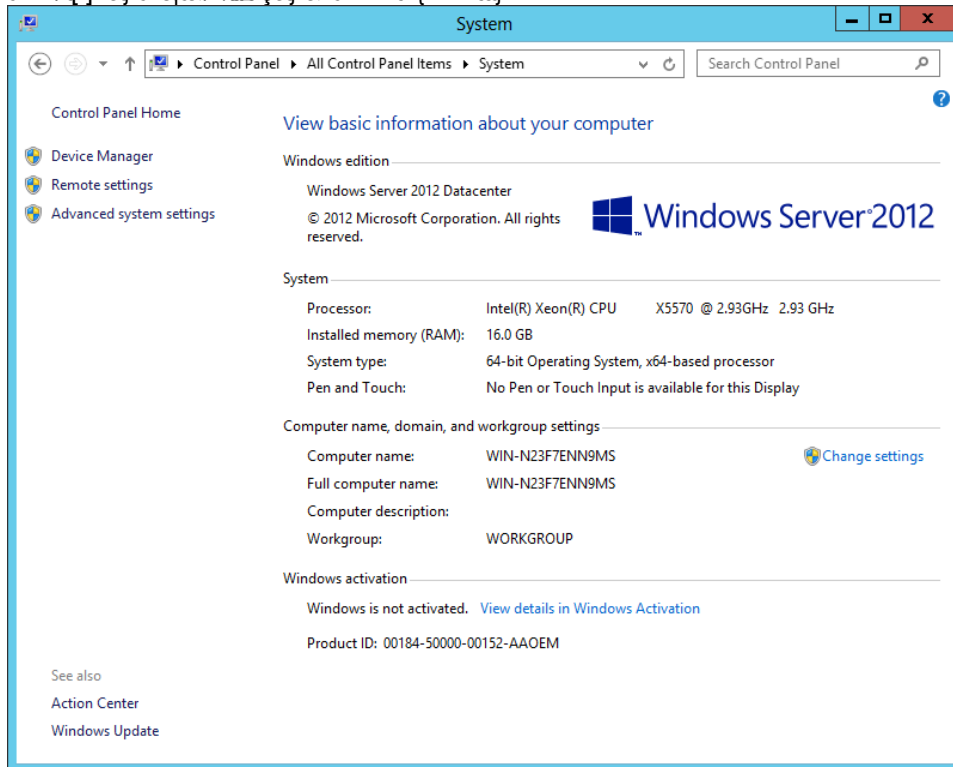
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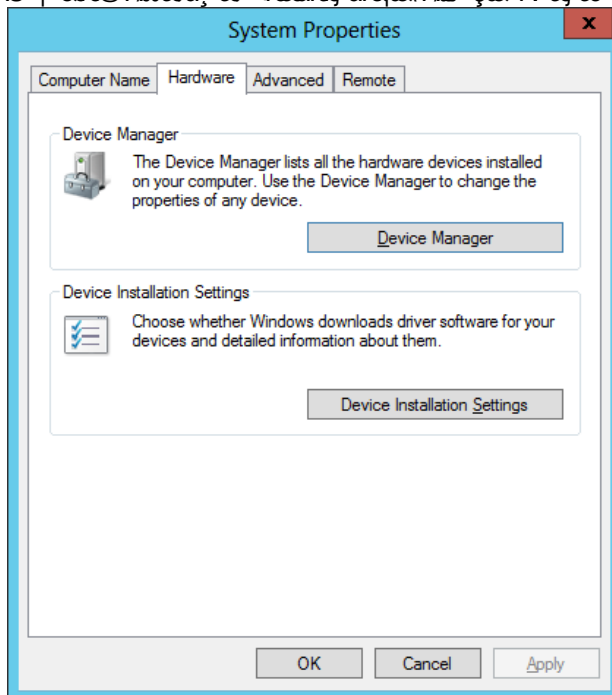
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Update driver

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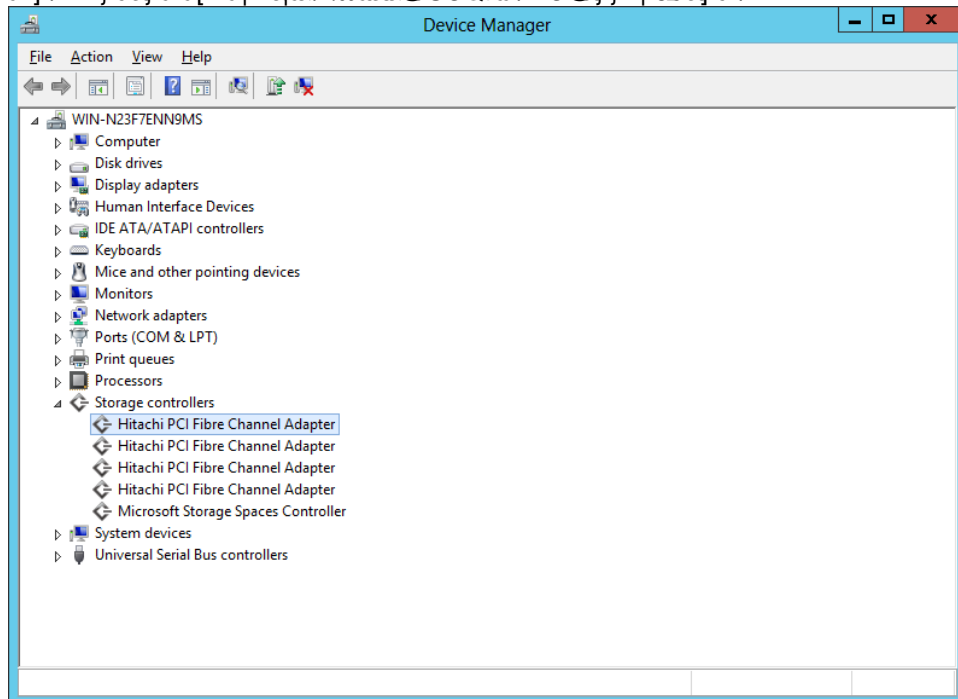


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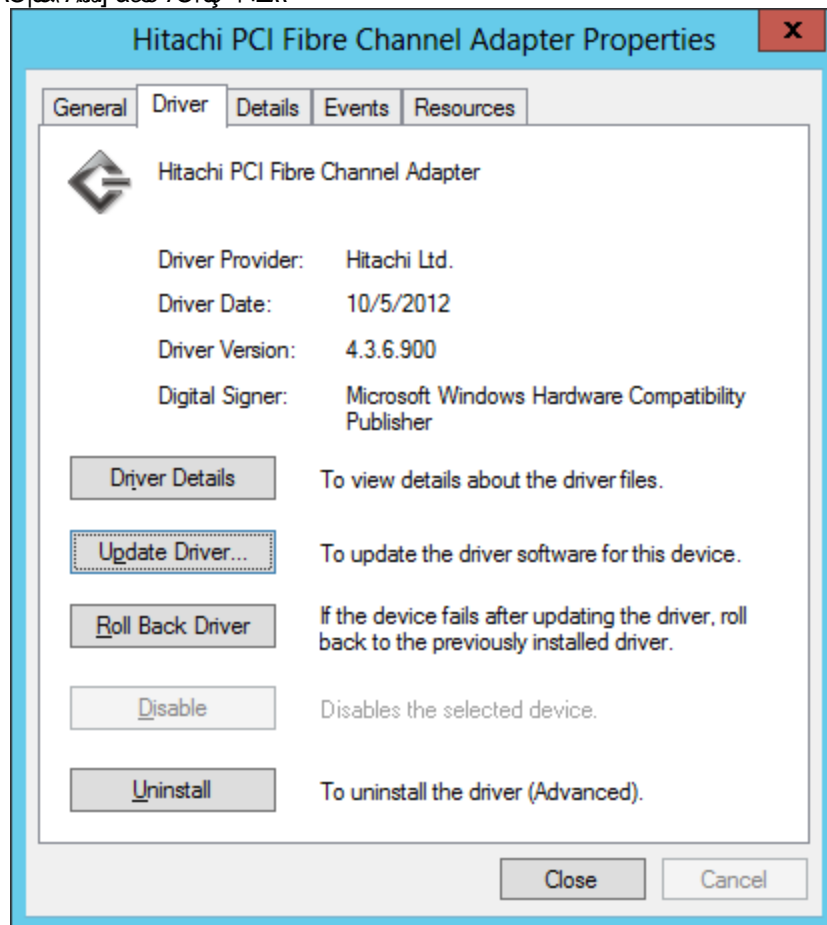
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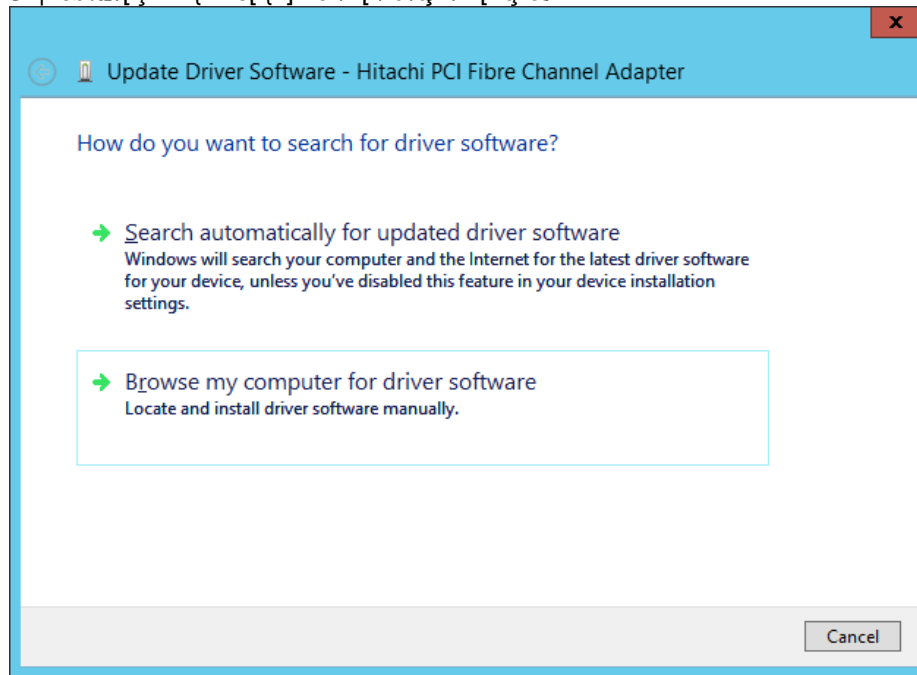
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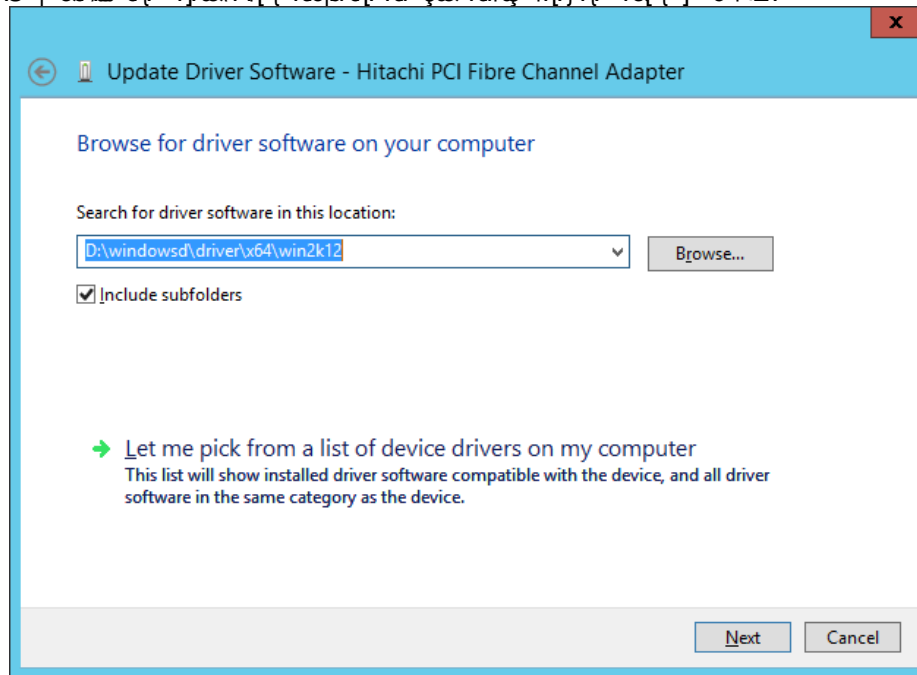


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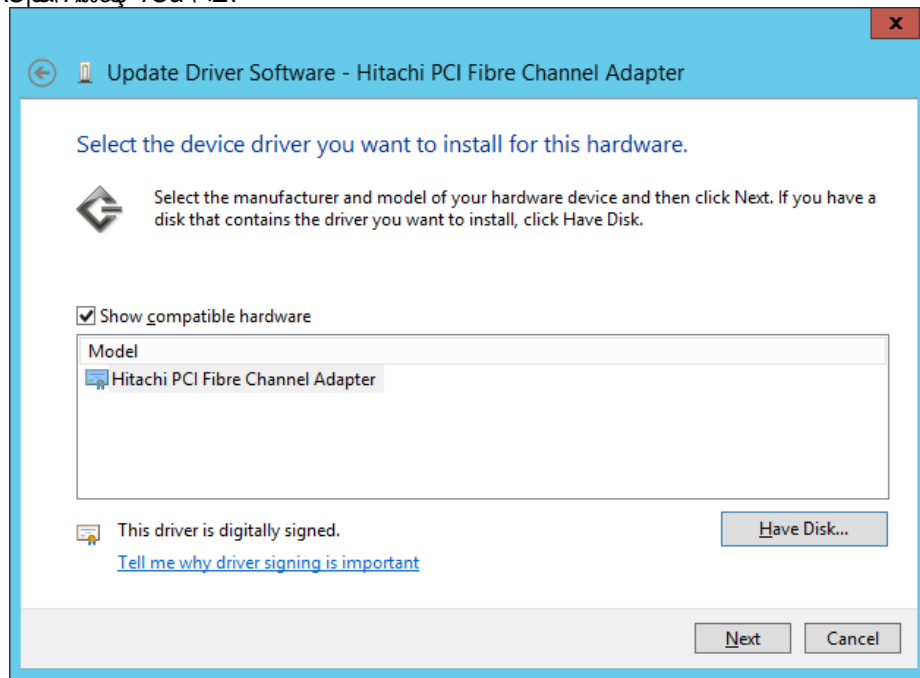
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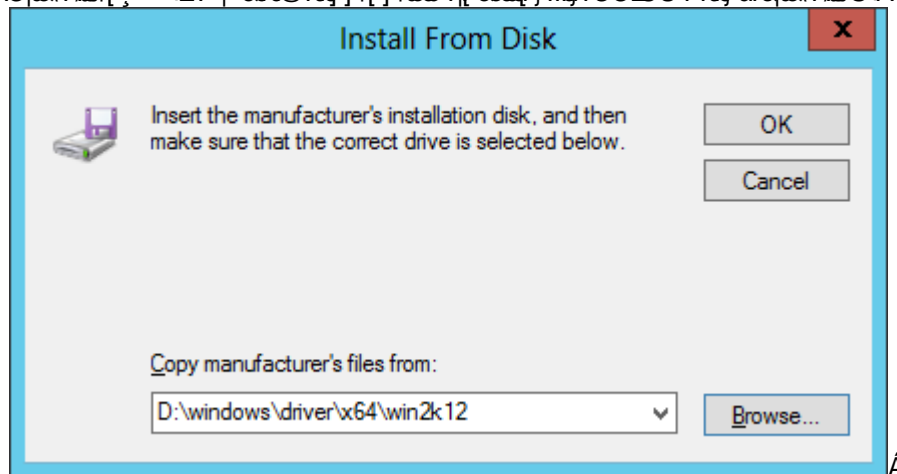
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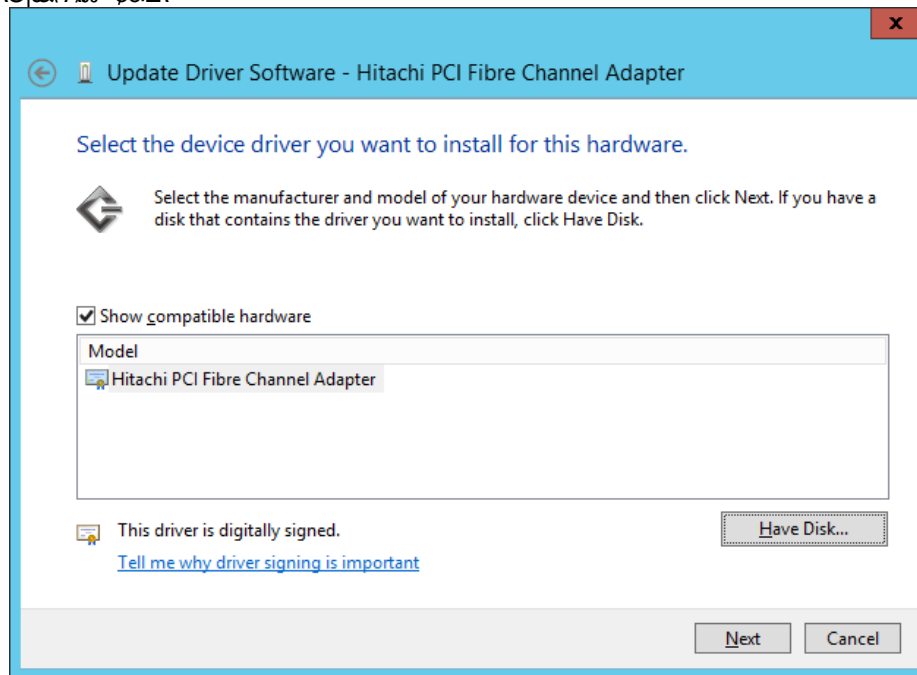


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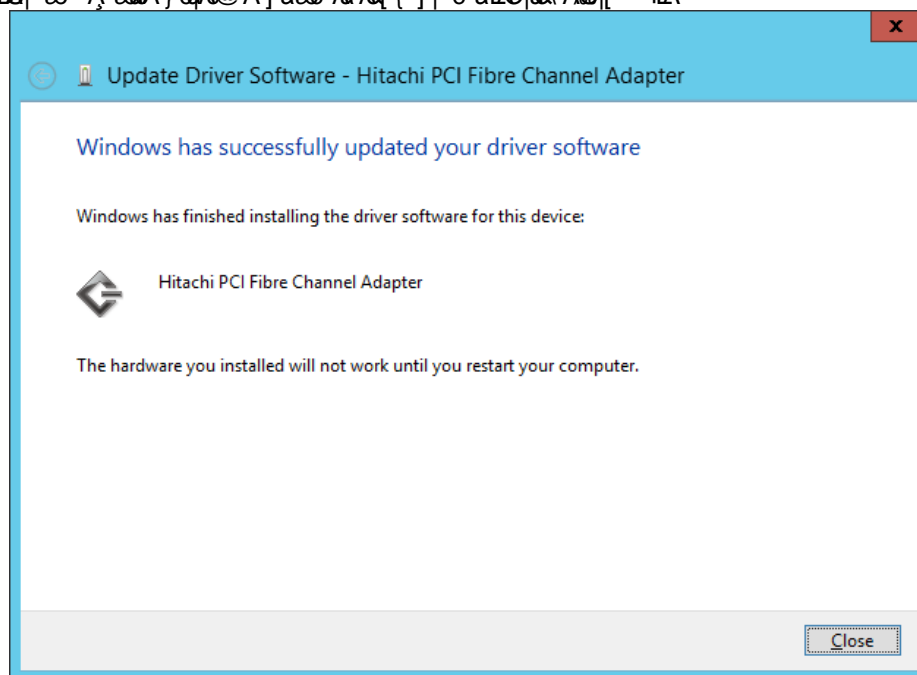
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Roll back to the previously installed driver

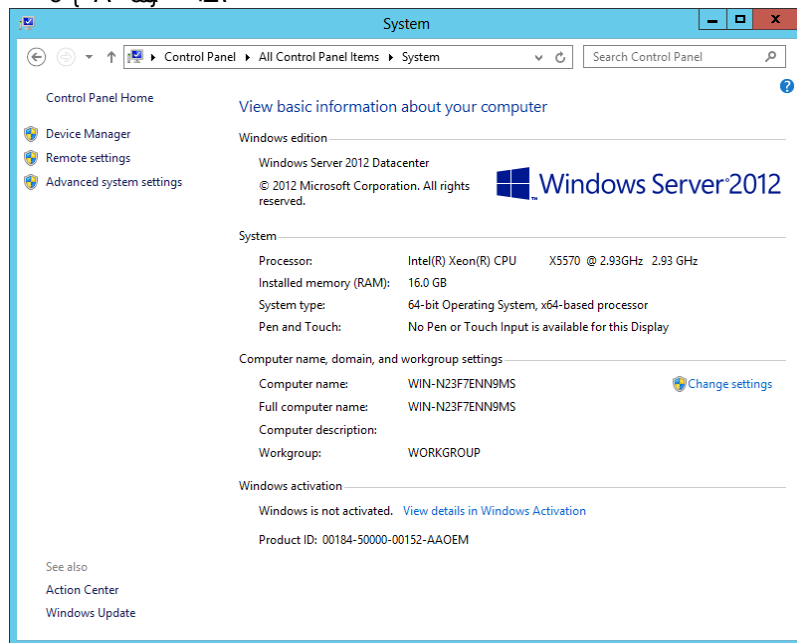
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Uninstall driver

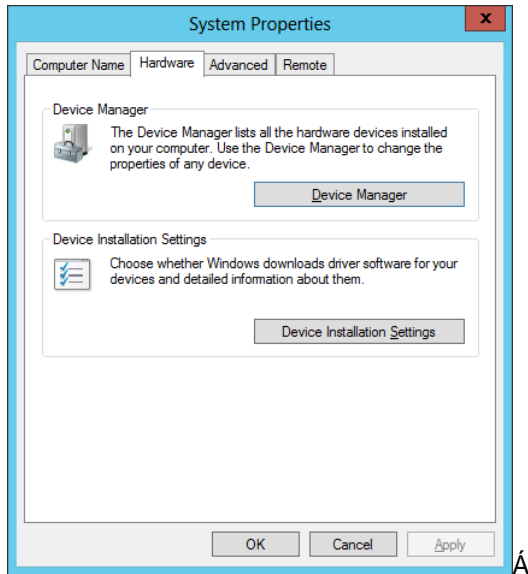
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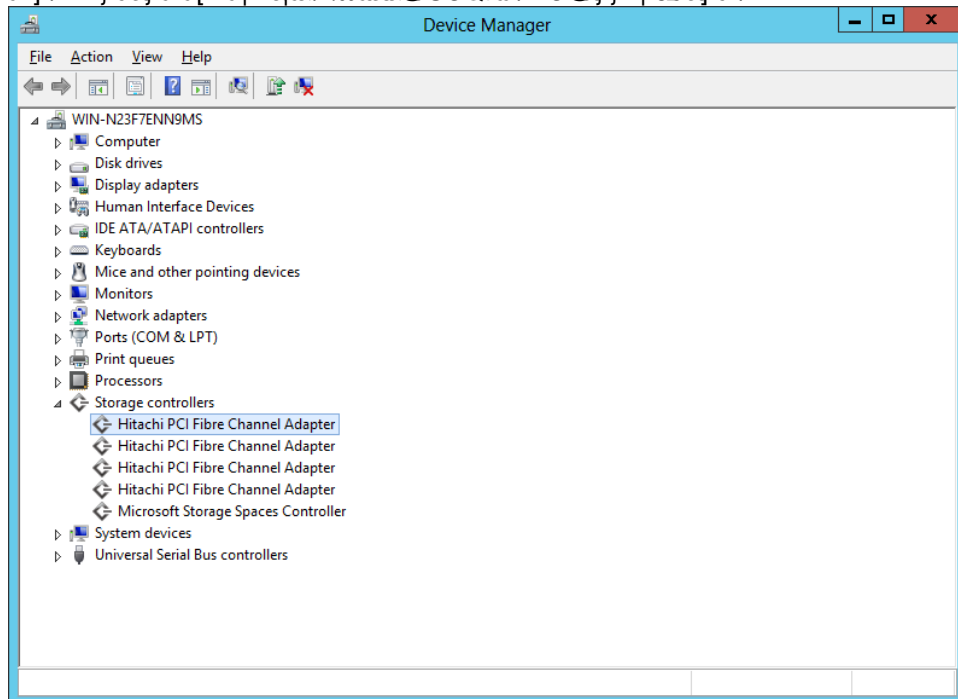
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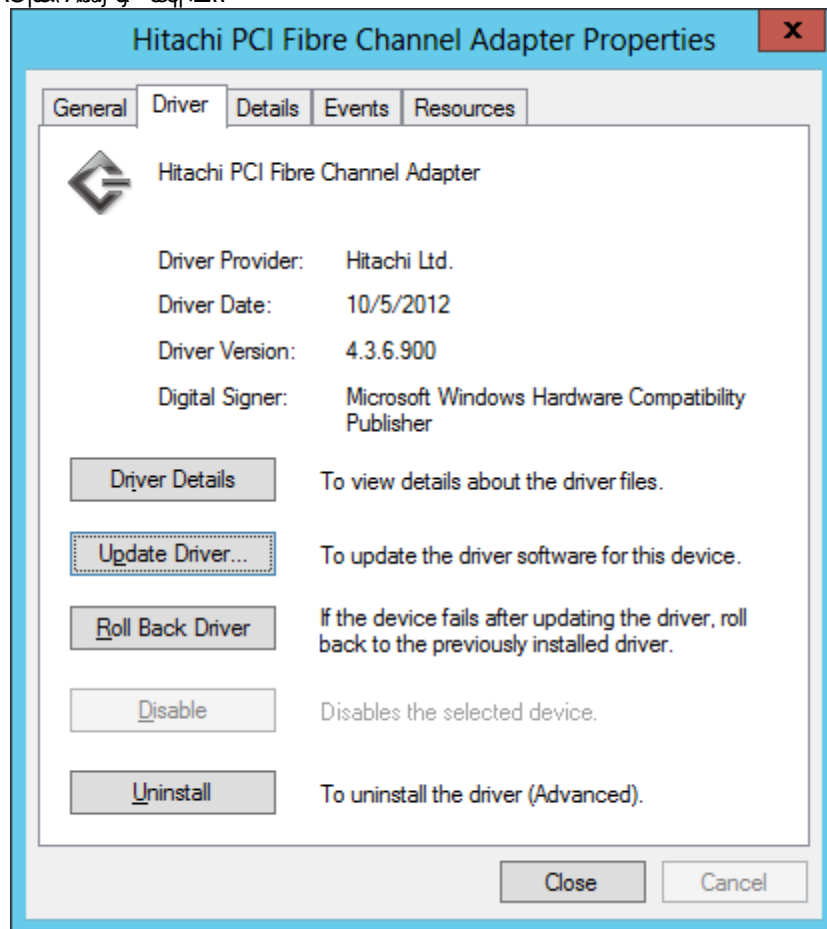
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Installation for Plug & Play

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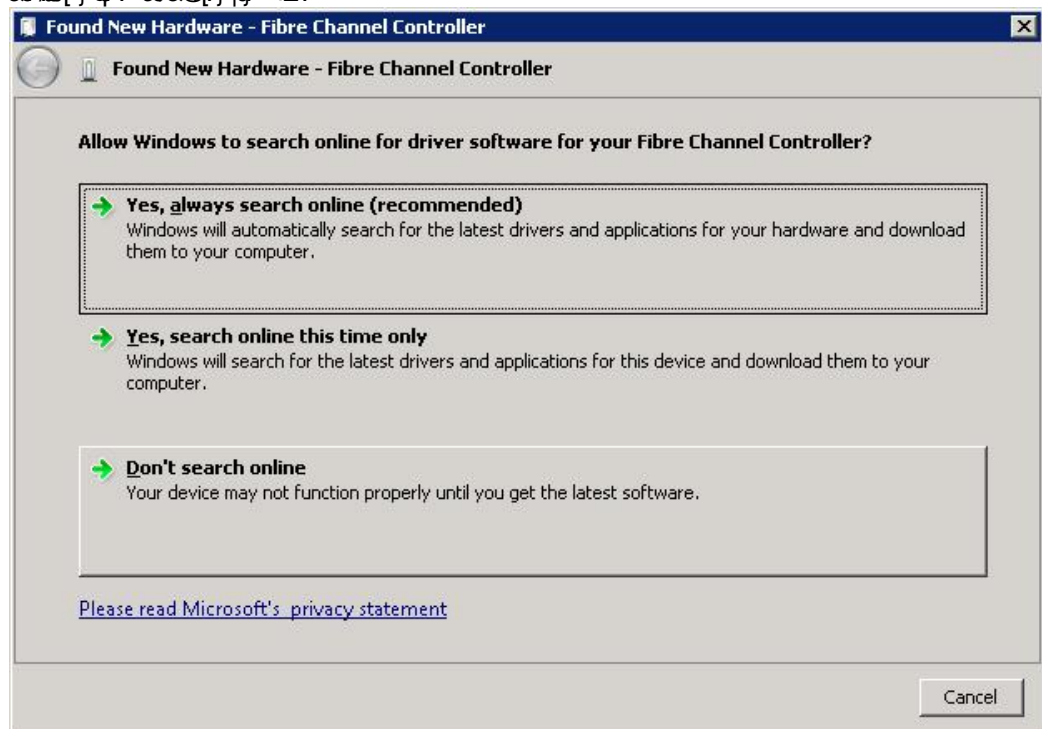
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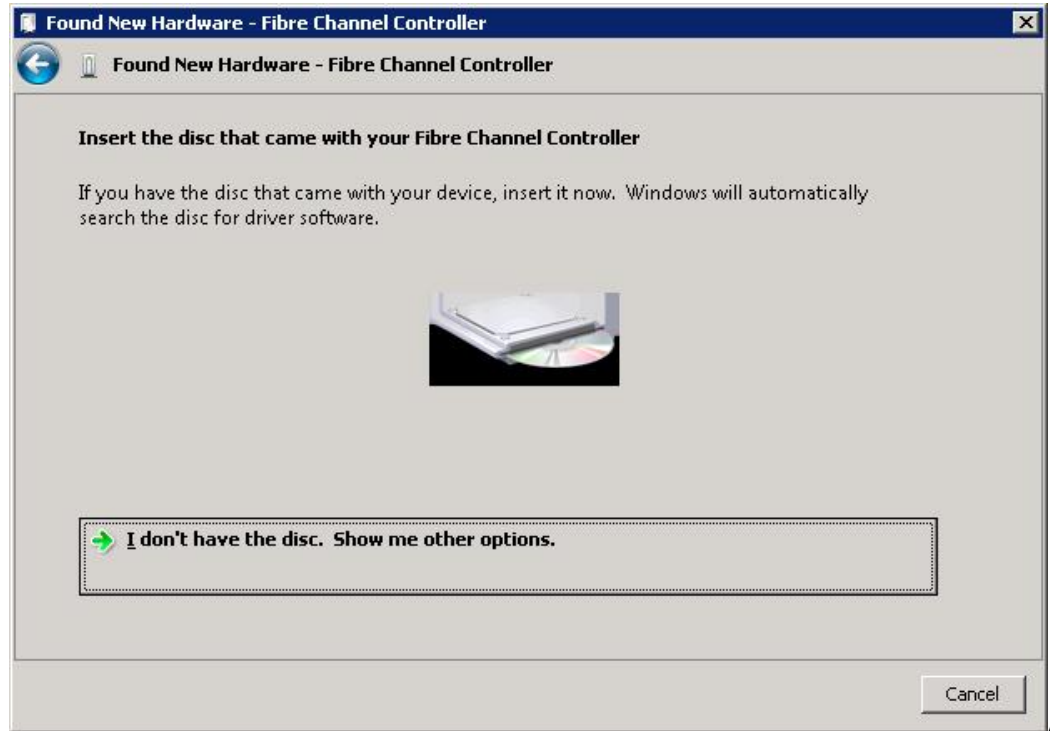


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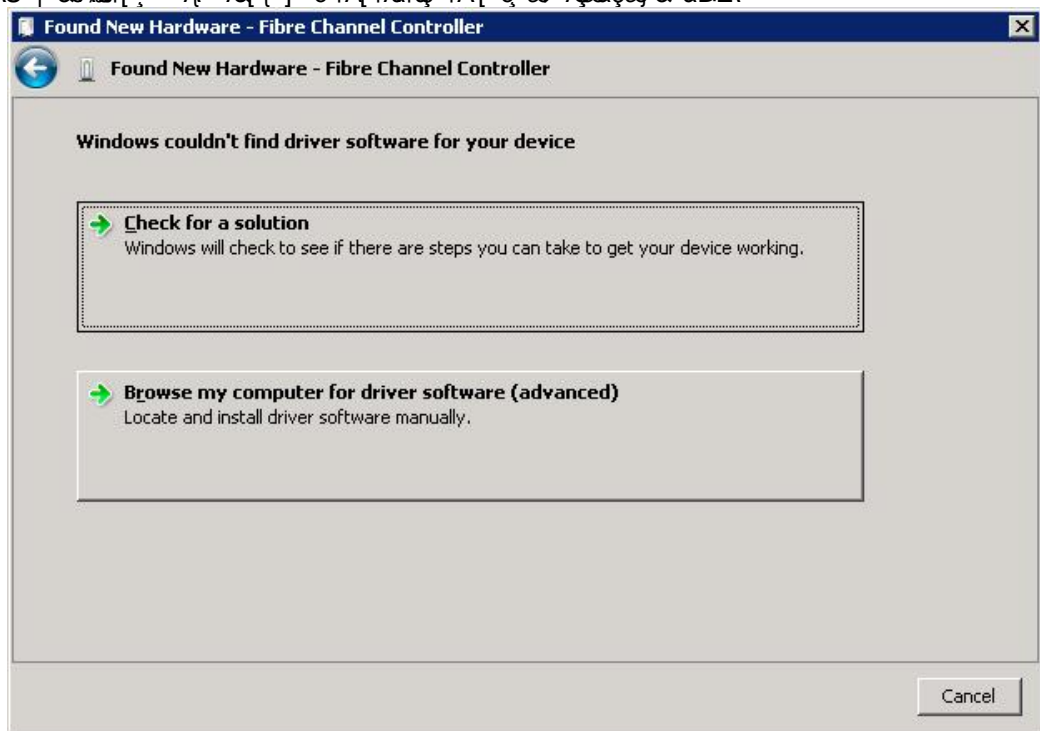


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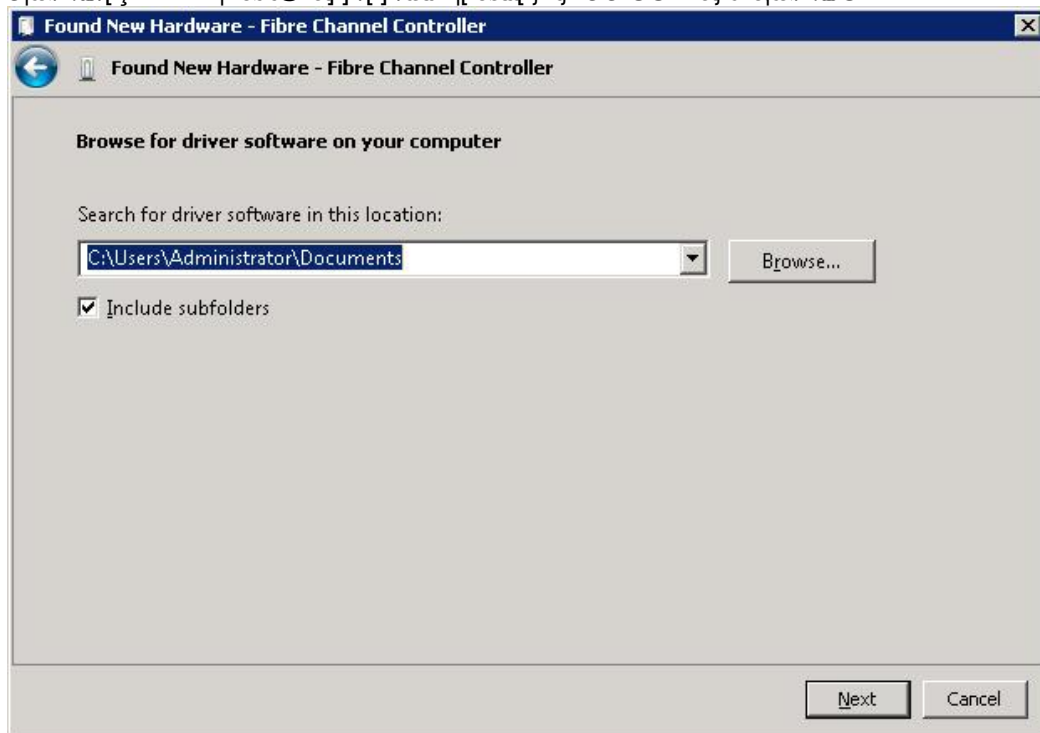
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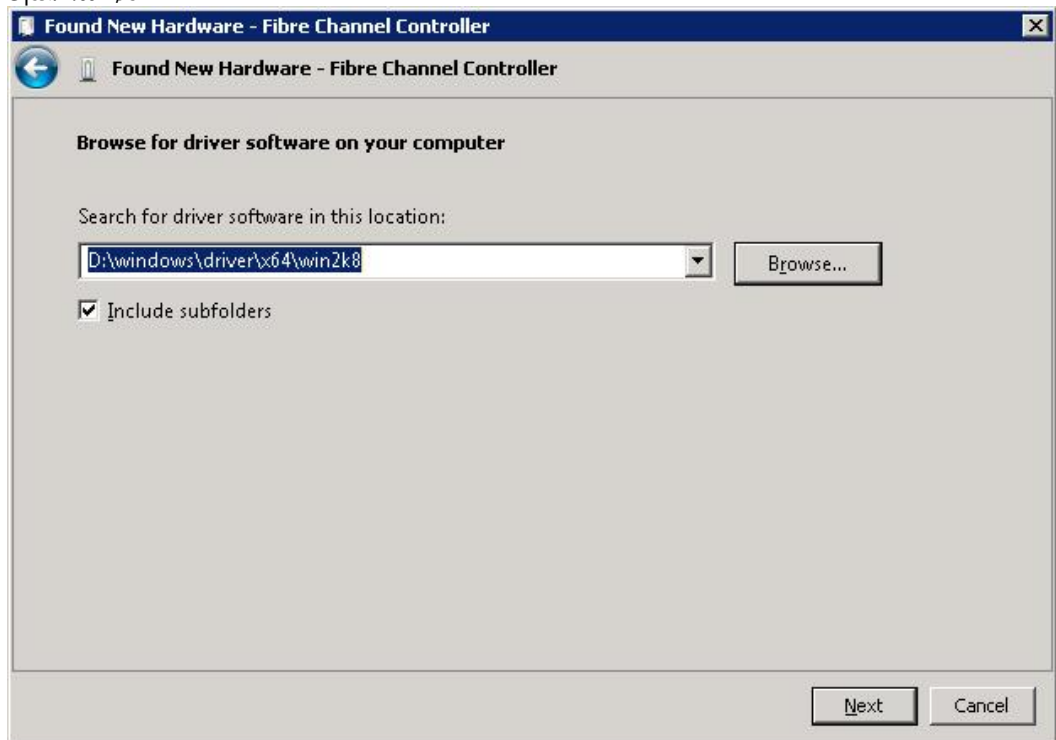


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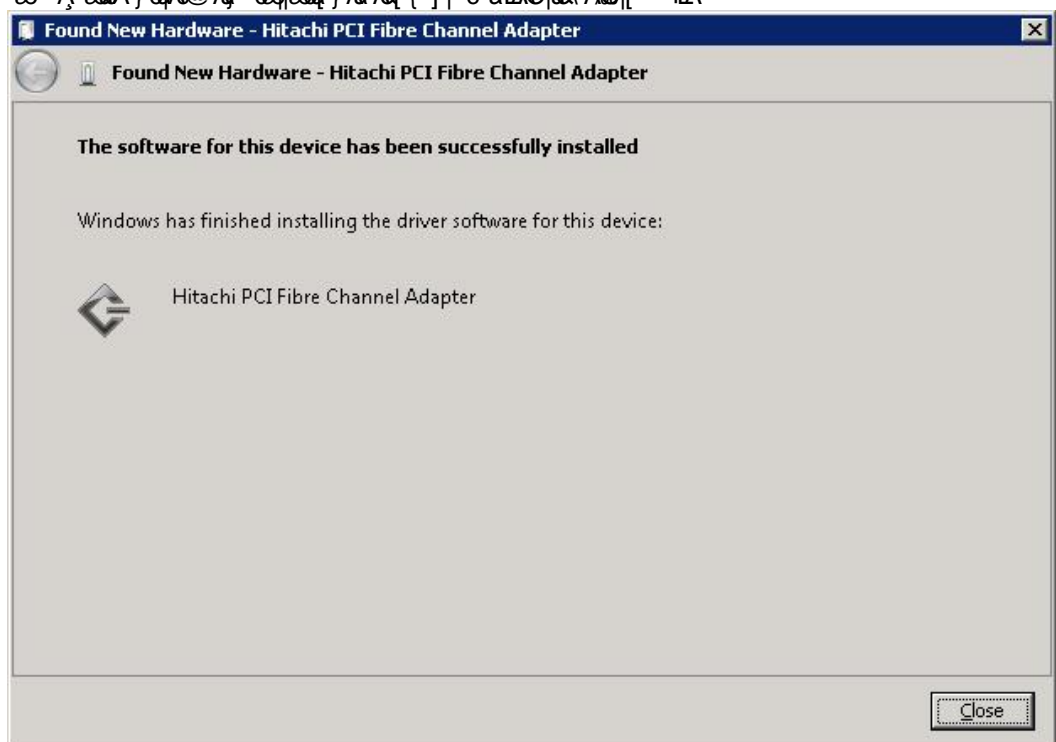


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Confirm the driver version

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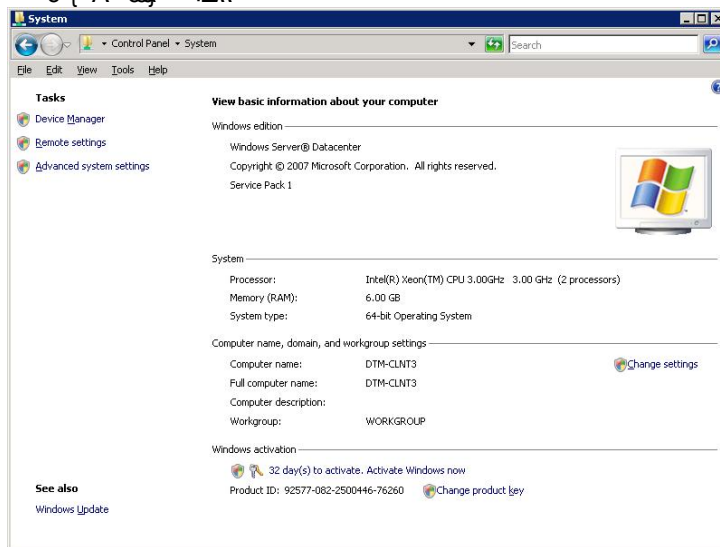
□Á How to confirm the driver version you intended to install

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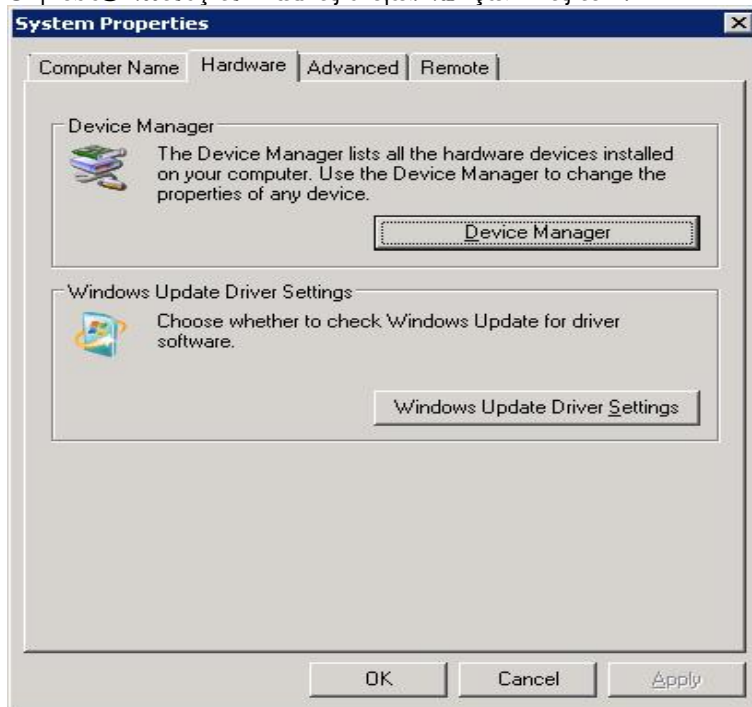
□Á How to confirm the installed driver version on your system

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FDÁÚ^!^&Á@Á ÁÁ, á^ÁÁÁÁ áÁÁÁ Á@ÁçÁ Á áá^!+ÁÁ



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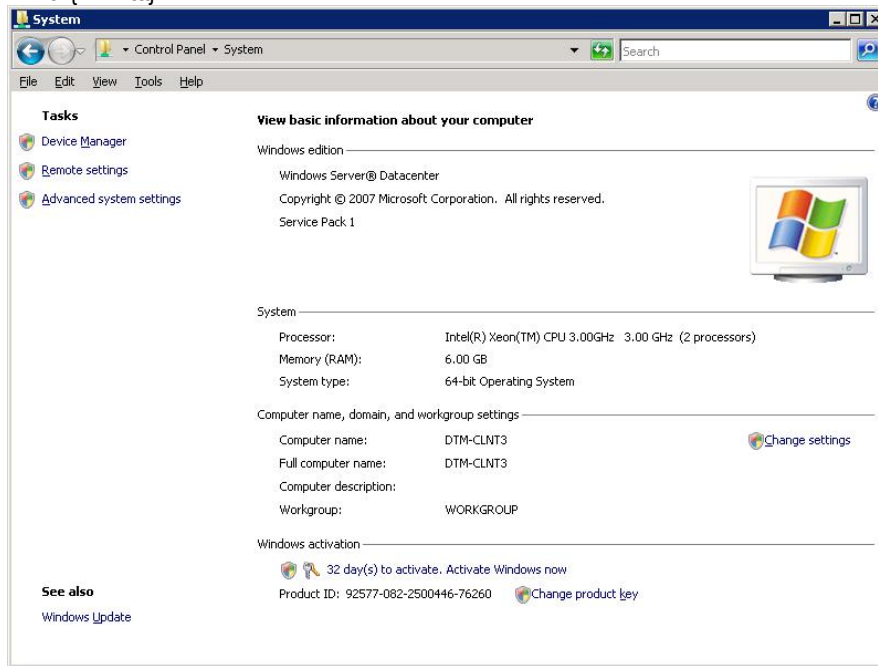
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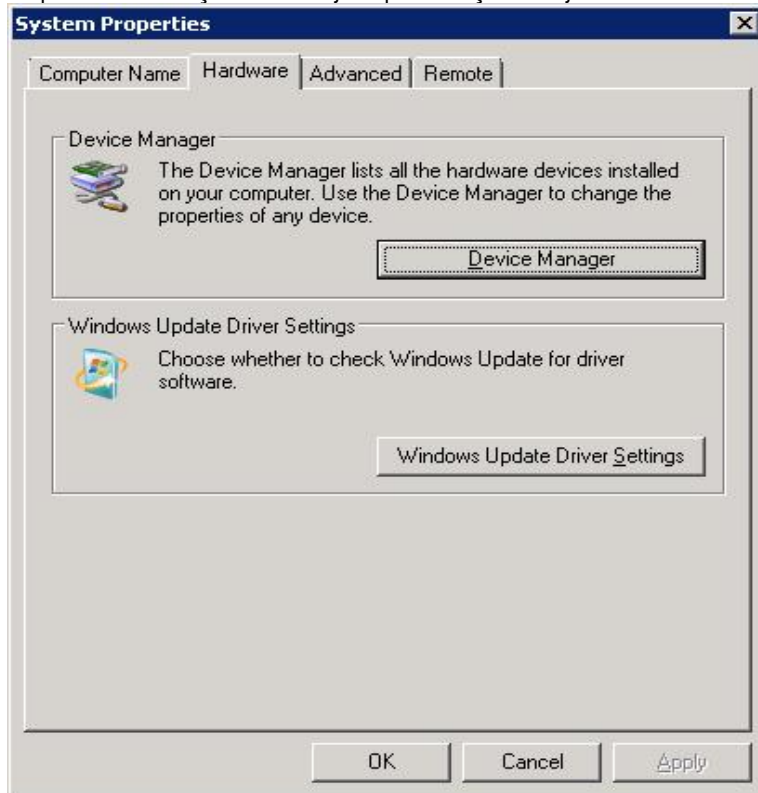
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Update driver

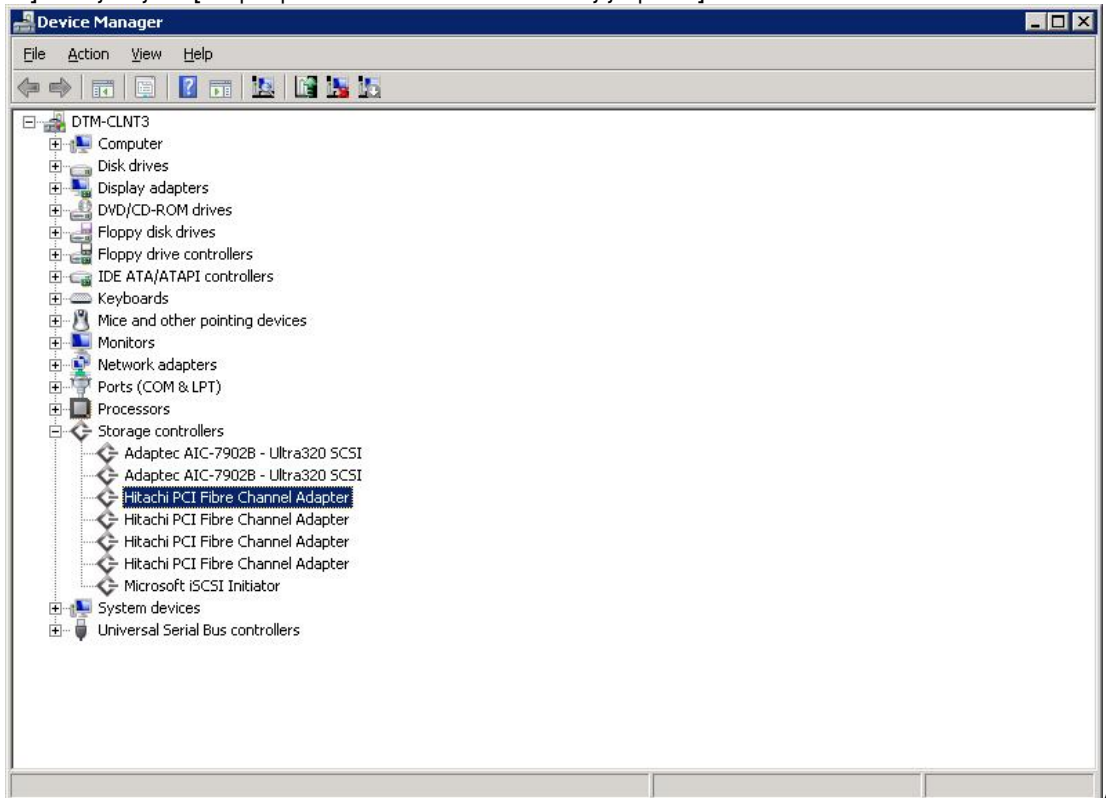
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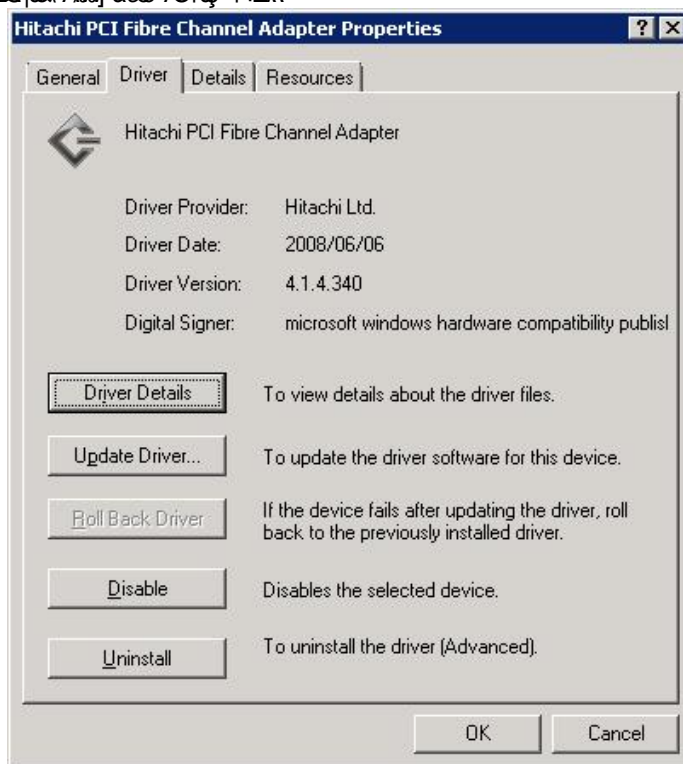
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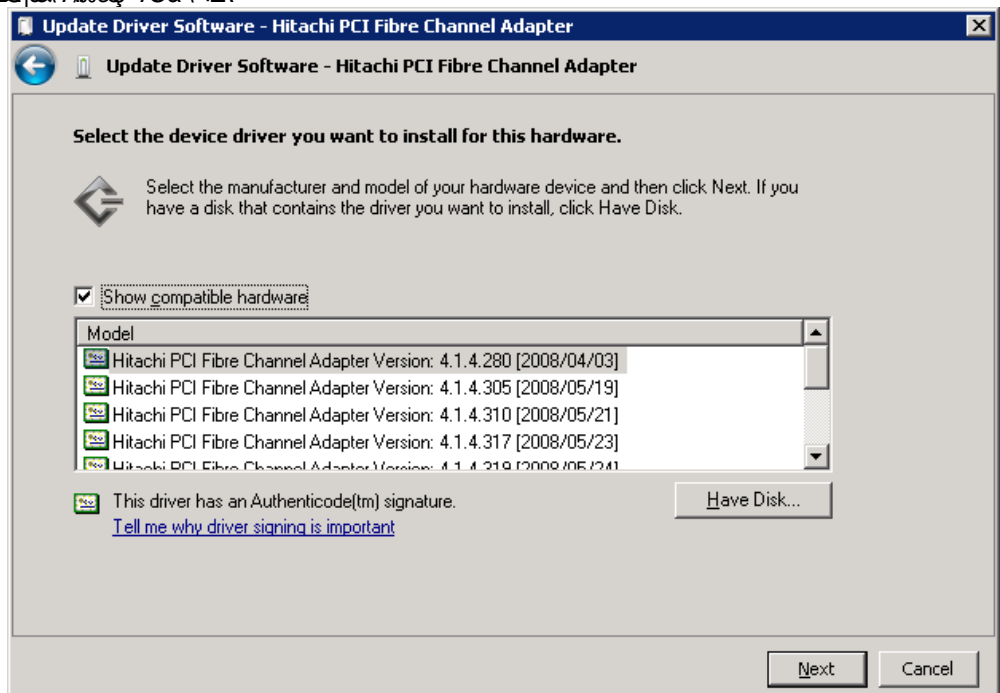
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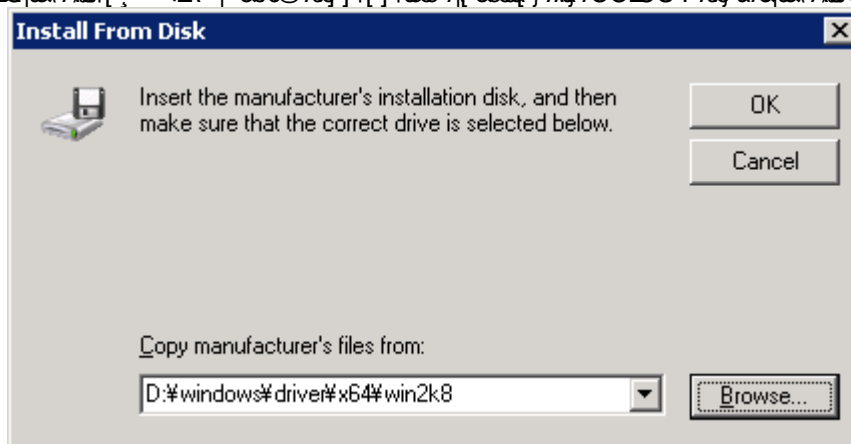
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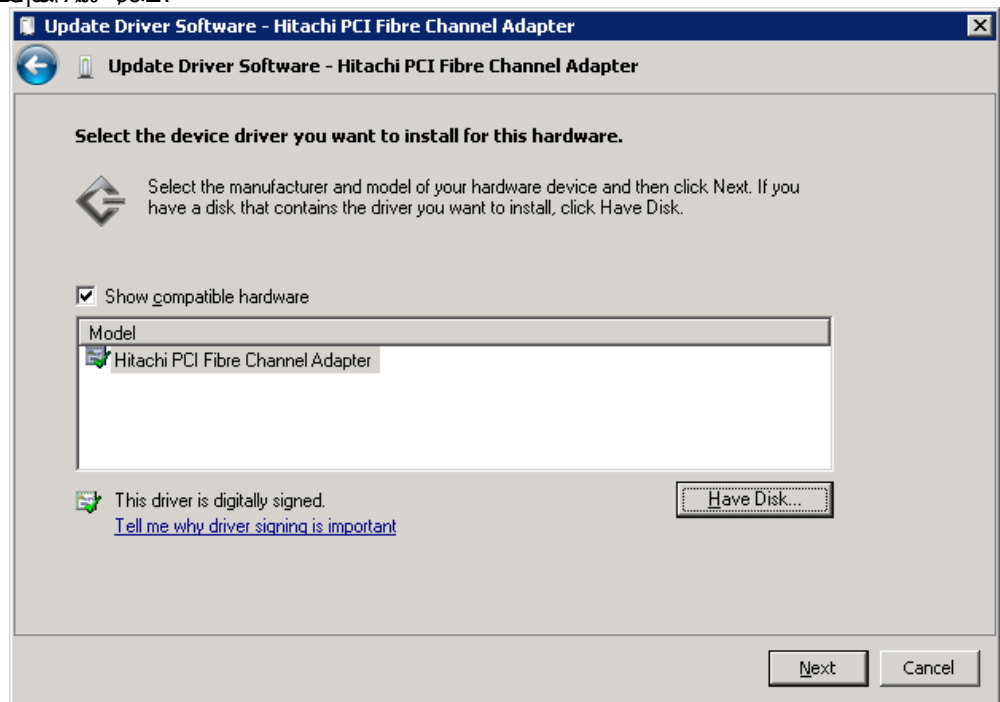
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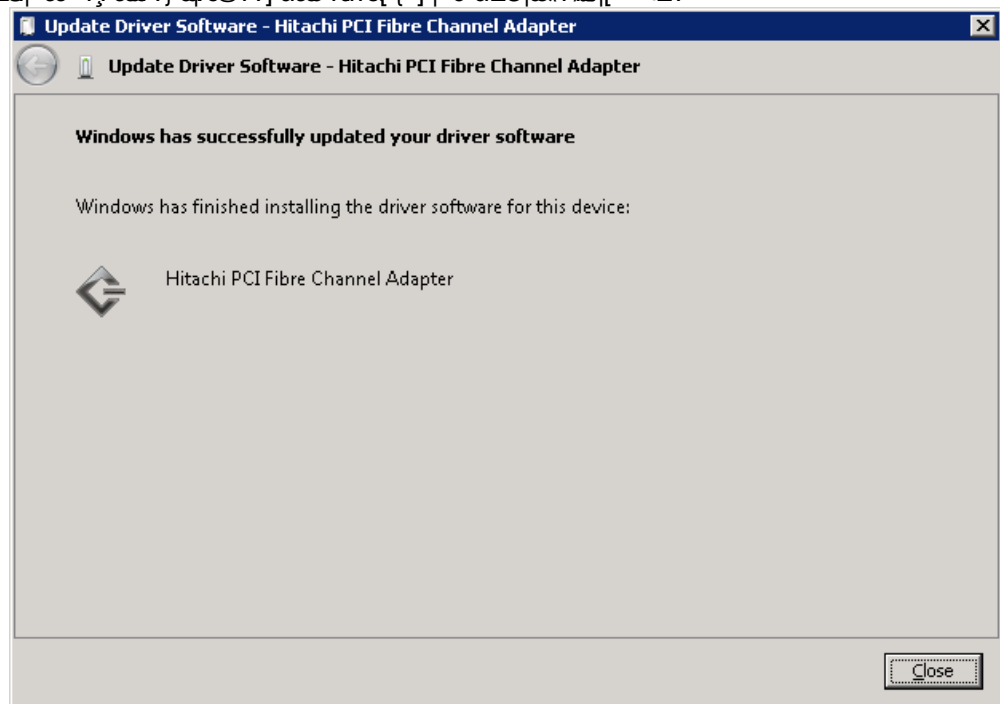
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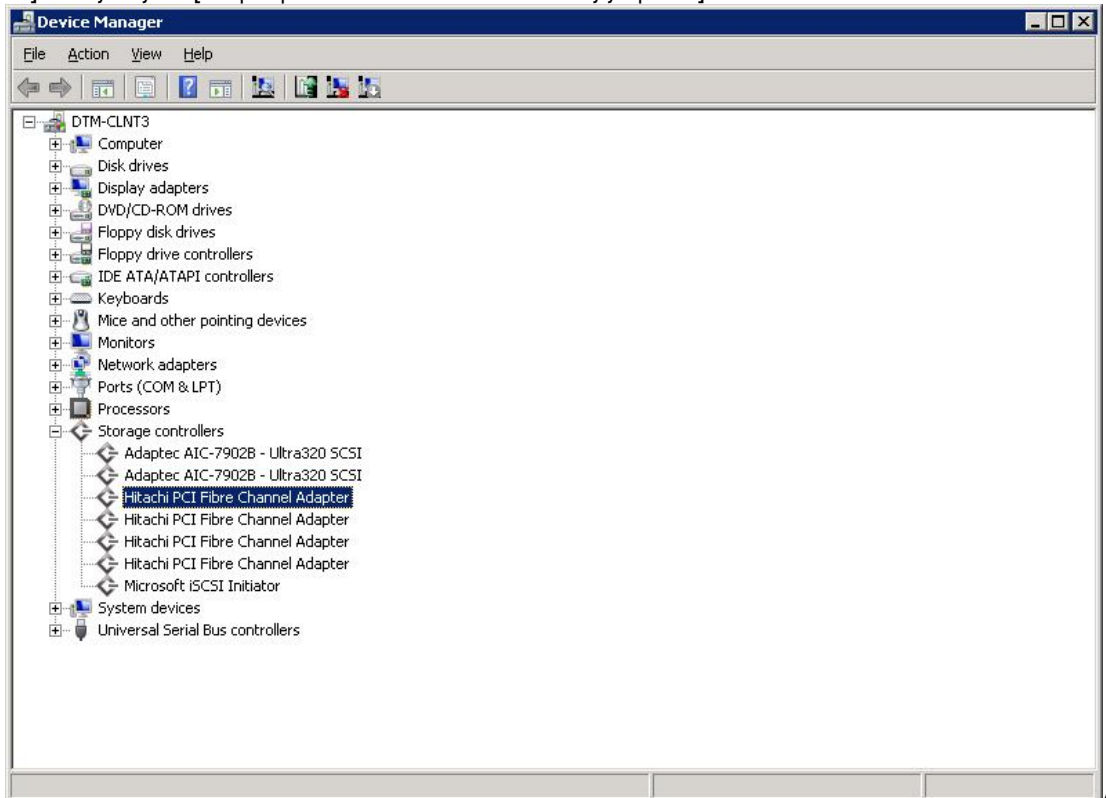
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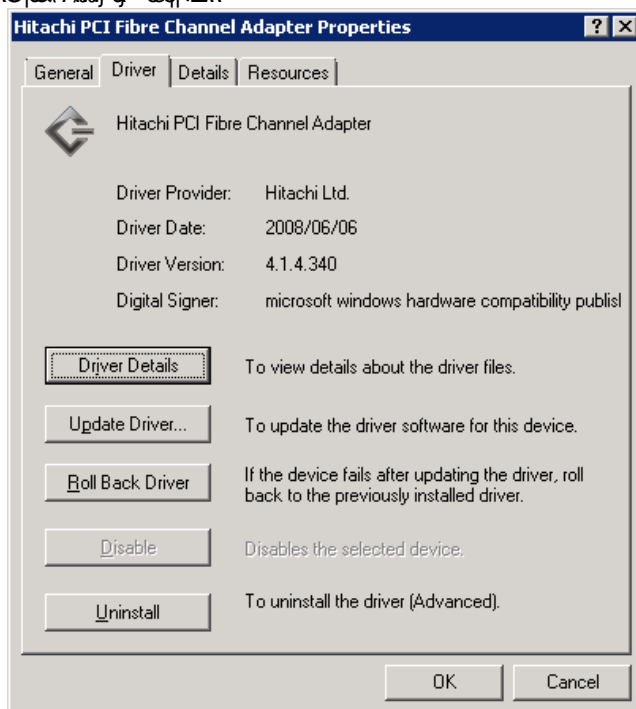
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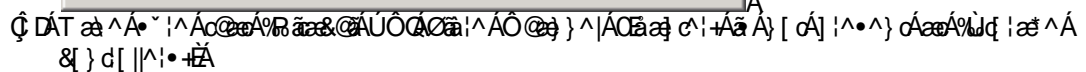
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Install driver on Windows Server 2003

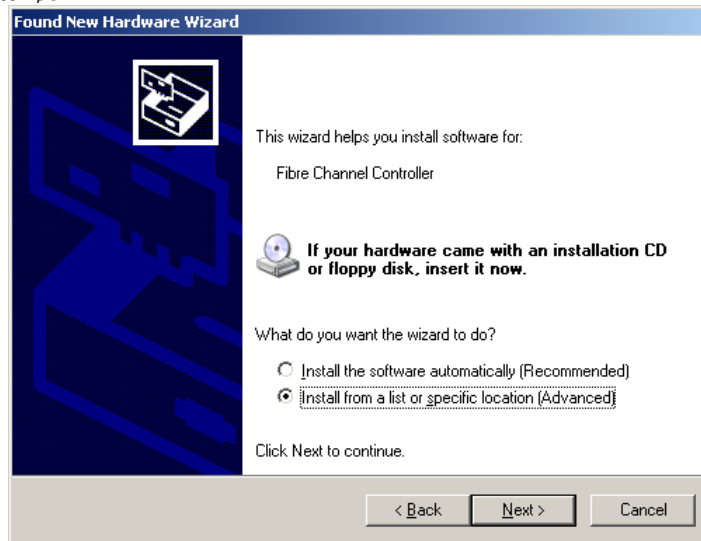
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Install driver

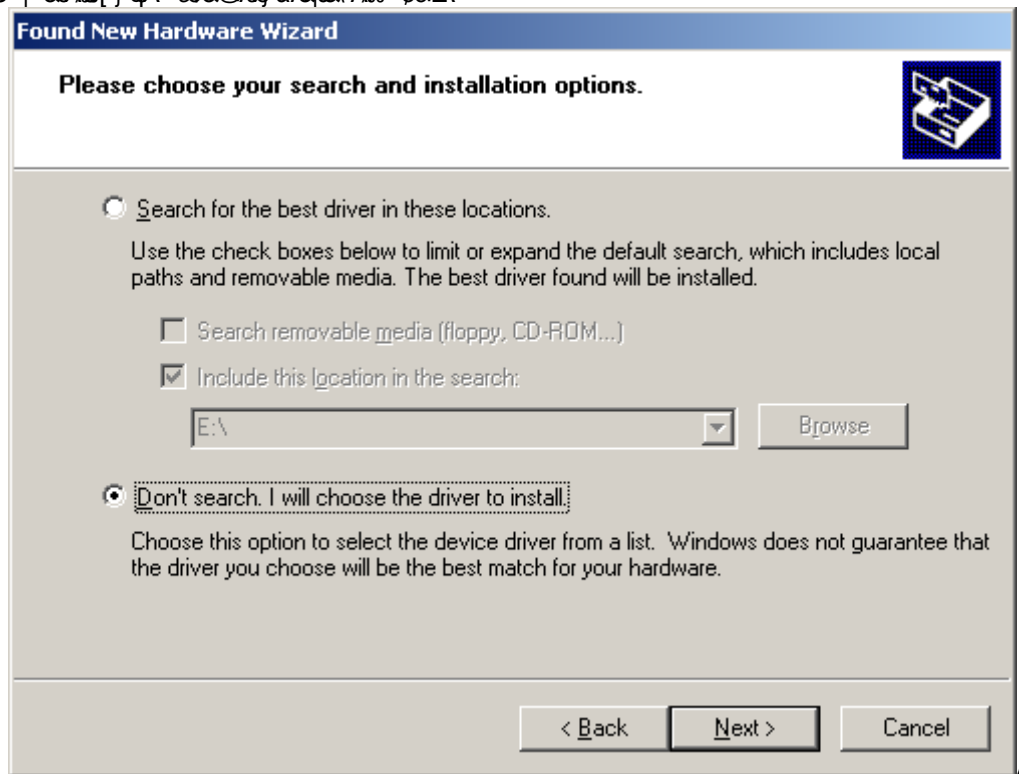
Installation for Plug & Play

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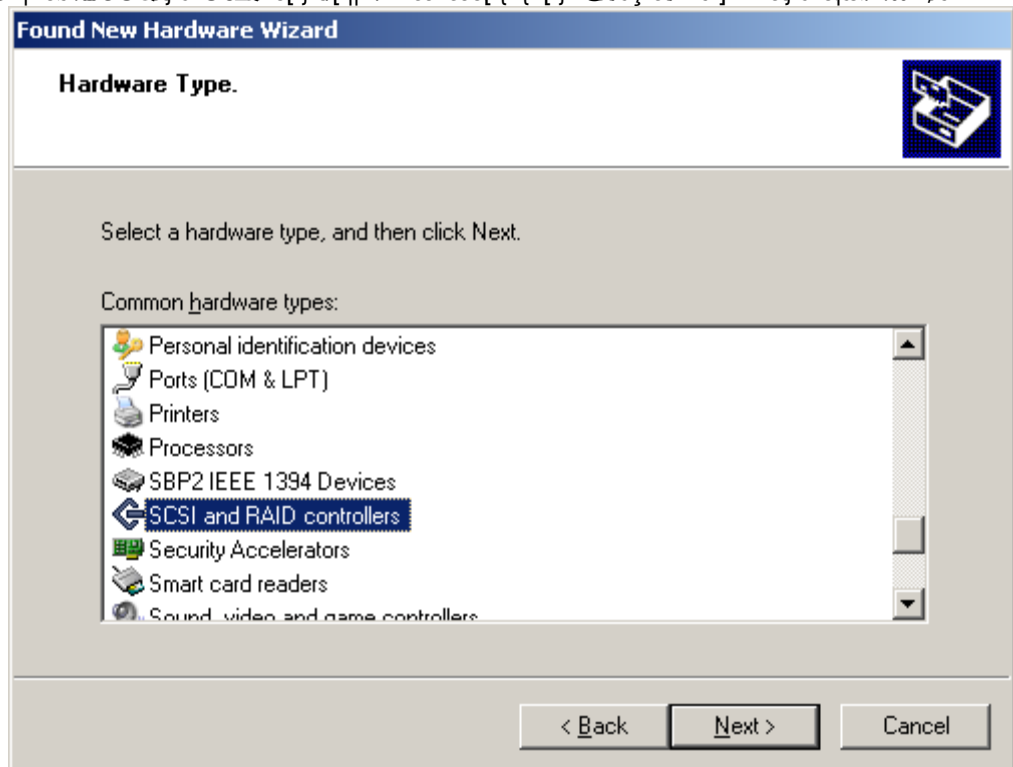
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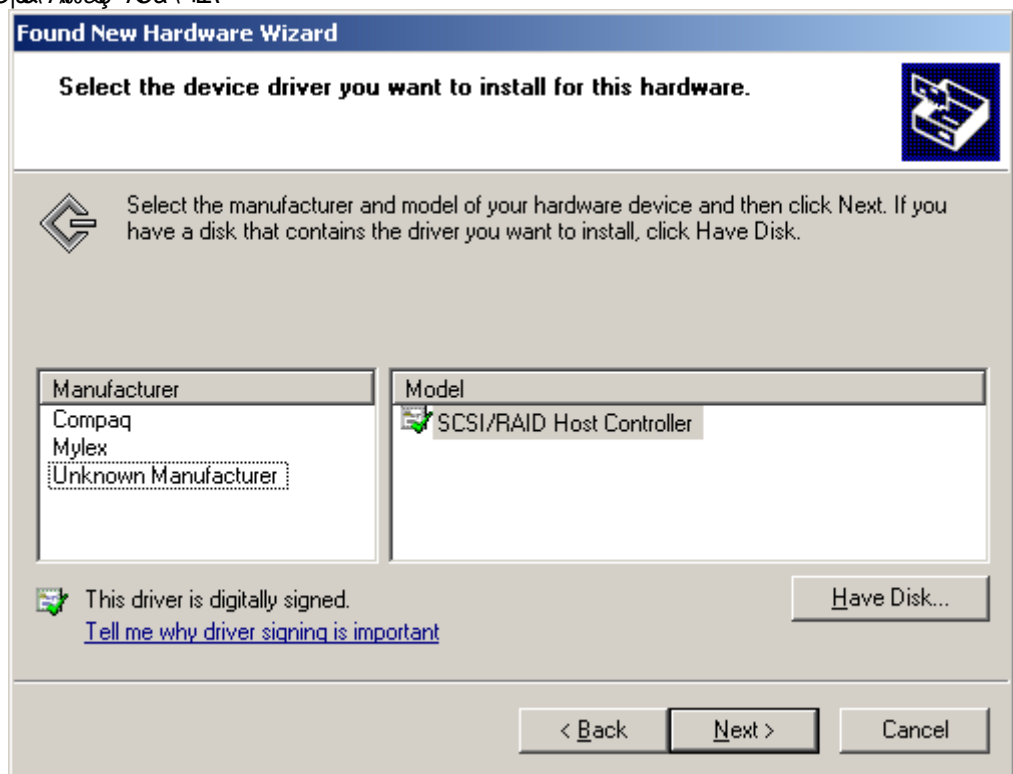
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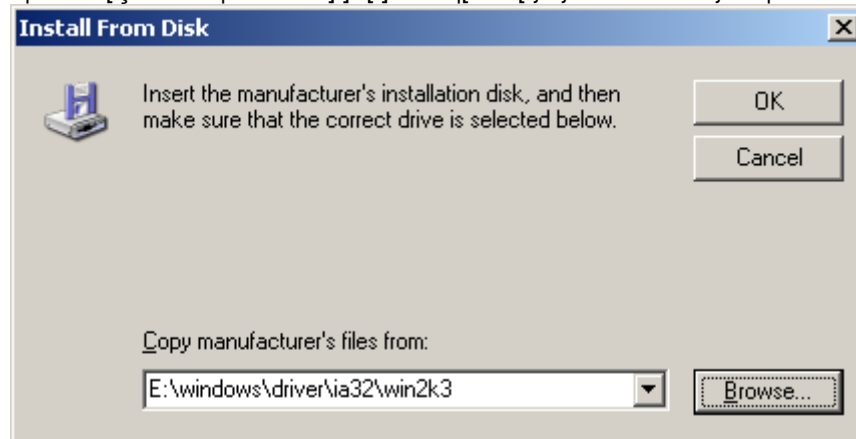


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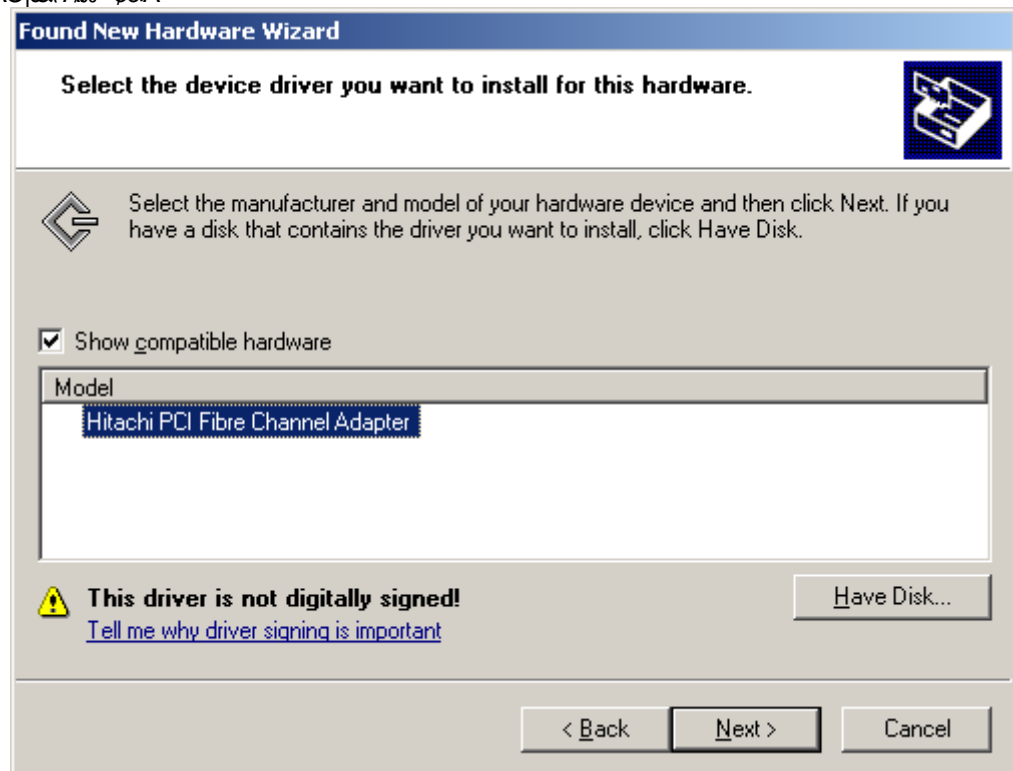
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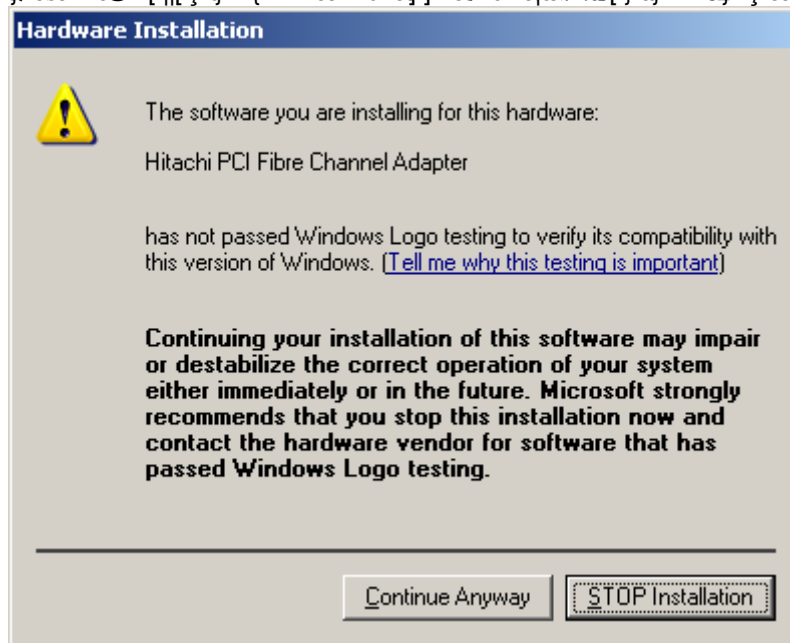
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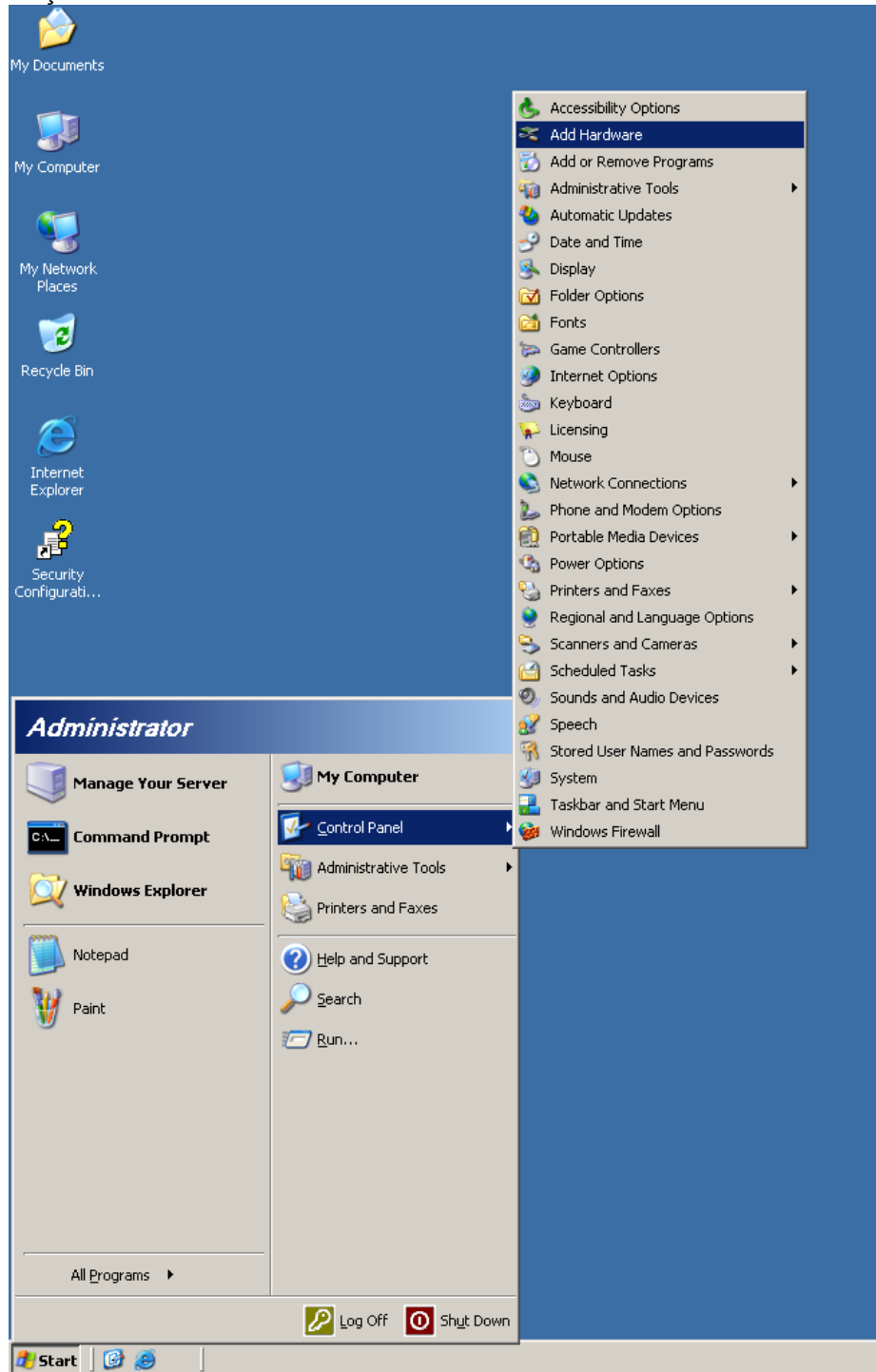
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Installation from Desktop

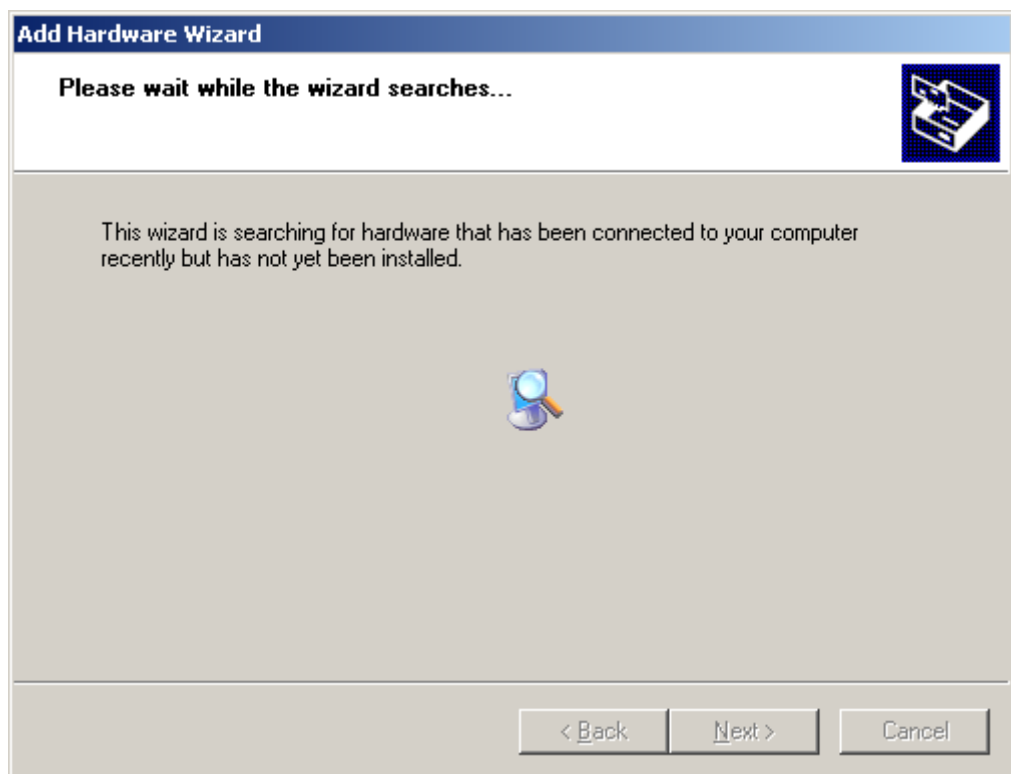
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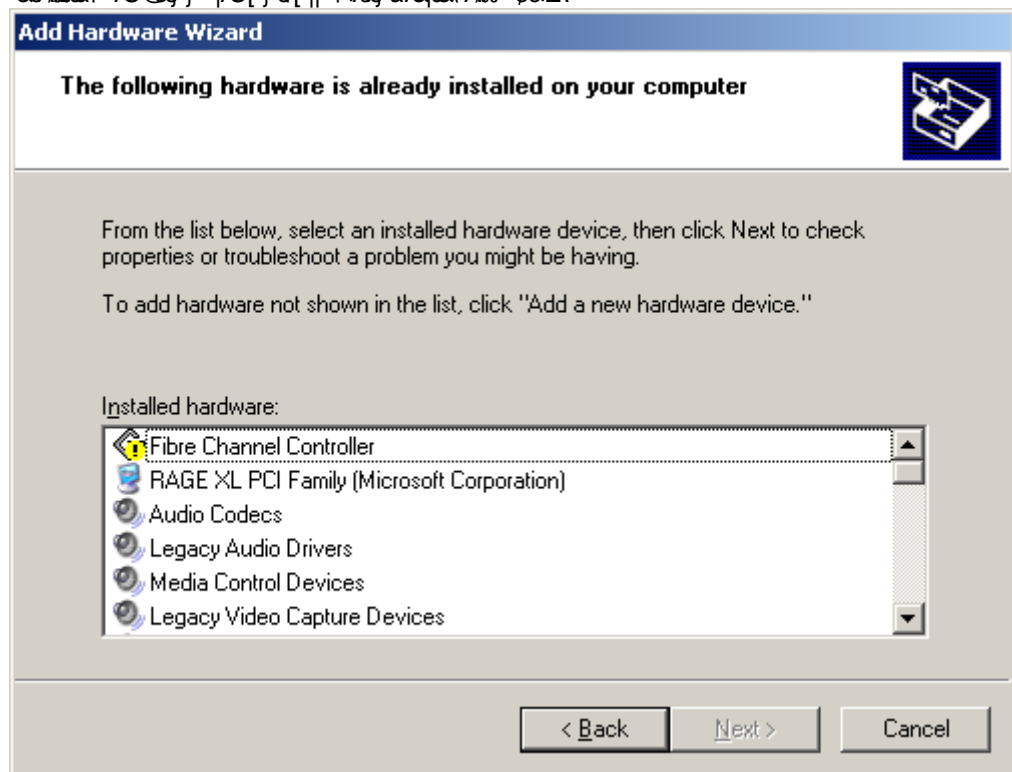
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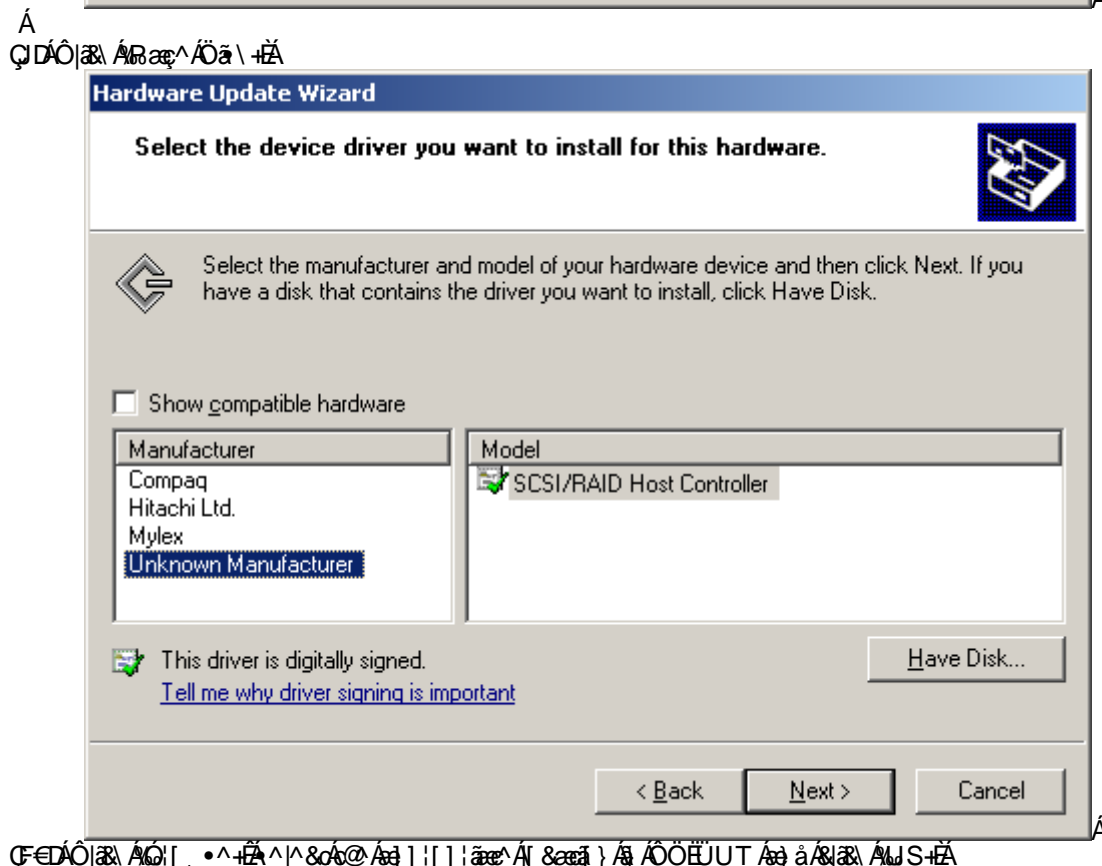
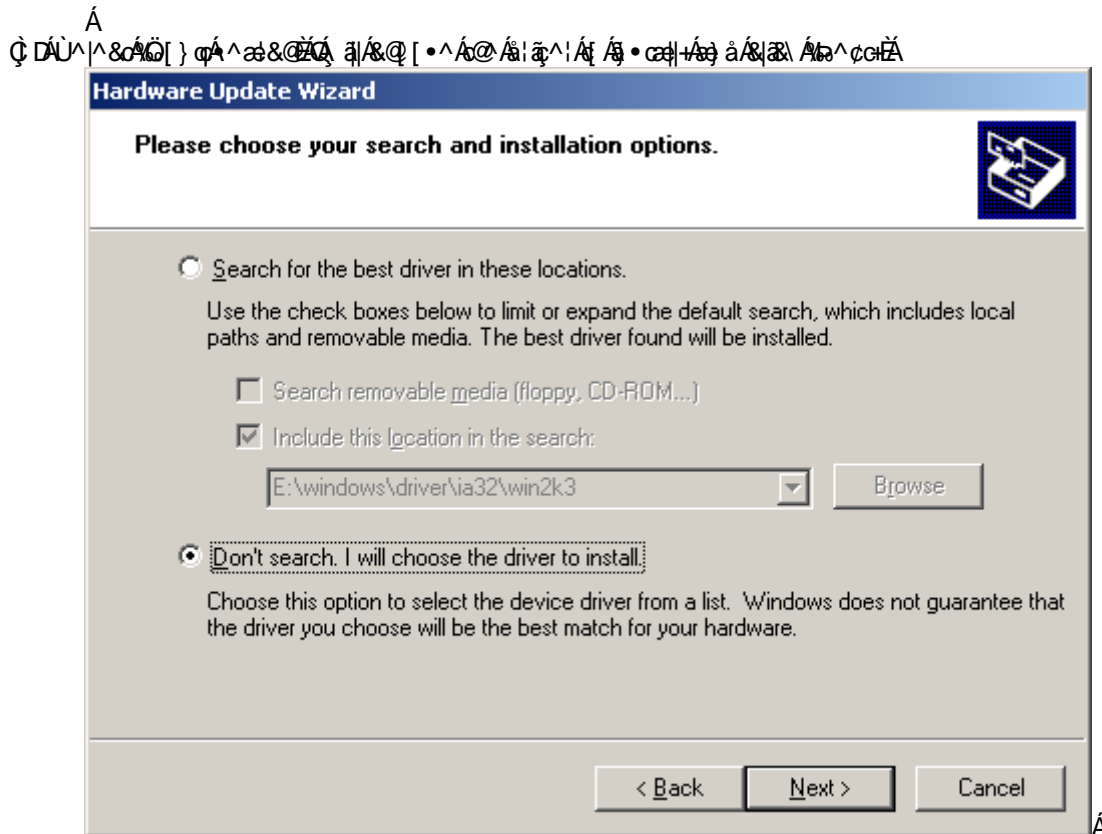


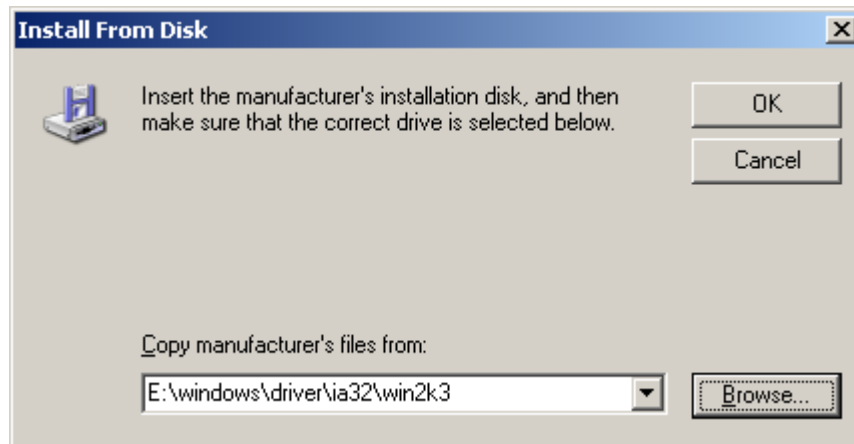
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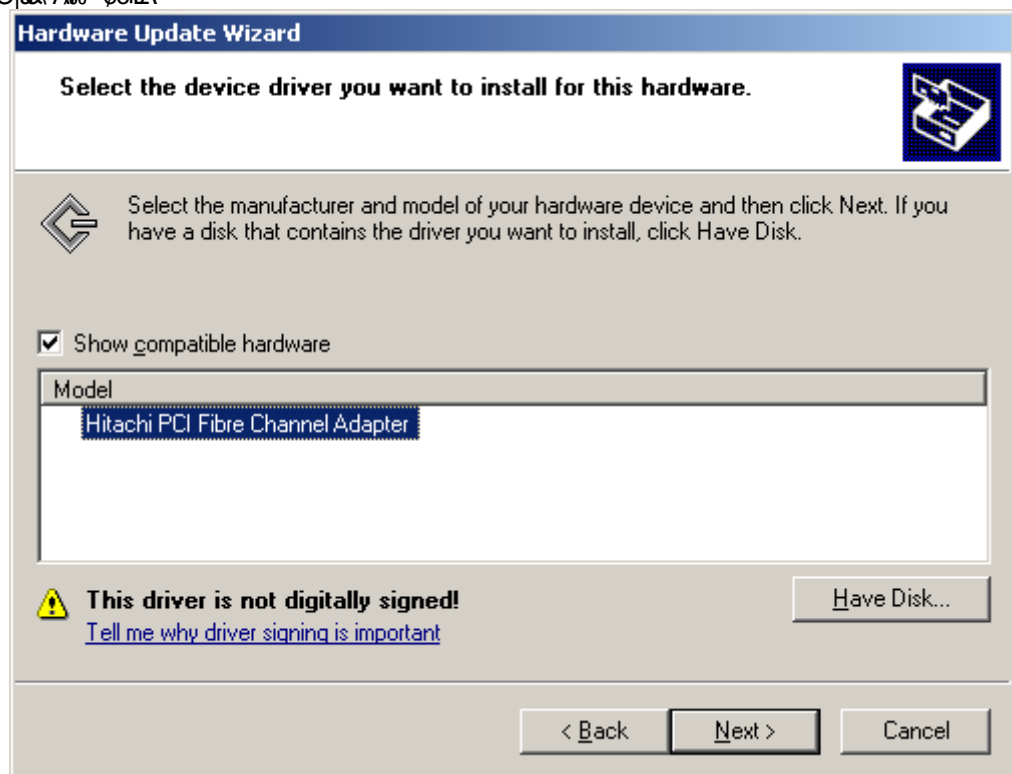
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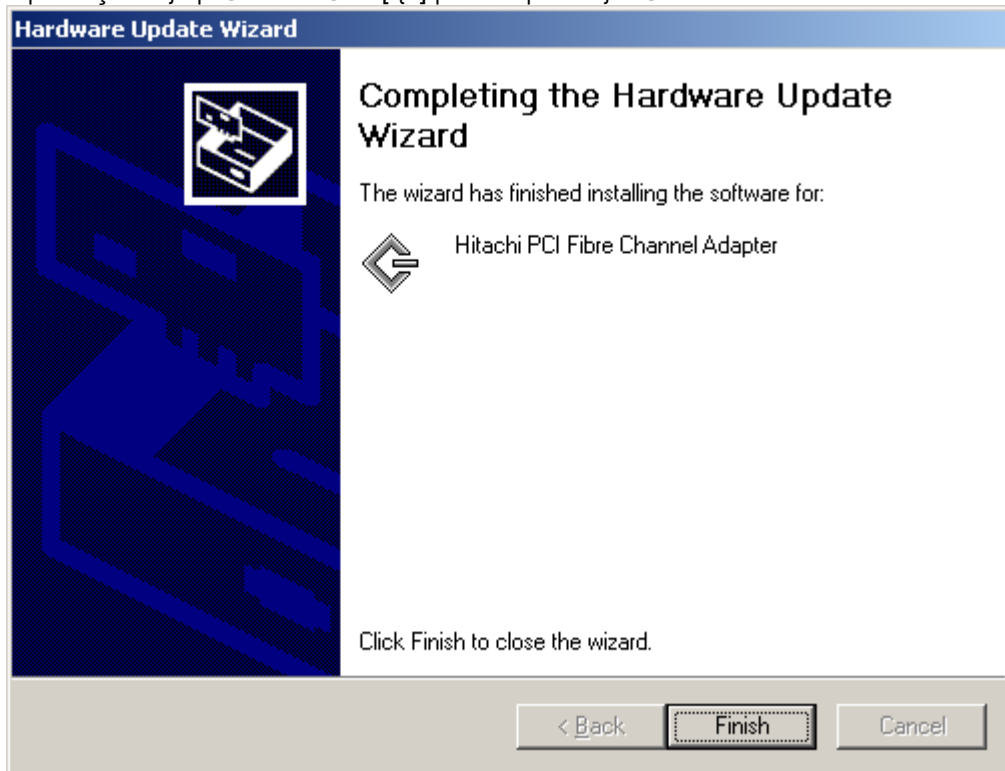
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FDÁU/æ^Á æÁ) qÁ@Á^æ&Ö/Á { }|c^áÉÖ/Á ÁÖ ā @Á



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Confirm the driver version

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ā•c/Á^á/æ&/!āā*Á Á@Á||[, ā*Á!| &ā^!•ÁÁ

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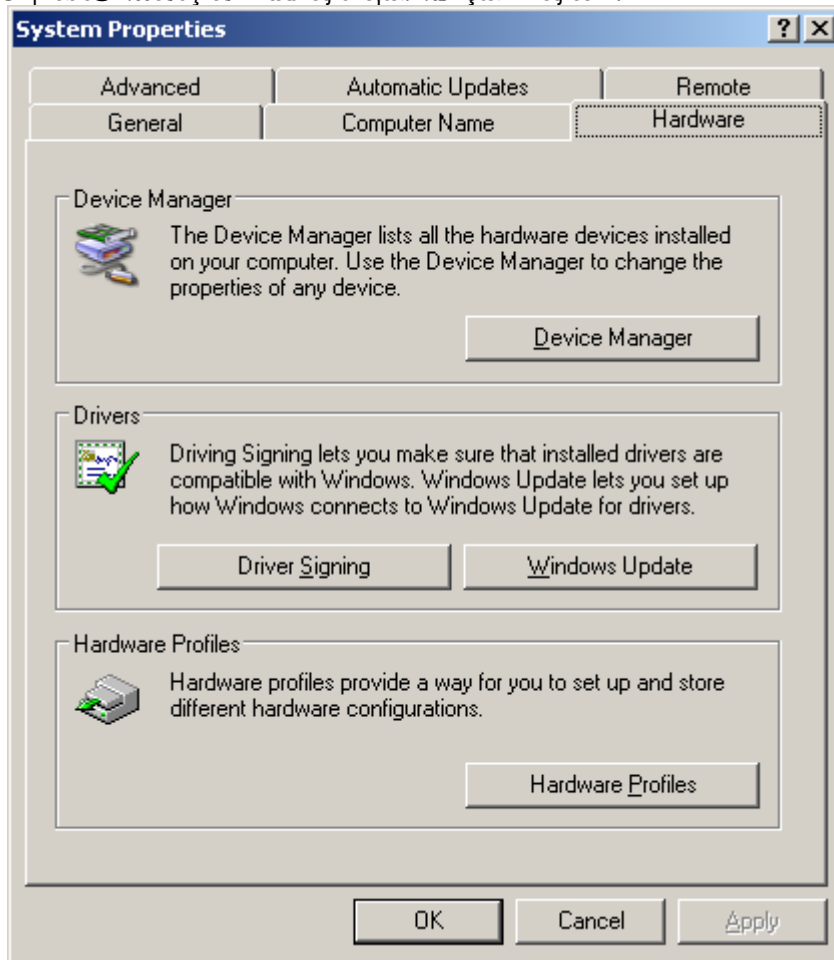
□Á How to confirm the driver version you intended to install

FDÁÜ^|&A@&_ ááÈ^•qÁ^Á áÁá @B|Á Á Á@Á] ^) Á : [] ^!c ÈÁ
GDÁÜ^^Á^ ááÁá áÁÁ } -á{ Á@ÁÁ^Á^!•q } ÈÁ

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□Á How to confirm the installed driver version on your system

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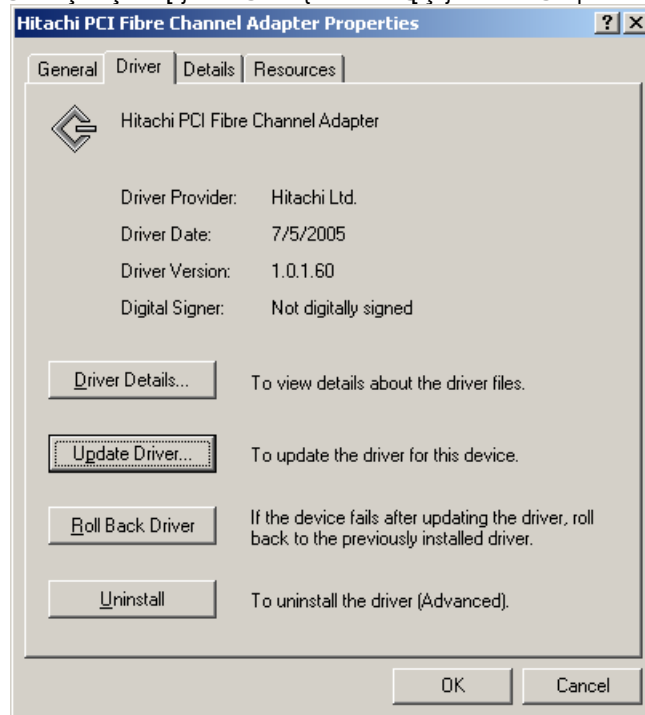
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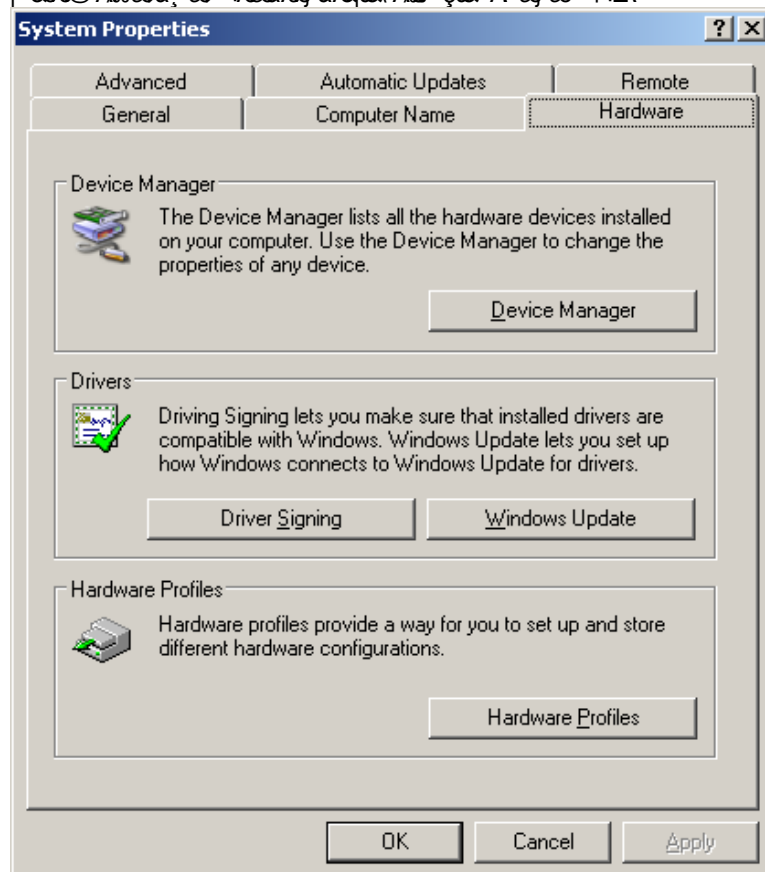
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Update driver

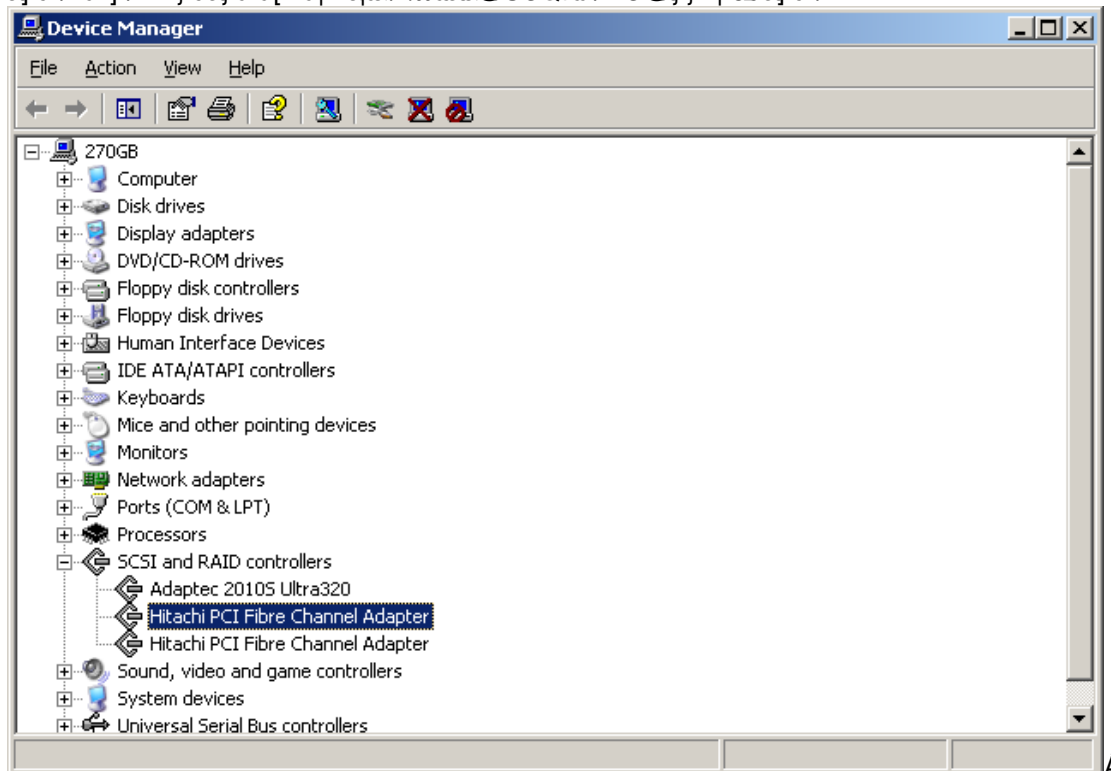
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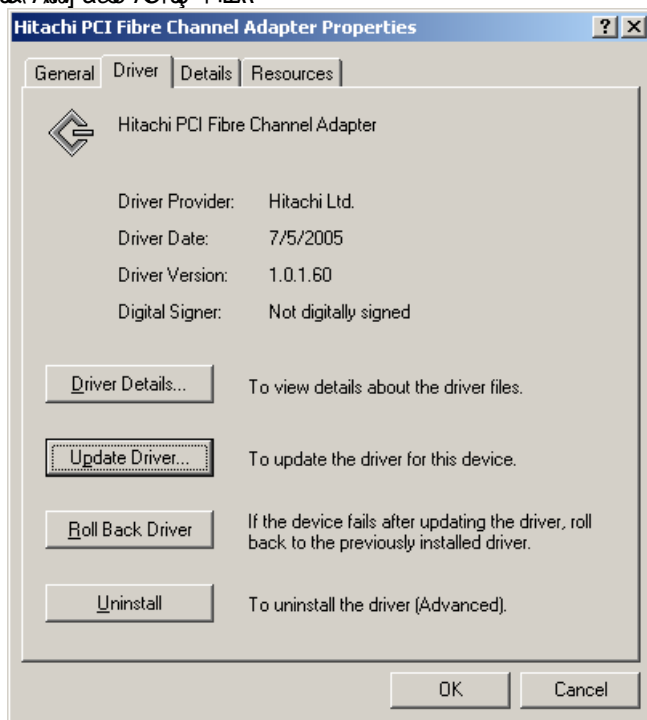
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Hardware Update Wizard

This wizard helps you install software for:

Hitachi PCI Fibre Channel Adapter

If your hardware came with an installation CD or floppy disk, insert it now.

What do you want the wizard to do?

☒ Install the software automatically (Recommended)

☐ Install from a list or specific location (Advanced)

Click Next to continue.

< Back Next > Cancel

Ç DÀÜ^ ^&0P [} çH^ æ&0PÁ q/ &Q [• ^Á@Á!á!Á! Á • çH^Áæ á&BÁ Áb^çHÁ

Hardware Update Wizard

Please choose your search and installation options.

☒ Search for the best driver in these locations.

Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.

☐ Search removable media (floppy, CD-ROM...)

☒ Include this location in the search:

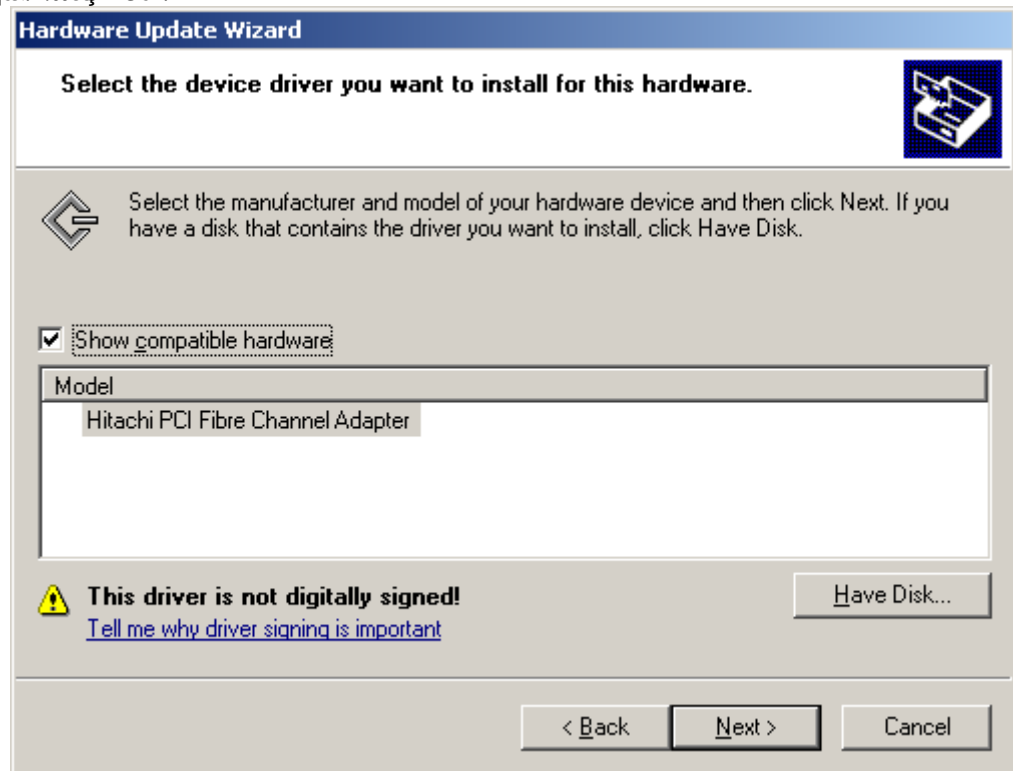
E:\windows\driver\ia32\win2k3 Browse

☒ Don't search. I will choose the driver to install.

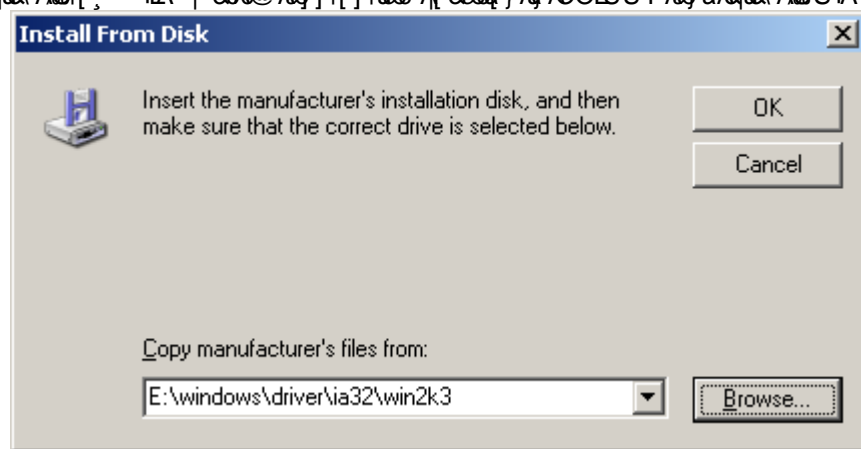
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.

< Back Next > Cancel

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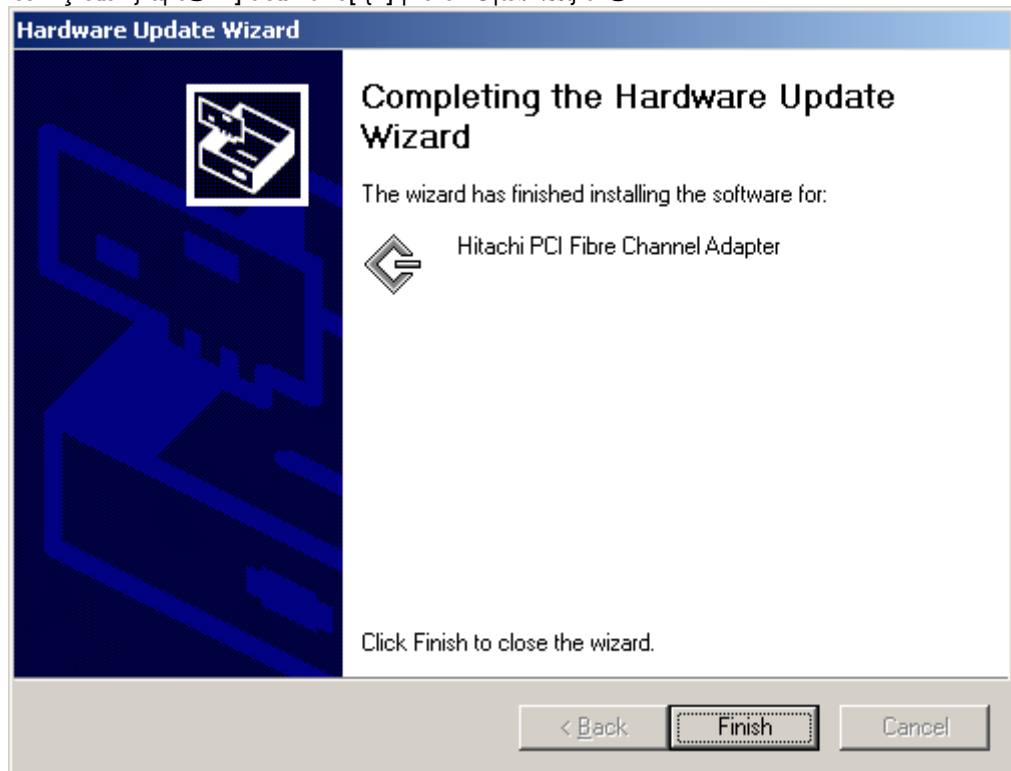
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Roll back to the previously installed driver

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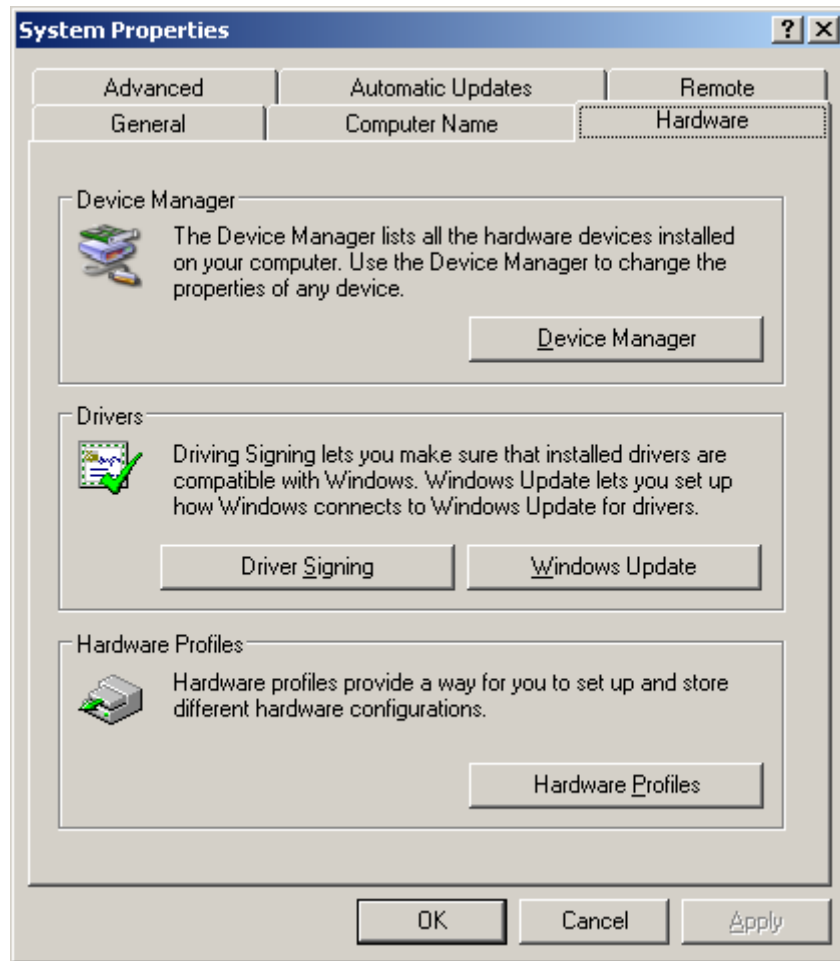
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Uninstall driver

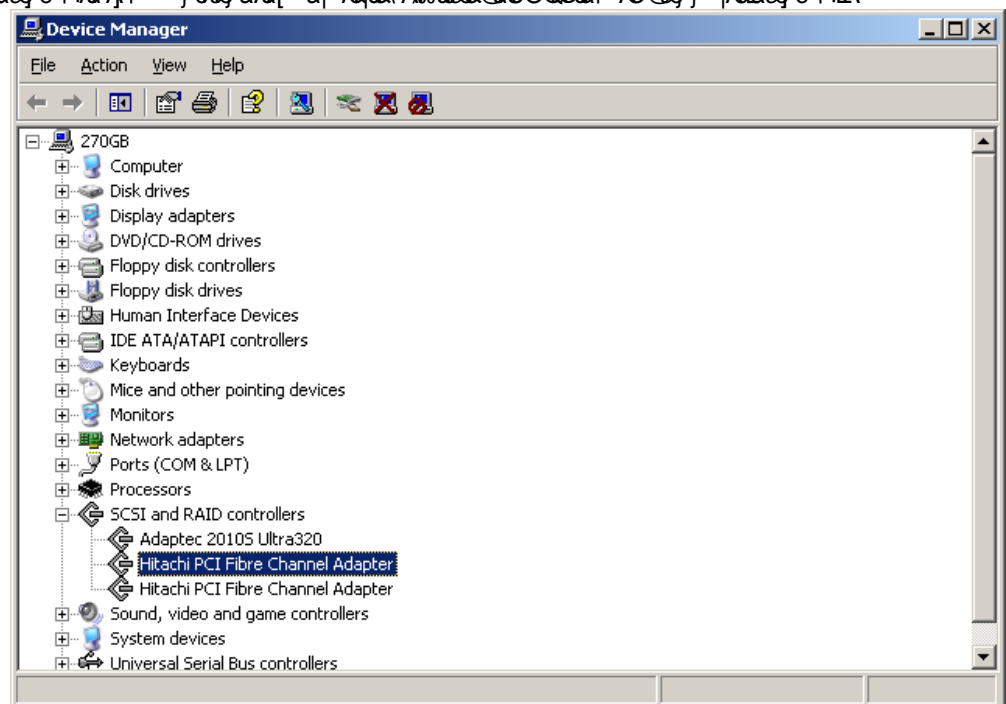
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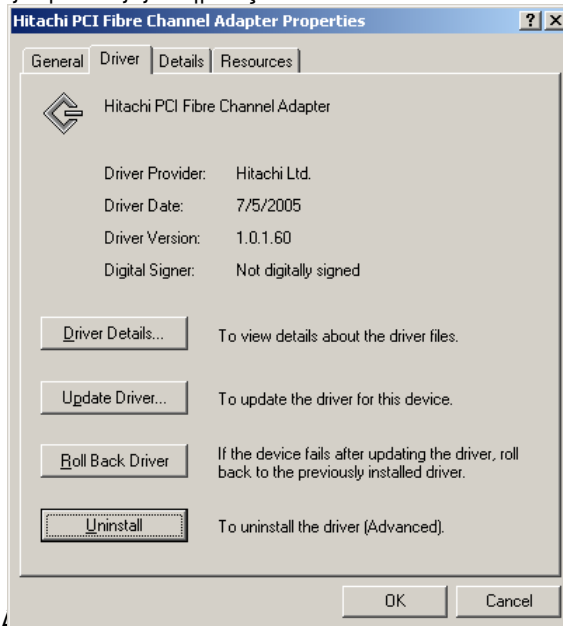


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OS installation procedure to the disk device connected with Hitachi Gigabit Fibre Channel Adapter

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Windows Server 2008, Windows Server 2008R2, Windows Server 2012 and Windows Server 2012 R2

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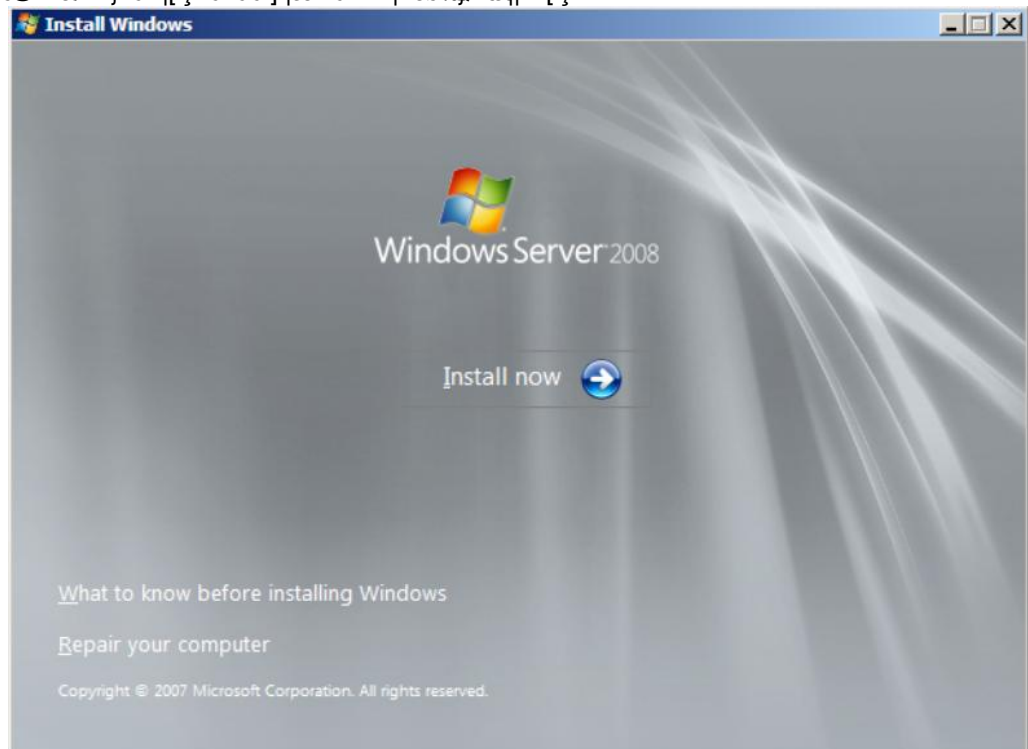
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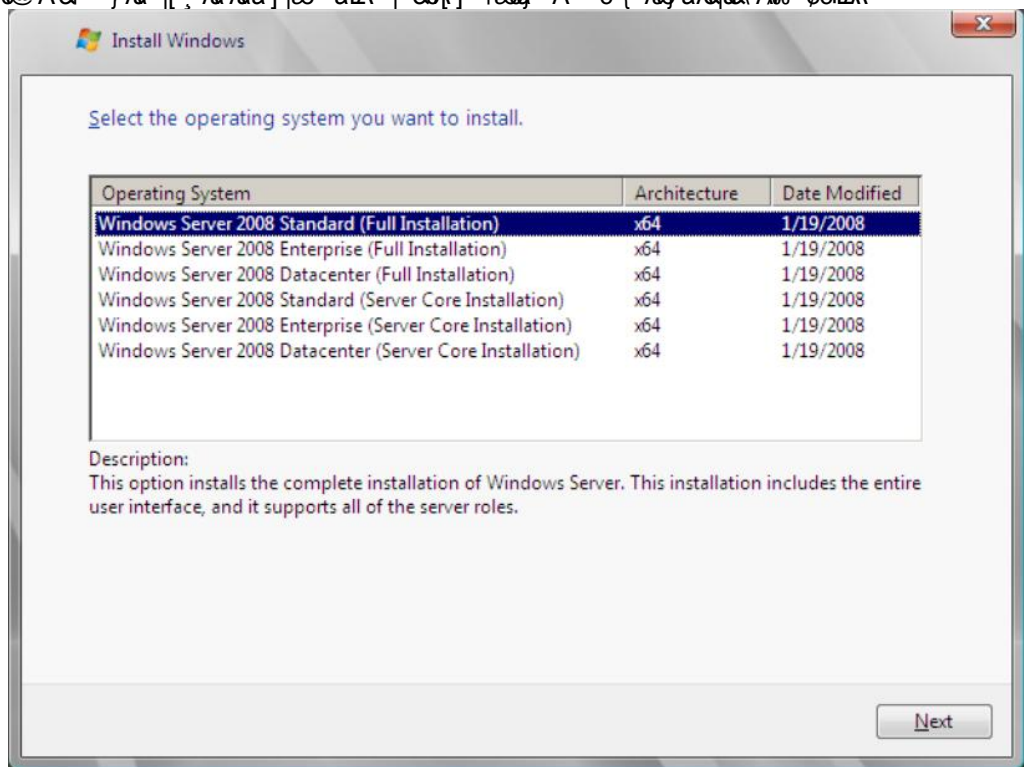
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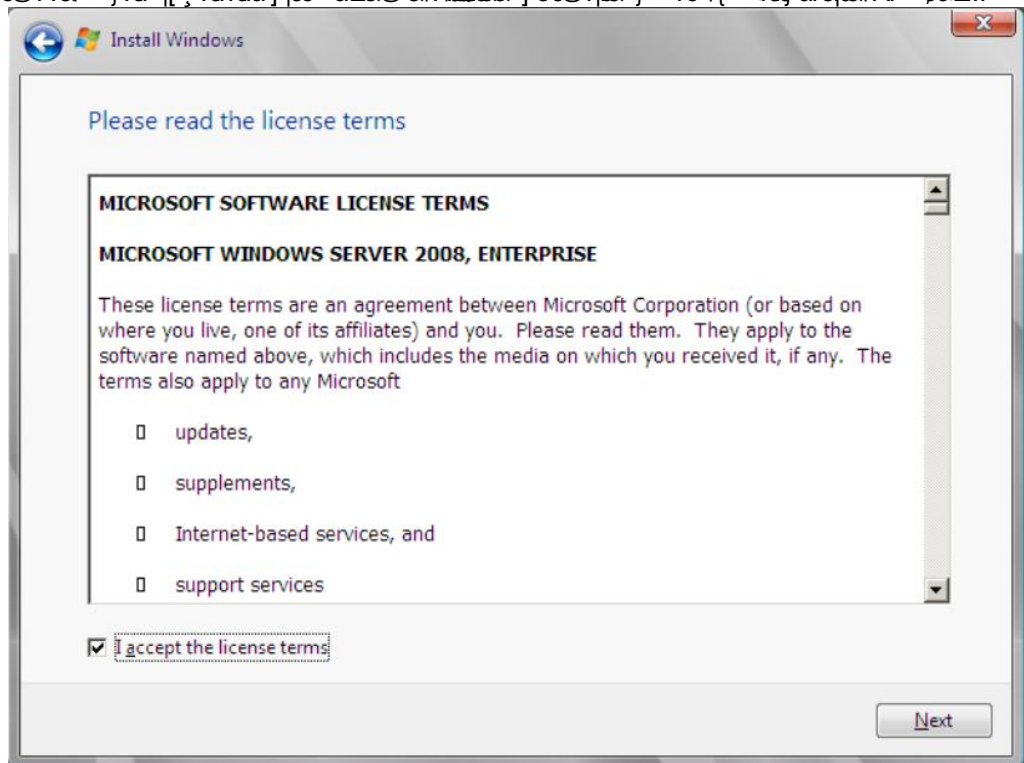


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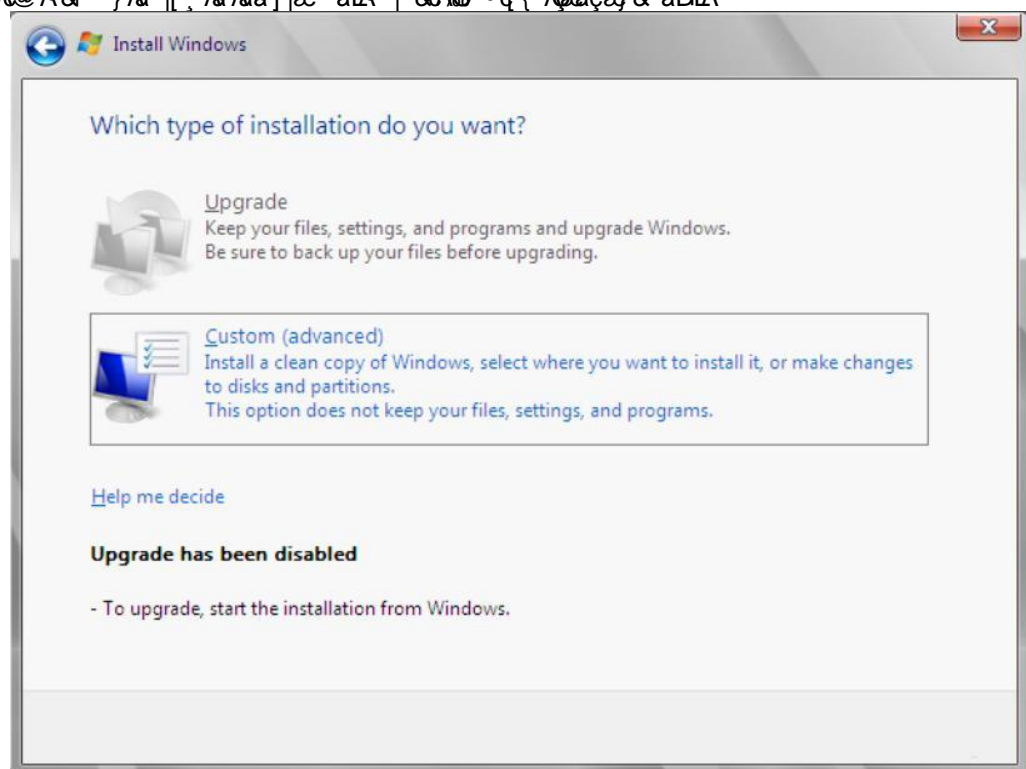


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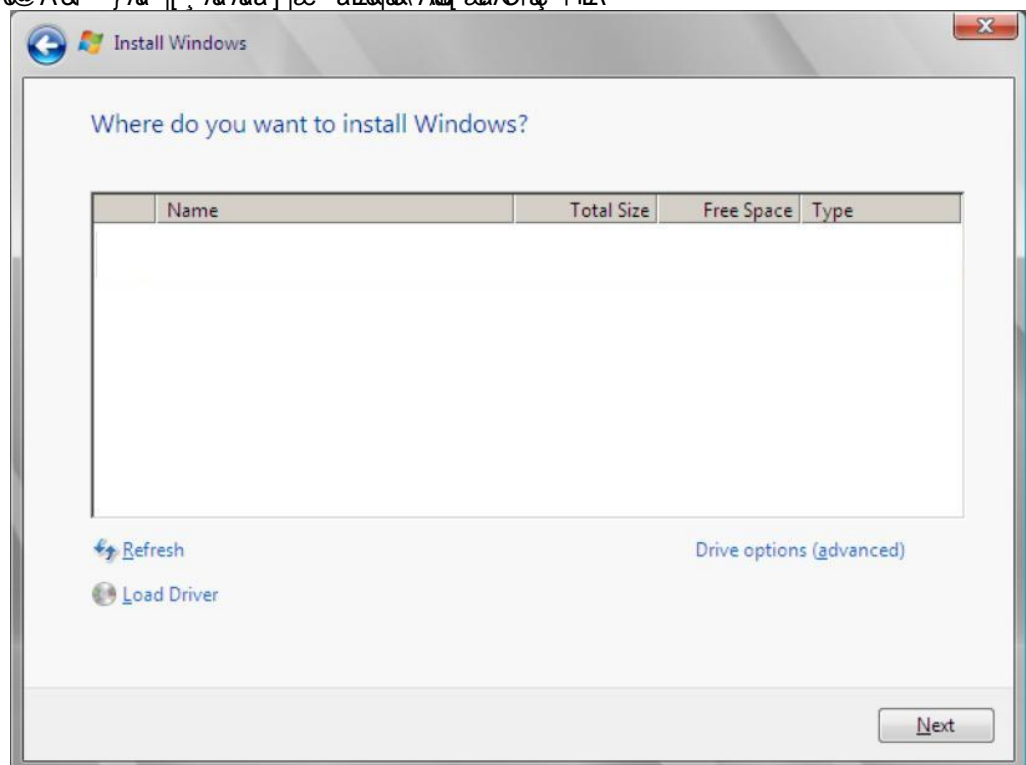


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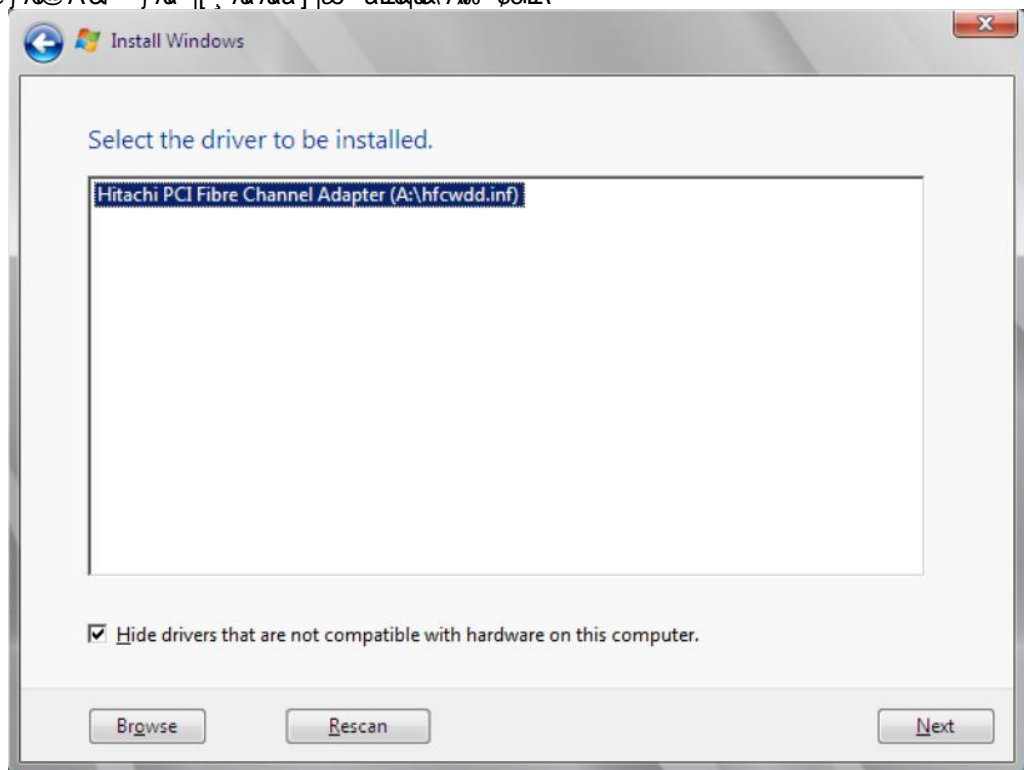
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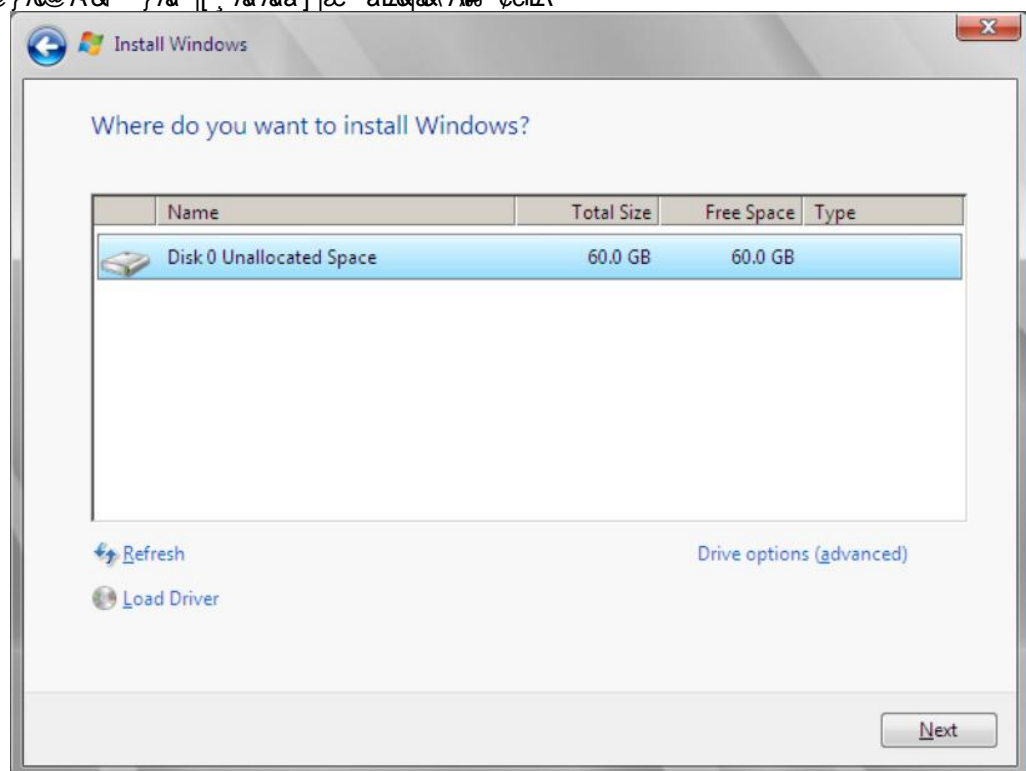


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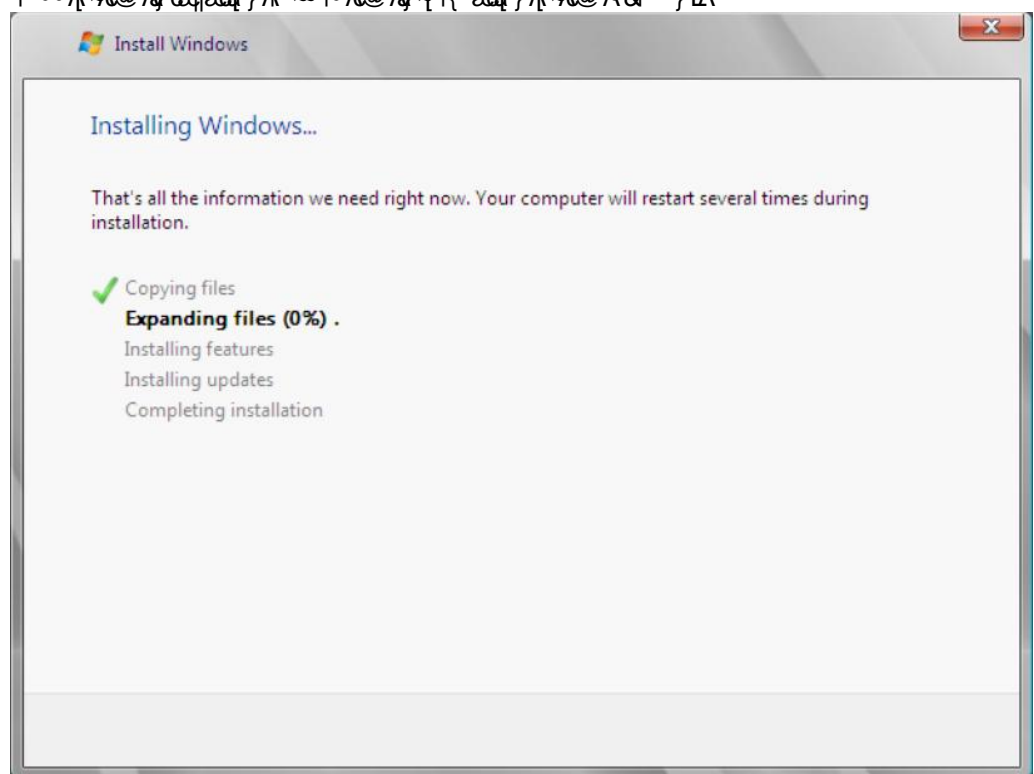


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Windows Server 2003

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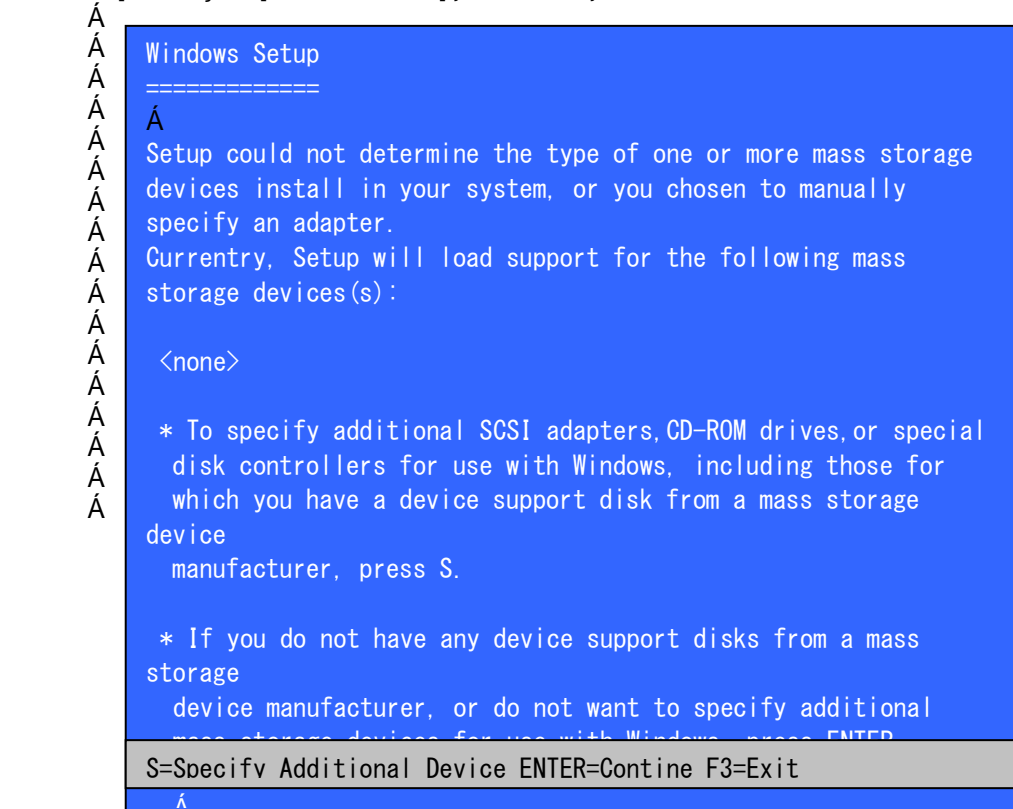
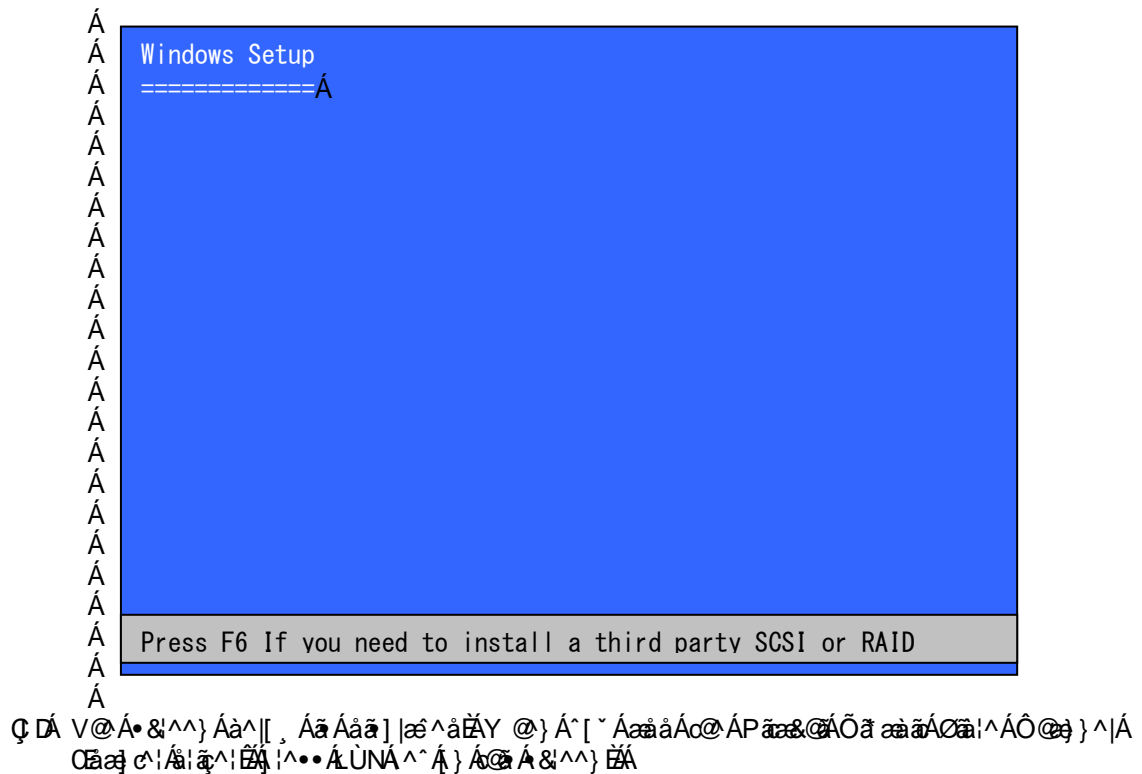
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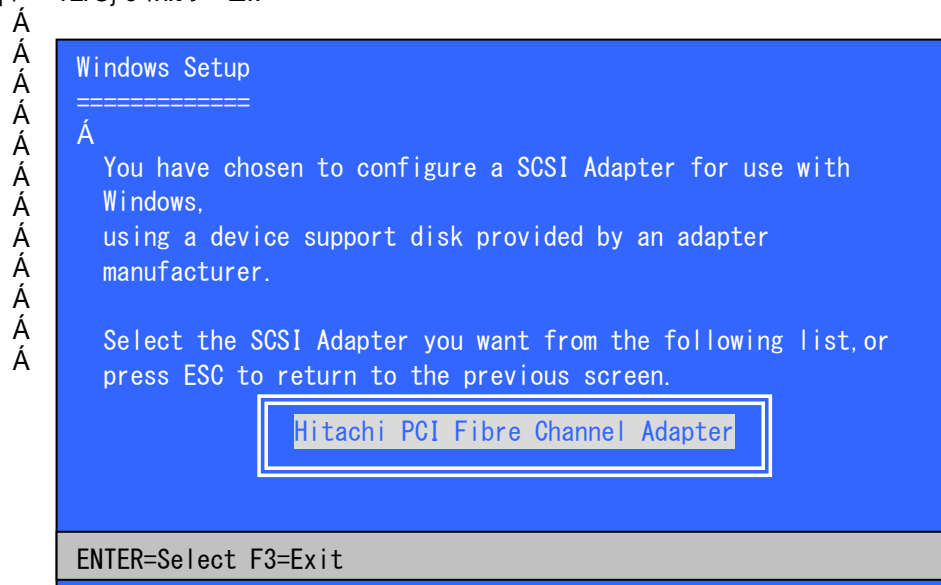
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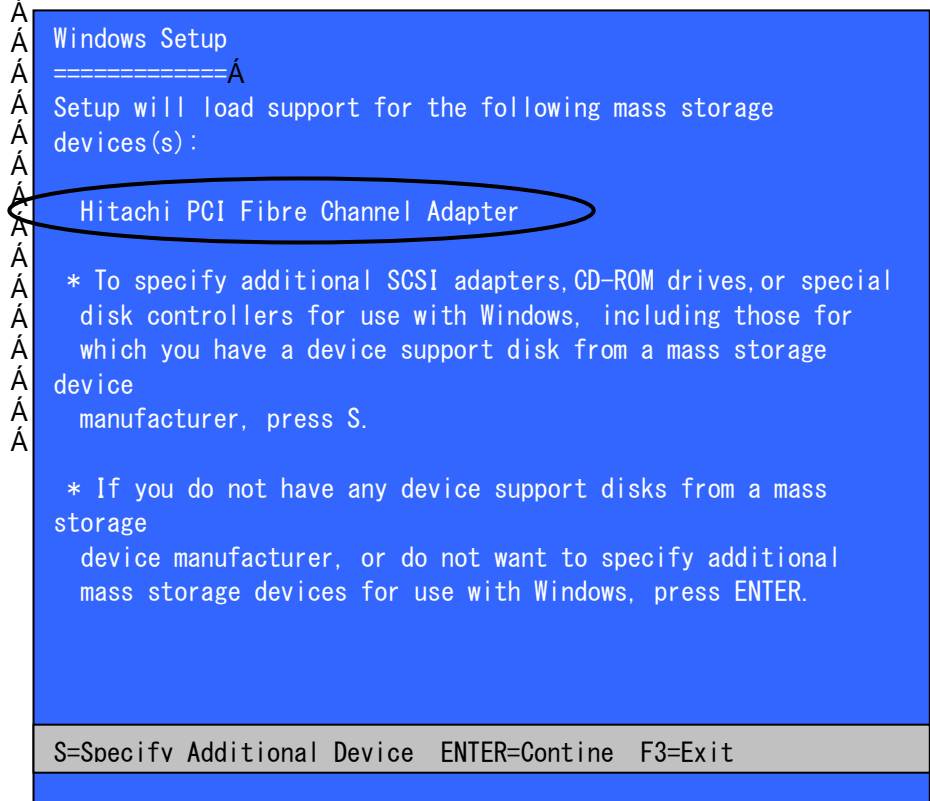
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Install utility software

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Bug Report: Uninstallation of HFCTools causes improper deletion of Registry.

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■ **Do not** á•ç!Á@Á][, á*Áç!•á}Á-Ö!ç!^ÁáÁPØV[[!Á @Öá•^Á@Á!&á~!Á

■ **Do not uninstall** ç@ÁPØV[[!•Á @}Á[~Áç^Áç!^ááÁ•ç!^Á@Á][, á*Áç!•á}ÁÖ
Uç!, áÁ@Á~*áÁ!^Á^ÁÁPØV[[!•Ö!ÁÁç!Ö^ÁÁPæáÖáááÁ!ÁÖ}Á
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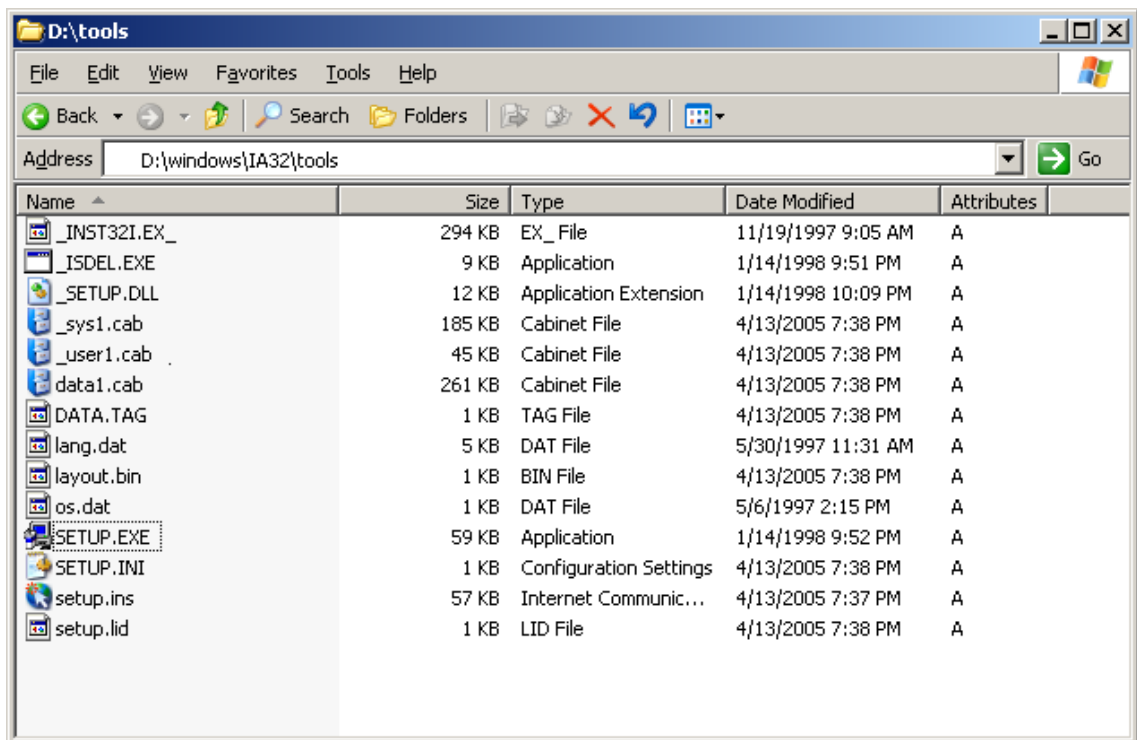
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Install the utility software using GUI

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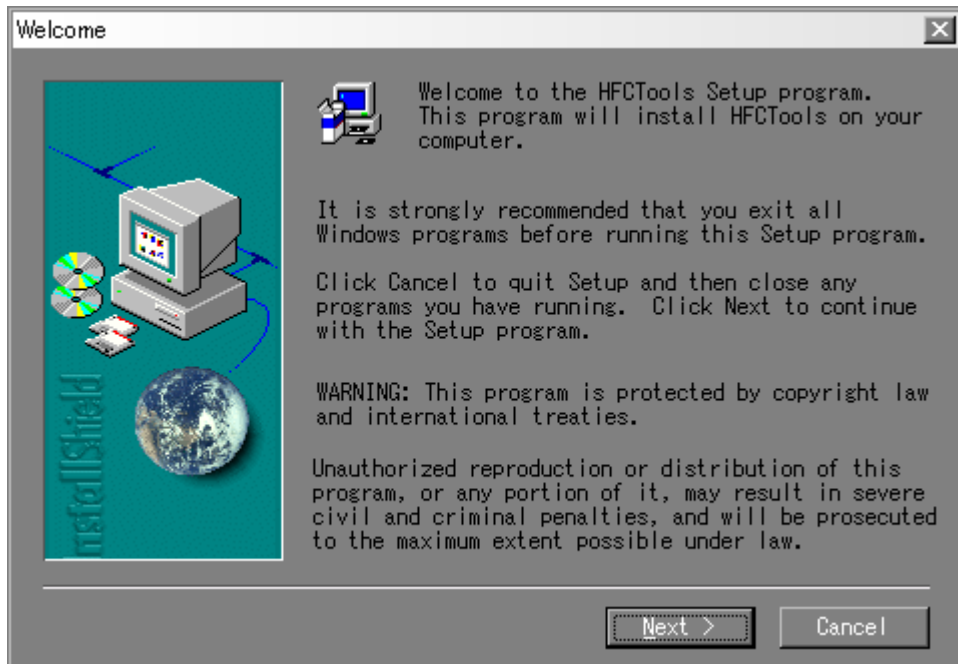


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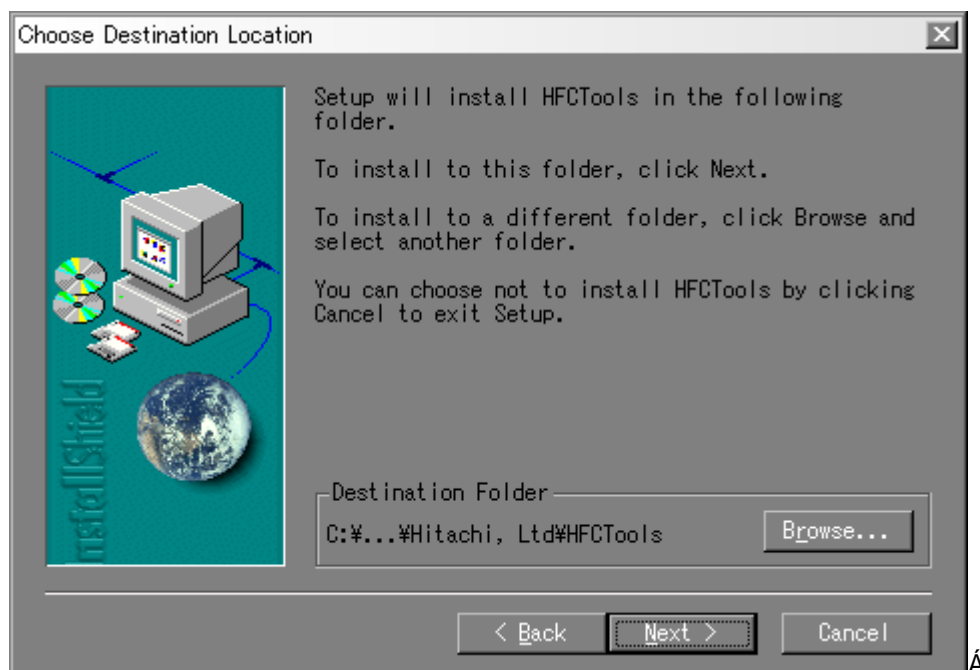
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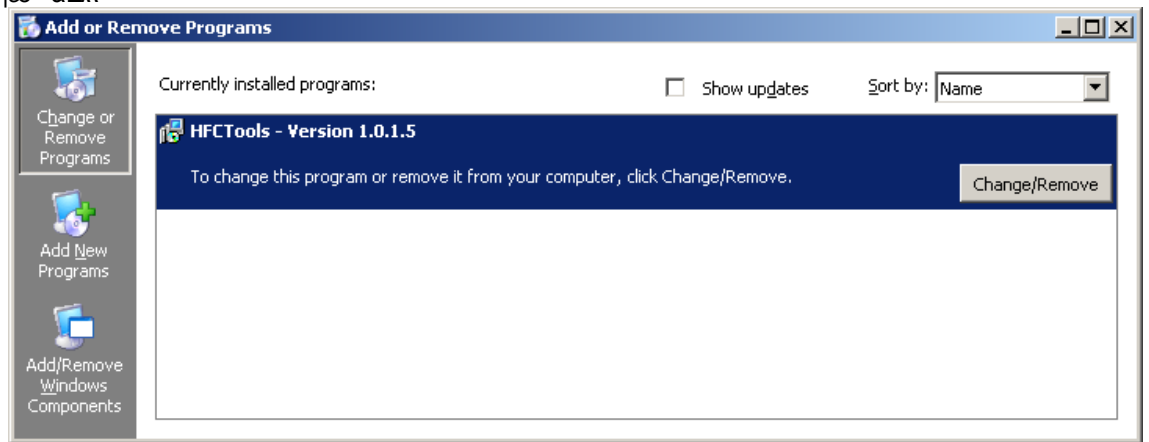
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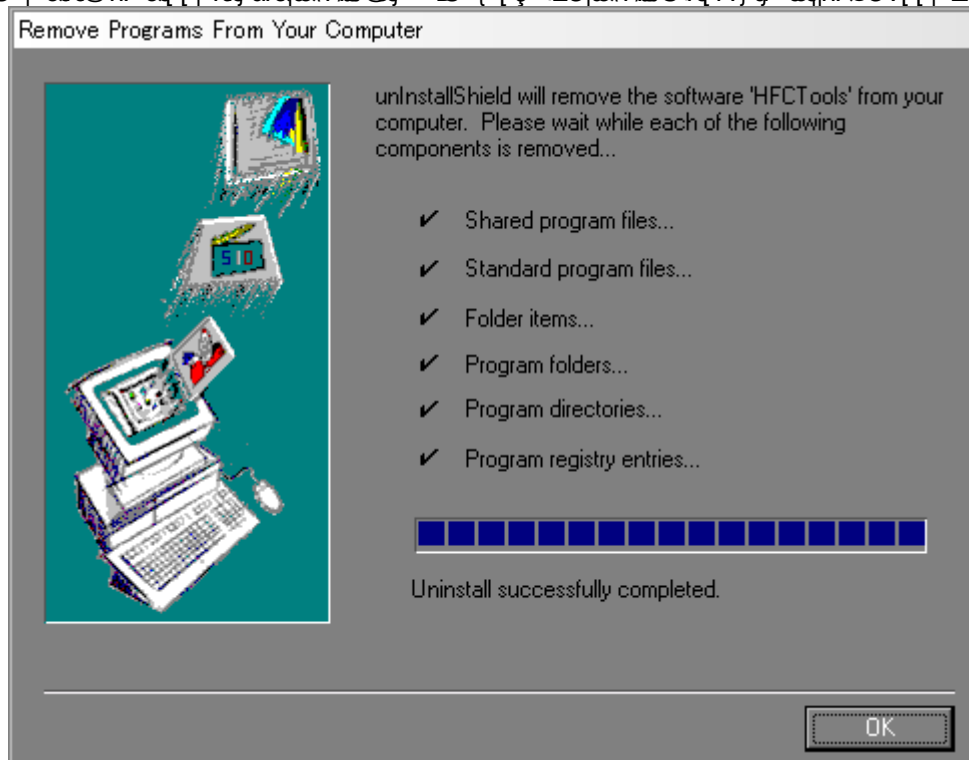
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Uninstall utility software using GUI

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Uninstall the utility software with silent mode

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 FĐÁŎ [] ^ Á cđ □ nstalledsly intalled utility software package to the local directory. In this example, the local directory is "C:\temp\hfctools".

- (2) Start "Command Prompt", and change current directory to the local directory.
- (3) Execute the following command.

```
C:\Temp\hfctools> start /w c:\Temp\hfctools\setup /s /uninst -f1"c:\Temp\hfctools\uninst.iss"
-f2"c:\Temp\hfctools\setup.log"
```

-f1: the directory of the "inst.iss" file (full path)

-f2: the directory of the log file (full path) (This option can be omitted.)

If you omitted the "-f2" option, the log file is generated the same directory as "inst.iss" file

Don't be the blank between "-f1" and "-f2".

- (4) Check the value of "Result Code" belong to "Response Result" section is zero to confirm that the utility software was normally uninstalled. If "Result Code" is not zero, you confirm the following terms, and execute above (3) command.

- Whether you executed the command exactly or not.

- (5) Reboot the Windows OS

7

Set Parameters for Hitachi Gigabit Fibre Channel Adapter

The Hitachi Gigabit Fibre Channel Adapter provide the functions that the user can set various parameter values.

Usually these parameters do not need to change.

How to set driver parameters

Use hfcmgr or hfcutil to set driver parameters. Parameters and their meaning supported by the driver are shown below.

See 'Hitachi Gigabit Fibre Channel Adapter User's Guide' (Utility Software Edition)' for the command line of hfcmgr and hfcutil, the set values and the detailed explanation of each driver parameter.

No	Parameter	Default value	Available setting value
1	Connection Type (*1)	Auto	Auto Point to Point FC-AL
2	Link Speed (*2)	Auto	Auto 1Gbps 2Gbps 4Gbps 8Gbps
3	Max Transfer Size	16MB	1MB 4MB 8MB 16MB 32MB
4	Link Down Time	15(sec)	0-60(sec)
5	Reset Delay Time	7(sec)	0-60(sec)
6	Machine Check Retry Count	8(times)	0-10(times)
7	Preferred AL-PA Number	0x01	0x01 0x17 0x02 0x18 0x04 0x1b 0x08 0x1d 0x0f 0x1e 0x10 0x1f
8	Scatter / Gather List Count	255	16-255
9	MSCS Mode	0	0:disable 1:enable
10	Queue Depth per LUN	32	1-254

(*1) If you use the FC port as FC shared mode, set below.

- When you connect the FC port and the storage device through FC switch, set Connection Type to Point to Point.
- When you connect the FC port and the storage device directory, set Connection Type to FC-AL.

(*2) When you use extension card mounted on Hitachi Compute Blade 320, you must set DATA RATE to the fixed value. Setting DATA RATE to 'Auto' is permitted. For details, See Hitachi Compute Blade 320 User's Guide.

8

Error log collection program (errord)

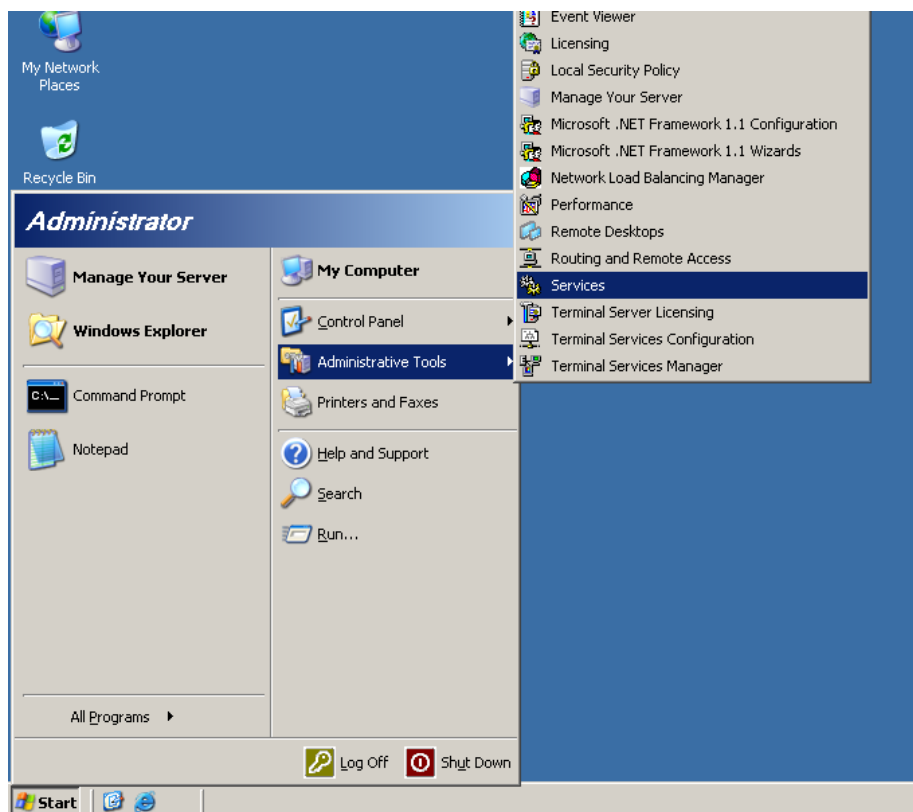
The Hitachi Gigabit Fibre Channel Adapter provides the error log collection program(errord) to collect failure information (error log) when the various failures occurred. Normally this program is registered and started automatically when the utility software is installed and you do not have to initiate this service.

You can restart the program manually according to the following procedure when the program stops by error.

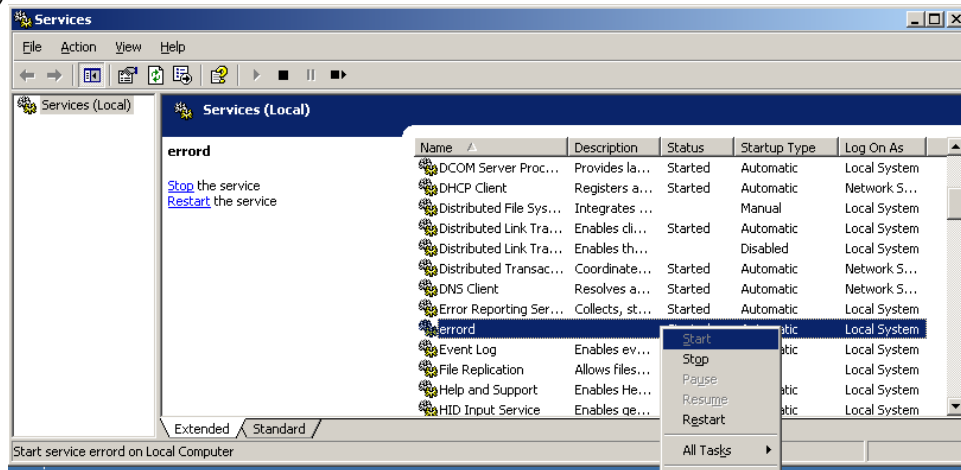
Note that the errord starts when system is booted or the utility software is installed. If the errord is not started, you may not collect enough information to analyze the failure. Confirm the errord is started referring the following procedure.

Start the program

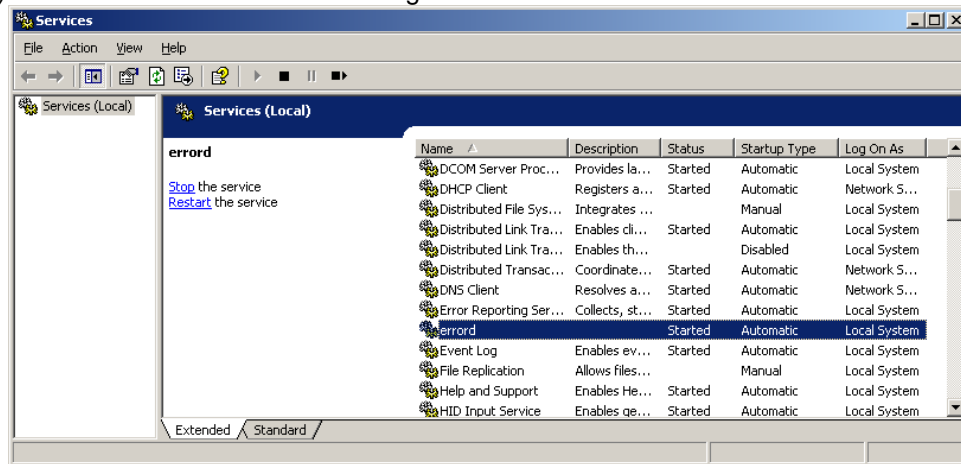
- (1) Click "Start", select "Administrative Tools" and "Services".



(2) Click "error" and select "Start" tab.

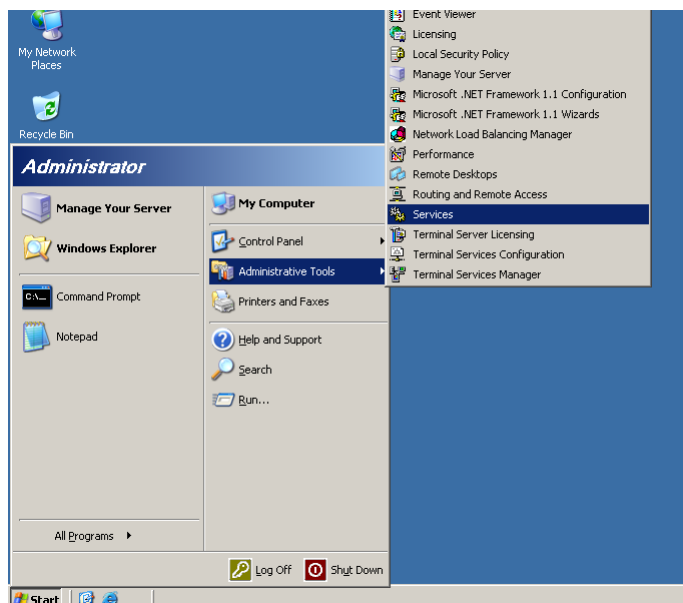


(3) Confirm that the status has changed into "started".

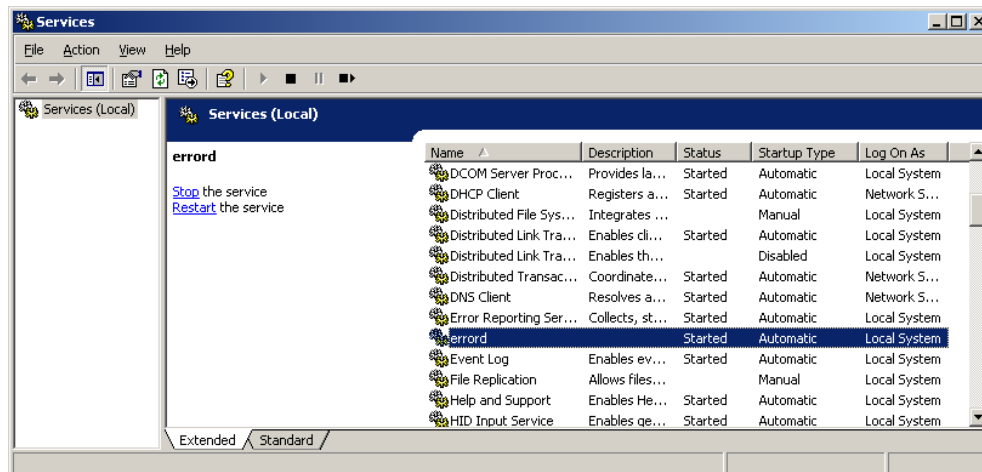


Confirm the program status

(1) Click "Start", select "Administrative Tools" and "Services".



(2) Confirm that the status of "error" is "started" status.



(3) In case of the status is "not ready" or Stopped, please initiate the error (error detection service program) in referred to the "Start" the program".

Start the error and confirm its status (Server Core)

There are two ways to start the error and confirm its status on Windows Server 2008.

- (1) Use MMC to start or confirm the error through the remote PC.

MMC(Microsoft Management Tool) on remote PC can manage the error service and confirm its status on Server Core using GUI interface describing in Start the program. The settings how to use MMC on Server core and remote PC, see Windows OS manuals for details.

- (2) Execute command directly on Server core.

Execute 'sc query' command and find the service that SERVICE_NAME is error. If its STATE is RUNNING, error has been started.

```
C:\>sc query state=all
```

If STATE is STOPPED, the error is not working. Execute the following command to restart.

```
C:\>net start error
```

9

Error log information

The Hitachi Gigabit Fibre Channel Adapter provides the functions to gather the failure information (error log) when the various failures occurred.

The Hitachi Gigabit Fibre Channel Adapter collects various kinds of log information using the Windows event log function. Windows driver collects the following log information.

Log information (Windows event log) that can be referenced using Windows Event Viewer

Detailed log information (detailed log) linked to the log information of (1)

The detailed log information (2) is only collected when the error log collection program (errord) is installed and a service started. Normally the errord is registered and started automatically when the utility software is installed and working as resident service.

If you use the HFCTools whose version is 1.0.1.19 or later, you can use hfcras.bat. Executing 'hfcras.bat' enables you to get (1)Log information and (2)Detailed log information together at once.

Windows Event Log

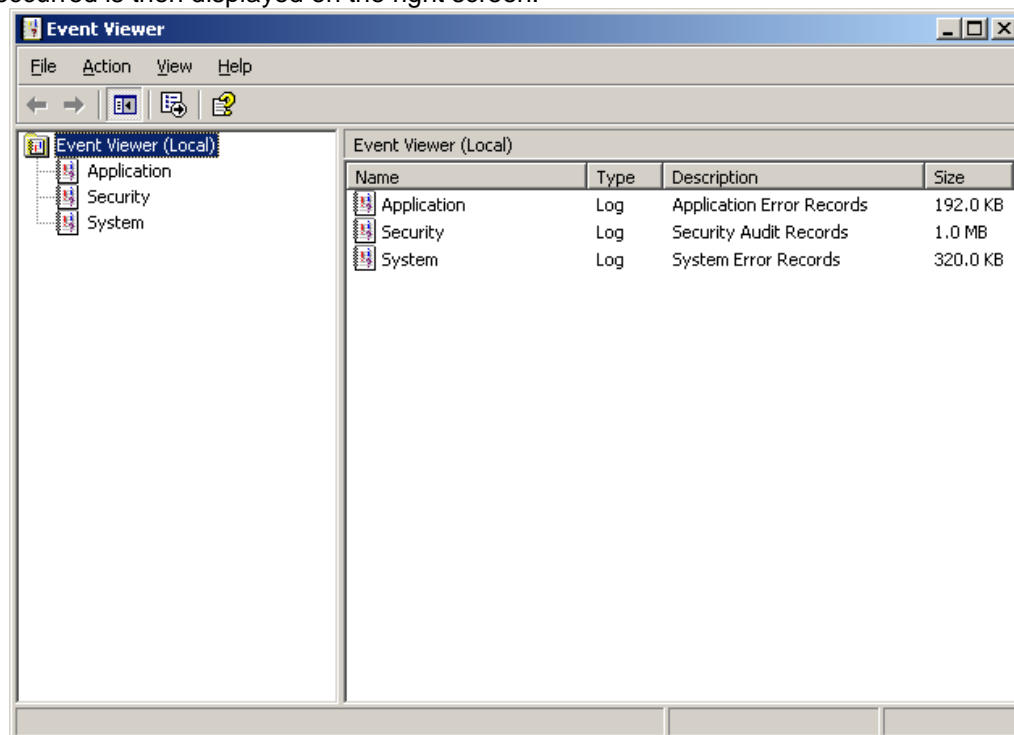
Error log information is "recorded" in "Event log" and can be referred to by "Event viewer". Moreover, detailed information can be referred to by double-clicking each entry.

< Procedure for referencing the event log >

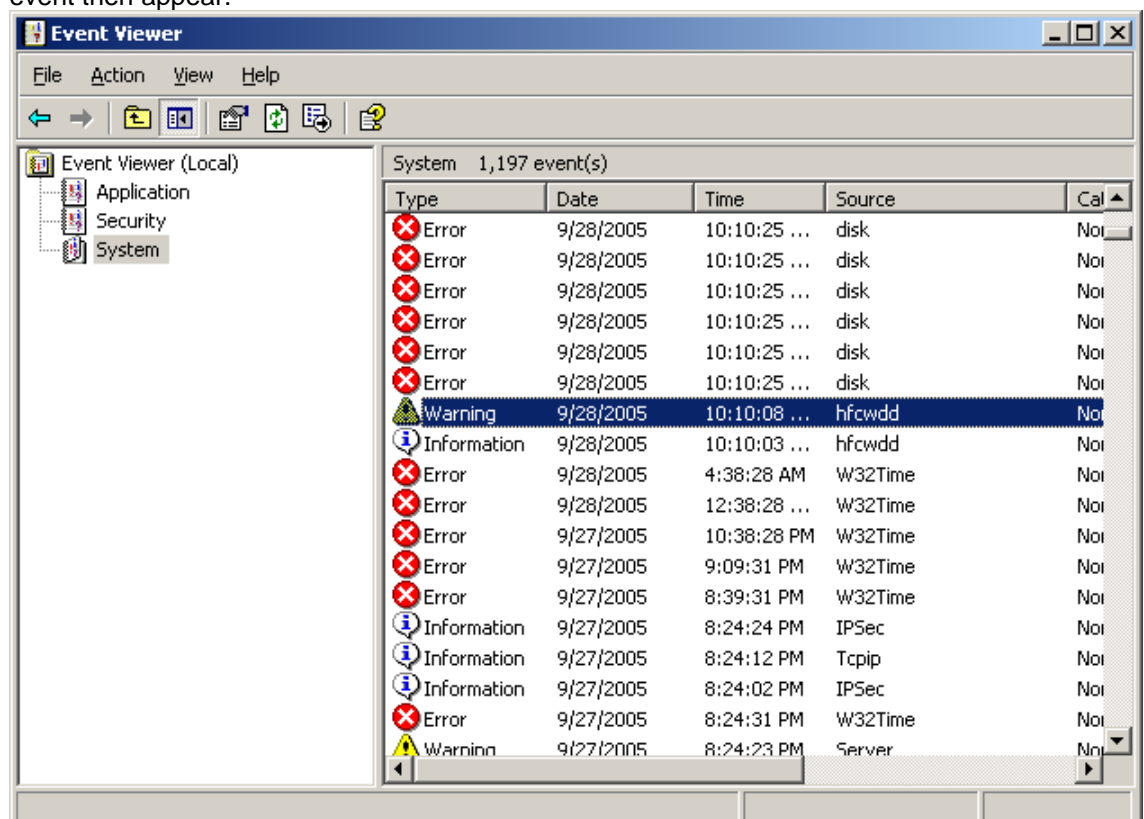
(1) Select "All Programs" on the "Start" - "Administrative Tools" - "Event Viewer" on the menu.

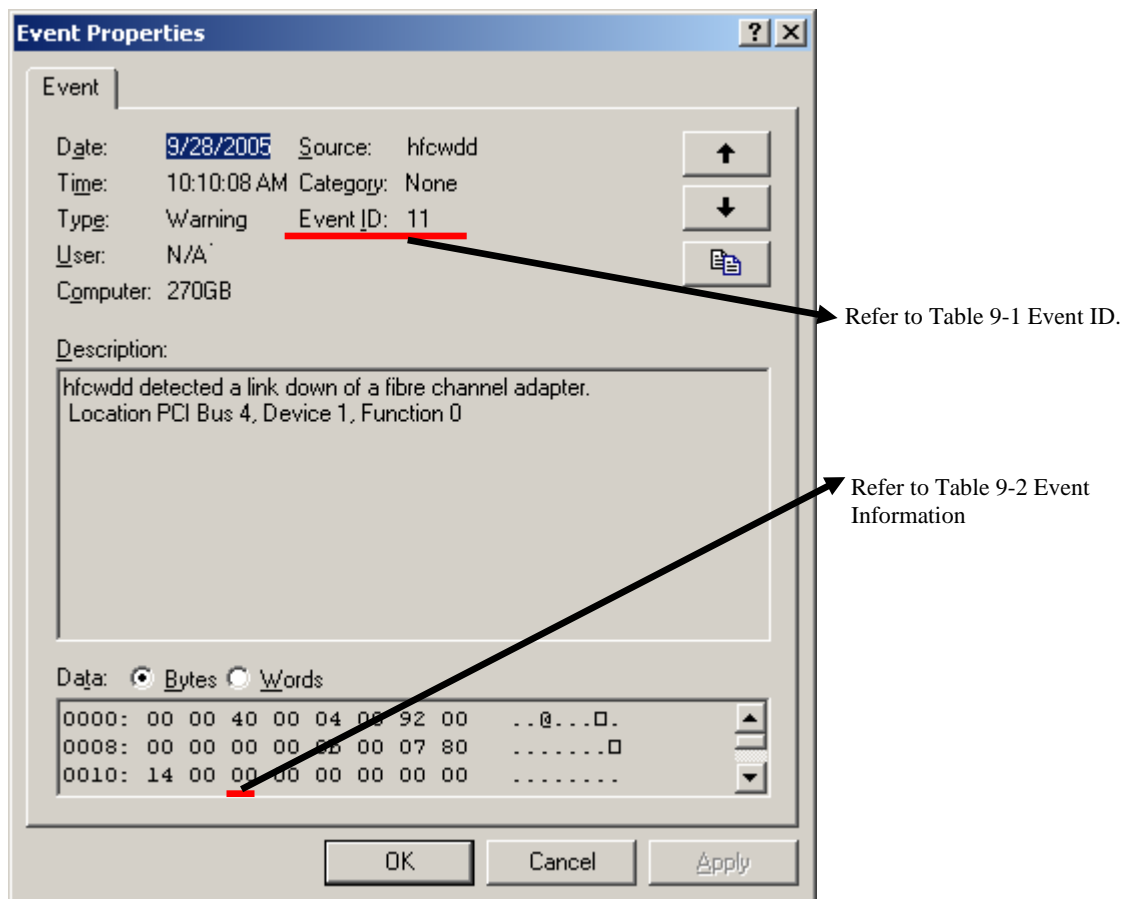


- (2) If you click "System" on the left screen of "Event Viewer", the information on events that occurred is then displayed on the right screen.

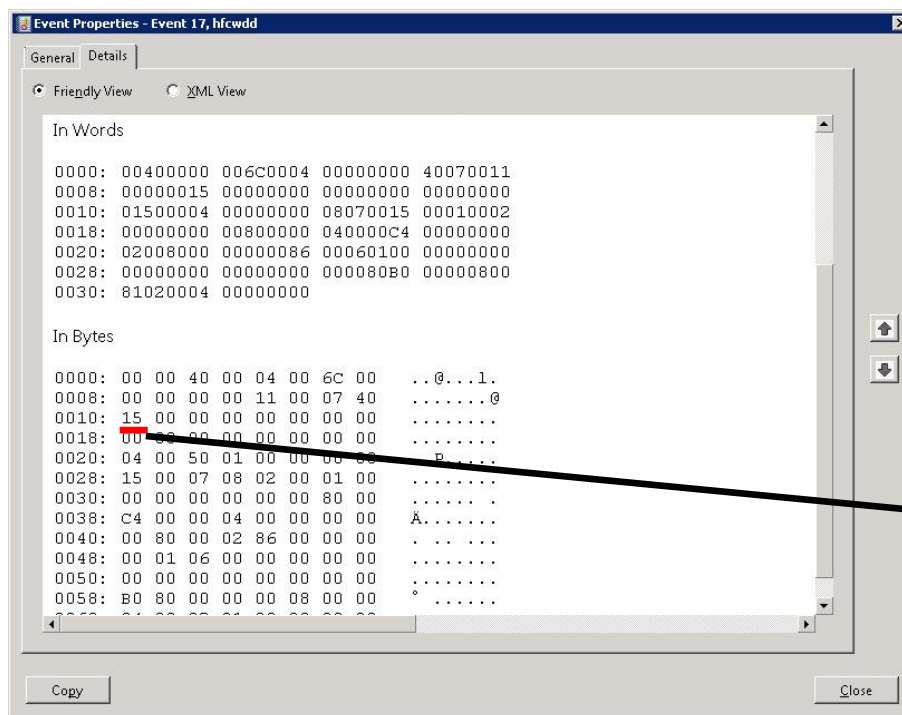
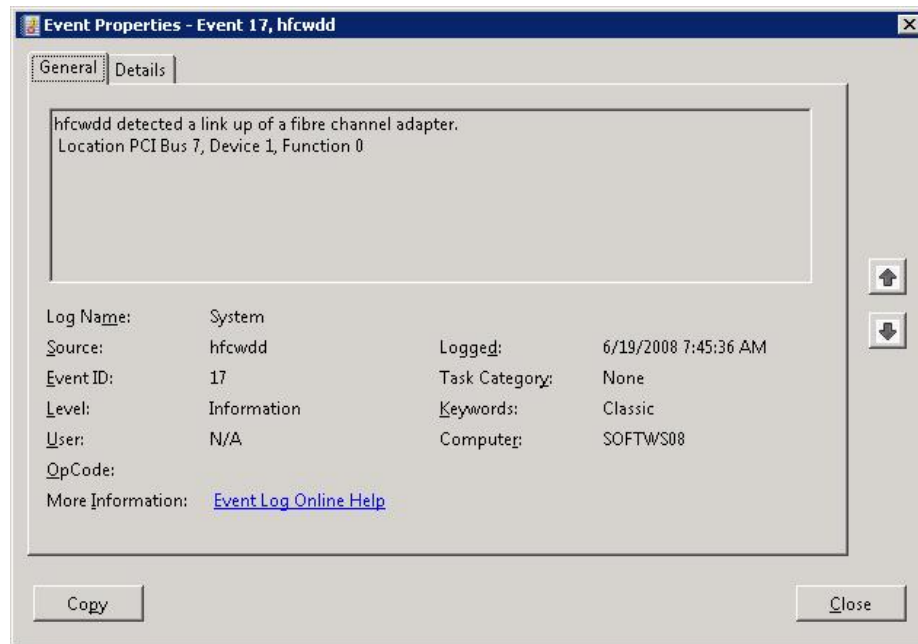


- (3) Double click the row on which "Source" corresponds to "hfcwdd". The properties of the event then appear.





Event Properties (Windows 2003)



Refer to Table9-2
Event Information.

Event Properties (Windows 2008 or later Windows OS)

The table below shows each event ID recorded in the event log, its type, and related explanation.

Table 9-1 Event ID

Event ID	Error name (*1)	Kind	Explanation
1	HFC_ERR1	Error	hfcwdd detected continuous hardware failure of the Fibre Channel Adapter.
2	HFC_ERR2	Error	hfcwdd detected temporary hardware failure of the Fibre Channel Adapter.
3	HFC_ERR3	Error	hfcwdd detected a continuous firmware trouble of the Fibre Channel Adapter.
4	HFC_ERR4	Error	hfcwdd detected a temporary firmware trouble of the Fibre Channel Adapter.
5	HFC_ERR5	Error	hfcwdd detected a continuous link failure of the Fibre Channel Adapter.
6	HFC_ERR6	Warning	hfcwdd detected a temporary link failure of the Fibre Channel Adapter.
9	HFC_ERR9	Error	hfcwdd reported on the internal error.
10	HFC_ERRA	Warning	hfcwdd detected the time-out of the Fibre Channel Adapter.
11	HFC_ERRB	Warning	hfcwdd detected the down of the link of the Fibre Channel Adapter.
12	HFC_ERRC	Information	hfcwdd detected the diagnosis error of the Fibre Channel Adapter.
13	HFC_ERRD	Error	hfcwdd detected the trouble in PCI of the Fibre Channel Adapter.
15	HFC_ERRF	Error	hfcwdd detected the trouble by the initialization of the Fibre Channel Adapter.
17	HFC_EVNT1	Information	hfcwdd detected the link-up of the Fibre Channel Adapter.
18	HFC_EVNT2	Information	hfcwdd detected the change in connection type of the Fibre Channel Adapter.
19	HFC_EVNT3	Information	hfcwdd reported on internal warning.
20	HFC_EVNT4	Information	hfcwdd reported on internal information.
21	HFC_ERR10	Error	hfcwdd detected the old firmware version of the Fibre Channel Adapter.
32	HFC_ERRBUFFULL	Information	hfcwdd used all the error log areas that were able to be acquired.
33	HFC_ERRDPCFULL	Information	hfcwdd detected the events more than treatable at a time.
34	HFC_PLUS	Information	hfcwdd reported on the additional information.
35	HFC_OPTERR0	Error	hfcwdd detected the installation of the unsupported optical transceiver.
36	HFC_ISOL	Information	SFP module of the adapter port is ready to replace.
37	HFC_ISOLRSV	Information	SFP module of the adapter port is ready to use.
126	-	-	This Event ID is generated by the Microsoft storport driver, when storport driver detected time-out and reset to device.

(*1) These names are displayed in the event log. It is the same as “Error name” of the trouble information in the next page.

(5) Error description

The Table below defines Error No, Error name and Error description to identify the detailed contents of the generated event. The error number is a value display^{ed} at the 40th byte (0x28 byte) in the data field displayed on the Properties above screen of each event.

Table 9-2 Error information(2Gbps/4Gbps/8Gbps Adapter)

NO.	Error No	Error name	Error description	Remarks
1	01	-	-	Unused number
2	02	-	-	Unused number
3	03	-	-	Unused number
4	04	-	-	Unused number
5	05	HFC_ERR9	Page number is illegal in the SCSI command	
6	06	HFC_EVNT4	Accepted the SCSI Start not supported	
7	07	-	-	Unused number
8	08	HFC_ERR9	The last entry of DMA Table is F=0.	
9	09	-	-	Unused number
10	0A	-	-	Unused number
11	0B	HFC_EVNT3	It is login response at the interrupt level and ww_name is a disagreement.	
12	0C	HFC_ERR6	It is login response at the interrupt level and XCC=82. (over the retry)	
13	0D	HFC_ERR6	It is login response at the interrupt level and XCC=82. (Retrying failed)	
14	0E	HFC_ERR6	In the login response at the interrupt level, XCC=83 or FSB=00. (Excluding AL_PA and new target)	(*3)(*4)
15	0F	HFC_EVNT3	It is the pdisc response at the interrupt level and ww_name is a disagreement.	
16	10	HFC_ERR6	It is the pdisc response at the interrupt level and XCC=82. (over the retry)	
17	11	HFC_ERR6	It is the pdisc response at the interrupt level and XCC=82. (Retrying failed)	
18	12	HFC_ERR6	In the pdisc response at the interrupt level, XCC=83 or FSB=00	
19	13	HFC_EVNT3	Pdisc start to the following target failed in the pdisc response at interrupt level	
20	14	HFC_ERRB	Detected Link Down interruption	
21	15	HFC_EVNT1	Detected Link Up interruption	
22	16	HFC_EVNT2	Detected PLOGI interruption	(*4)
23	17	HFC_EVNT2	Detected LOGO interruption	(*1) (*4)
24	18	HFC_EVNT2	Detected SCN/RSCN interruption	(*4)
25	19	-	-	Unused number
26	1A	-	-	Unused number
27	1B	-	-	Unused number
28	1C	HFC_EVNT3	Detected unanticipated Interruption	
29	1D	HFC_ERR4	Xrb valid flag is "0"	
30	1E	-	-	Unused number
31	1F	-	-	Unused number
32	20	HFC_ERR6	It is Target_Reset and is XCC#80 or FSB#00.	

NO.	Error No	Error name	Error description	Remarks
33	21	HFC_ERR6	It is Abort_Task_Set and is XCC#80 or FSB#00.	
34	22	HFC_ERR6	It is normal SCSI start and is XCC#80 or FSB#00.	
35	23	-	-	Unused number
36	24	HFC_ERRA	Detected Time-Out in the scsi command operation.	
37	25	-	-	Unused number
38	26	-	-	Unused number
39	27	-	-	Unused number
40	28	-	-	Unused number
41	29	-	-	Unused number
42	2A	HFC_EVNT4	Detected Time-Out in mailbox procedure (*2) at interrupt level	
43	2B	HFC_ERR2	Detected MCKINT	Collect Mcklog
44	2C	HFC_ERR4	Detected MCKINT (MPCHK)	Collect Mcklog
45	2D	HFC_ERR4	Detected MCKINT (T-OUT3)	Collect Mcklog
46	2E	-	-	Unused number
47	2F	-	-	Unused number
48	30	HFC_ERR1	PCI BUS error	
49	31	HFC_ERR1	CHECK-STOP occurred	
50	32	HFC_ERRD	PCI SERR	
51	33	HFC_ERRD	PCI PERR	
52	34	HFC_ERRD	PCI SPERR	
53	35	HFC_ERRF	Check error of initial value of H/W status	
54	36	HFC_ERRF	POST error	
55	37	-	-	Unused number
56	38	-	-	Unused number
57	39	-	-	Unused number
58	3A	-	-	Unused number
59	3B	-	-	Unused number
60	3C	-	-	Unused number
61	3D	-	-	Unused number
62	3E	-	-	Unused number
63	3F	-	-	Unused number
64	40	-	-	Unused number
65	41	-	-	Unused number
66	42	-	-	Unused number
67	43	-	-	Unused number
68	44	-	-	Unused number
69	45	-	-	Unused number
70	46	-	-	Unused number
71	47	-	-	Unused number
72	48	-	-	Unused number
73	49	-	-	Unused number
74	4A	-	-	Unused number
75	4B	-	-	Unused number
76	4C	-	-	Unused number
77	4D	-	-	Unused number
78	4E	-	-	Unused number
79	4F	-	-	Unused number
80	50	-	-	Unused number
81	51	-	-	Unused number

NO.	Error No	Error name	Error description	Remarks
82	52	HFC_ERR6	Detected an error at the mailbox (*2) completion.	
83	53	-	-	Unused number
84	54	-	-	Unused number
85	55	-	-	Unused number
86	56	-	-	Unused number
87	57	-	-	Unused number
88	58	-	-	Unused number
89	59	-	-	Unused number
90	5A	-	-	Unused number
91	5B	-	-	Unused number
92	5C	-	-	Unused number
93	5D	-	-	Unused number
94	5E	-	-	Unused number
95	5F	-	-	Unused number
96	60	-	-	Unused number
97	61	-	-	Unused number
98	62	-	-	Unused number
99	63	-	-	Unused number
100	64	-	-	Unused number
101	65	-	-	Unused number
102	66	-	-	Unused number
103	67	-	-	Unused number
104	68	-	-	Unused number
105	69	-	-	Unused number
106	6A	HFC_EVNT3	Detected the MSI-X message INT.	
107	6B	-	-	Unused number
108	6C	-	-	Unused number
109	6D	-	-	Unused number
110	6E	-	-	Unused number
111	6F	-	-	Unused number
112	70	-	-	Unused number
113	71	HFC_ERRF	The Capabilities List value is invalid. (Excluding one.)	
114	72	HFC_ERRF	The Capabilities pointer value is invalid. (Excluding 0x40.)	
115	73	HFC_ERRF	The Capabilities List ID value is invalid. (Excluding three.)	
116	74	HFC_ERRF	Acquiring VPD information failed (time-out).	
117	75	HFC_ERRF	The checksum value is wrong.	
118	76	-	-	Unused number
119	77	-	-	Unused number
120	78	-	-	Unused number
121	79	-	-	Unused number
122	7A	-	-	Unused number
123	7B	HFC_ERR6	It is GID-FT of the interrupt level and XCC=82. (over the retry)	
124	7C	HFC_ERR6	It is GID-FT of the interrupt level and XCC=82. (Retrying failed)	
125	7D	HFC_ERR6	It is GID-FT of the interrupt level and is XCC=83 or FSB#00.	

NO.	Error No	Error name	Error description	Remarks
126	7E	HFC_ERR6	It is MIH-LOG response of the interrupt level and is XCC#80 or FSB#00.	
127	7F	HFC_ERRA	SCSI command time-out	
128	80	HFC_EVNT3	In the TMT check, it is neither Target Reset nor Abort Task Set	
129	81	HFC_ERR6	It is GID_PN of the interrupt level and XCC=82. (over the retry)	
130	82	HFC_ERR6	It is GID_PN of the interrupt level and XCC=82. (Retrying failed)	
131	83	HFC_ERR6	It is GID_PN of the interrupt level and is XCC=83 or FSB#00.	
132	84	HFC_ERR6	It is GPN_ID of the interrupt level and XCC=82. (over the retry)	
133	85	HFC_ERR6	It is GPN_ID of the interrupt level and XCC=82. (Retrying failed)	
134	86	HFC_ERR6	It is GPN_ID of the interrupt level and is XCC=83 or FSB#00.	
135	87	HFC_EVNT5	The firmware version is old.	
136	88	HFC_ERR6	It is Link Initialize response and is XCC=83 or FSB#00.	
137	89	HFC_ERR6	It is Link Initialize response and XCC=82. (Retrying failed)	
138	8A	HFC_ERR6	It is Link Initialize response and is XCC=83 or FSB#00.	
139	8D	HFC_EVNT4	A pertinent command remains in XOB at the SCSI command time-out.	
140	90	HFC_ISOL	SFP is ready to replace	
141	91	-	-	Unused number
142	92	-	-	Unused number
143	98	-	-	Unused number
144	99	-	-	Unused number
145	9A	-	-	Unused number
145	9B	-	-	Unused number
147	9C	HFC_OPTERR0	The unsupported optical transceiver is installed.	
148	9D	HFC_ERR5	Detected the trouble of the optical transceiver.	
149	9E	HFC_ERR5	Failure of Adapter transmission part	
150	9F	HFC_ERR5	The optical transceiver has come off.	
151	A0	HFC_EVNT4	Detected memory 1bit error.	
154	A4	HFC_ERR2	Memory 1bit errors exceeds threshold (FIVE-EX).	Threshold is 9 times
155	A5	HFC_ERR2	SRAM 1bit failure at PCIe IP core exceeds threshold.	Threshold is 4 times
156	A6	HFC_EVNT4	Start Firmware Online Update	
157	A7	HFC_EVNT4	Complete Firmware Online Update	
158	A8	HFC_ERR9	Program Check is detected when executing Target_Reset	
159	A9	HFC_ERR9	Program Check is detected when executing Lun_Reset/Abort_Task_Set	
160	AA	HFC_ERR9	Program Check is detected when executing SCSI command	
161	AB	HFC_ERR9	Program Check is detected on Mailbox response.(Issued in Interrupt level)	
162	AD	HFC_ERR9	Program Check is detected on asynchronous Mailbox response.	
163	AF	HFC_EVNT4	Adapter was changed into other one by the change of the physical server by LPAR manager.	
164	B0	HFC_EVNT3	Failed to register interrupt procedure (MSI or MSI-X)	
165	B2	HFC_EVNT4	Received an interruption from unexpected LPAR# in LPAR mode.	

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NO.	Error No	Error name	Error description	Remarks
166	C5	HFC_ERRF HFC_EVT3	Failed to allocate adapter resource	
167	D3	HFC_ISOL	Adapter state is recovered from SFP replacable status to available status.	
168	D4	HFC_ISOL	Adapter state is changed into SFP replacable status.	
169	D7	HFC_ERRF	AddWWPN or VFCWWPN is invalid.	
170	D8			
171	D9	HFC_EVT3	Error is detected when checking PCIe Link_Width register	
172	DA	HFC_ERR9	Error is detected when checking PCIe Link_Width register (FATAL)	
173	F0	-	Driver log that continues to softlog and mcklog and is gathered (Non-display it in the event viewer.)	

(*1) There may exist an event log of ErrNo:0x17 when the driver is installed or the server is rebooted in case of the cascade composition.
Please set a value that is larger than the displayed value to "LOGIN"DELAY TIME" according to 'HITACHI Gigabit Fibre Channel User's Guide (Utility software edition)' when this event is generated.

The set value has the possibility that the event log of ErrNo:0x17 is generated even if it depends on the composition, and this setting is done. Please set a bigger value to the value of "LOGI" DELAY TIME" in that case.

(*2) Mailbox procedure : Procedure that the driver of Hitachi Gigabit Fibre Channel Board directs the firmware the execution of processing other than the SCSI start. This start is a synchronous command, and one end response becomes a pair for one start. The command executed by this start is as follows.

- a) Link establishment instruction in FC interface.
- b) Frame transmission instruction of login etc.
- c) Trouble information (log) collection instruction

(*3) There is a possibility that the event log of ErrNo:0x0E is generated when the server reboots, when the port of the adapter on the server is not registered in the LUN security and the LUN security of the port of the connected disk device is made effective. In that case, please confirm the following.

- (5) a) Each port of the disk device that should be connected with the port of the adapter that outputted the event log must be done in the zoning in the same zone in FC-Switch.
- b) Do not let the port of the disk device that should not be connected with the port of the adapter that outputted the event log be done in the zoning in the same zone in FC-Switch.
- c) The port of the adapter that outputted the event log must be registered in the LUN security of the port of all the disk devices connected in the same zone in FC-Switch with the port.

(*4) When the adapter port is not separated from the rest of the ports, such as using Access Gateway mode in FC-switch, the adapter port interferes with each other unlike the adapter ports are in usual Zoning. Because of this reason, Linkdown of the other adapter port or the server reboot may make the driver log unnecessary errors. When you need to stop an unnecessary logs, There is a driver parameter which stops unnecessary errors. For detail, see 'Hitachi Gigabit Fibre Channel Adapter User's Guide' (Utility Software Edition)'.

Table 9-2 Error information(16Gbps Fibre Channel Adapter)

NO.	Error No	Error name	Error description	Remarks
1	01	-	-	Unused number
2	02	-	-	Unused number
3	03	-	-	Unused number
4	04	-	-	Unused number
5	05	HFC_ERR9	Page number is illegal in the SCSI command	
6	06	HFC_EVNT4	Accepted the SCSI Start not supported	
7	07	-	-	Unused number
8	08	HFC_ERR9	The last entry of DMA Table is F=0.	
9	09	-	-	Unused number
10	0A	-	-	Unused number
11	0B	HFC_EVNT3	Detected the unmatched WWN in the process of the LOGIN response.	
12	0C	HFC_ERR6	Exceeded the retry count in the process of the LOGIN response.	
13	0D	HFC_ERR6	Failed to retry the LOGIN request in the process of the LOGIN response.	
14	0E	HFC_ERR6	Detected XCC=83 or FSB=00(i.e. invalid response code) in the process of the LOGIN response.	(*3)(*4)
15	0F	HFC_EVNT3	Detected the unmatched WWN in the process of the PDISC response.	
16	10	HFC_ERR6	Exceeded the retry count in the process of the PDISC response.	
17	11	HFC_ERR6	Failed to retry the PDISC request in the process of the PDISC response.	
18	12	HFC_ERR6	Detected XCC=83 or FSB=00(i.e. invalid response code) in the process of the PDISC response.	
19	13	HFC_EVNT3	-	
20	14	HFC_ERRB	Detected Link Down interruption	
21	15	HFC_EVNT1	Detected Link Up interruption	
22	16	HFC_EVNT2	Detected PLOGI interruption	(*4)
23	17	HFC_EVNT2	Detected LOGO interruption	(*1) (*4)
24	18	HFC_EVNT2	Detected SCN/RSCN interruption	(*4)
25	19	-	-	Unused number
26	1A	HFC_EVNT3	Detected the illegal mailbox response(exceeded the retry count or FSB \neq 0) at link initialization after mck recovery/receiving linkup.	
27	1B	HFC_EVNT3	Receiving linkup.	
28	1C	HFC_EVNT3	Detected unanticipated Interruption	
29	1D	HFC_ERR4	Xrb valid flag is "0"	
30	1E	-	-	Unused number
31	1F	-	-	Unused number
32	20	HFC_ERR6	It is Target_Reset and XCC#80 or FSB#00.	

NO.	Error No	Error name	Error description	Remarks
33	21	HFC_ERR6	It is Abort_Task_Set and XCC#80 or FSB#00.	
34	22	HFC_ERR6	It is normal SCSI start and XCC#80 or FSB#00.	
35	23	-	-	Unused number
36	24	HFC_ERRA	Detected Time-Out in the scsi command operation.	
37	25	-	-	Unused number
38	26	-	-	Unused number
39	27	-	-	Unused number
40	28	-	-	Unused number
41	29	-	-	Unused number
42	2A	HFC_EVNT4	Detected Time-Out for mailbox (*2) response	
43	2B	HFC_ERR2	Detected MCKINT	Collect Mcklog
44	2C	HFC_ERR4	Detected MCKINT (MPCHK)	Collect Mcklog
45	2D	HFC_ERR4	Detected MCKINT (T-OUT3)	Collect Mcklog
46	2E	HFC_EVNT2	Execute momentary link down.	Unused number
47	2F	HFC_EVNT3	Detected CHECK-STOP of HBA Core	Unused number
48	30	HFC_ERR1	PCI BUS error	
49	31	HFC_ERR1	CHECK-STOP occurred.	
50	32	HFC_ERRD	PCI SERR	
51	33	HFC_ERRD	PCI PERR	
52	34	HFC_ERRD	PCI SPERR	
53	35	HFC_ERRF	Check error of initial value of H/W status	
54	36	HFC_ERRF	POST error	
55	37	-	-	Unused number
56	38	-	-	Unused number
57	39	-	-	Unused number
58	3A	-	-	Unused number
59	3B	-	-	Unused number
60	3C	-	-	Unused number
61	3D	-	-	Unused number
62	3E	-	-	Unused number
63	3F	-	-	Unused number
64	40	-	-	Unused number
65	41	-	-	Unused number
66	42	-	-	Unused number
67	43	-	-	Unused number
68	44	-	-	Unused number
69	45	-	-	Unused number
70	46	-	-	Unused number
71	47	-	-	Unused number
72	48	-	-	Unused number
73	49	-	-	Unused number
74	4A	-	-	Unused number
75	4B	-	-	Unused number
76	4C	-	-	Unused number
77	4D	-	-	Unused number
78	4E	-	-	Unused number
79	4F	-	-	Unused number
80	50	-	-	Unused number
81	51	-	-	Unused number

NO.	Error No	Error name	Error description	Remarks
82	52	HFC_ERR6	Detected an error at the mailbox (*2) completion.	
83	53	-	-	Unused number
84	54	-	-	Unused number
85	55	-	-	Unused number
86	56	-	-	Unused number
87	57	-	-	Unused number
88	58	-	-	Unused number
89	59	-	-	Unused number
90	5A	-	-	Unused number
91	5B	-	-	Unused number
92	5C	-	-	Unused number
93	5D	-	-	Unused number
94	5E	-	-	Unused number
95	5F	-	-	Unused number
96	60	-	-	Unused number
97	61	-	-	Unused number
98	62	-	-	Unused number
99	63	-	-	Unused number
100	64	-	-	Unused number
101	65	-	-	Unused number
102	66	-	-	Unused number
103	67	-	-	Unused number
104	68	-	-	Unused number
105	69	-	-	Unused number
106	6A	HFC_EVT3	Detected the MSI-X message INT.	
107	6B	-	-	Unused number
108	6C	-	-	Unused number
109	6D	-	-	Unused number
110	6E	-	-	Unused number
111	6F	-	-	Unused number
112	70	-	-	Unused number
113	71	HFC_ERRF	The Capabilities List value is invalid. (Excluding one.)	
114	72	HFC_ERRF	The Capabilities pointer value is invalid. (Excluding 0x40.)	
115	73	HFC_ERRF	The Capabilities List ID value is invalid. (Excluding three.)	
116	74	HFC_ERRF	Acquiring VPD information failed (time-out).	
117	75	HFC_ERRF	The checksum value is wrong.	
118	76	-	-	Unused number
119	77	-	-	Unused number
120	78	-	-	Unused number
121	79	-	-	Unused number
122	7A	-	-	Unused number
123	7B	HFC_ERR6	Exceeded the retry count in the process of the GID-FT response.	
124	7C	HFC_ERR6	Failed to retry the LOGIN request in the process of the GID-FT response.	
125	7D	HFC_ERR6	Detected XCC=83 or FSB=00(i.e. invalid response code) in the process of the GID-FT response.	

NO.	Error No	Error name	Error description	Remarks
126	7E	HFC_ERR6	Detected XCC=83 or FSB=00(i.e. invalid response code) in the process of the MIH-LOG response.	
127	7F	HFC_ERRA	SCSI command time-out	
128	80	HFC_EVNT3	In the TMT check, it is neither Target Reset nor Abort Task Set	
129	81	HFC_ERR6	Exceeded the retry count in the process of the GID-PN response.	
130	82	HFC_ERR6	Failed to retry the LOGIN request in the process of the GID-PN response.	
131	83	HFC_ERR6	Detected XCC=83 or FSB=00(i.e. invalid response code) in the process of the GID-PN response.	
132	84	HFC_ERR6	Exceeded the retry count in the process of the GPN-ID response.	
133	85	HFC_ERR6	Failed to retry the LOGIN request in the process of the GPN-ID response.	
134	86	HFC_ERR6	Detected XCC=83 or FSB=00(i.e. invalid response code) in the process of the GPN-ID response.	
135	87	HFC_EVNT5	The firmware version is old.	
136	88	HFC_ERR6	Exceeded the retry count in the process of the Link Initialize response.	
137	89	HFC_ERR6	Failed to retry the LOGIN request in the process of the Link Initialize response.	
138	8A	HFC_ERR6	Detected XCC=83 or FSB=00(i.e. invalid response code) in the process of the Link Initialize response.	
139	8D	HFC_EVNT4	A pertinent command remains in XOB at the SCSI command time-out.	
140	90	HFC_ISOL	SFP is ready to replace	
141	91	-	-	Unused number
142	92	-	-	Unused number
143	96	HFC_ERR6	Post error of core	
144	98	-	-	Unused number
145	99	-	-	Unused number
146	9A	-	-	Unused number
147	9B	-	-	Unused number
148	9C	HFC_OPTERR0	The unsupported optical transceiver is installed.	
149	9D	HFC_ERR5	Detected the trouble of the optical transceiver.	
150	9E	HFC_ERR5	Failure of Adapter transmission part	
151	9F	HFC_ERR5	The optical transceiver has come off.	
152	A0	HFC_EVNT4	Detected memory 1bit error.	
153	A1	HFC_EVT3	Driver was initialized with Forced auto mode setting.	
154	A4	HFC_ERR2	Memory 1bit errors exceeds threshold (FIVE-EX).	Threshold is 9 times
155	A5	HFC_ERR2	SRAM 1bit failure at PCIe IP core exceeds threshold.	Threshold is 4 times
156	A6	HFC_EVNT4	Start Firmware Online Update	
157	A7	HFC_EVNT4	Complete Firmware Online Update	
158	A8	HFC_ERR9	Program Check is detected when executing Target_Reset	
159	A9	HFC_ERR9	Program Check is detected when executing Lun_Reset/Abort_Task_Set	
160	AA	HFC_ERR9	Program Check is detected when executing SCSI command	
161	AB	HFC_ERR9	Program Check is detected on Mailbox response.(Issued in Interrupt level	
162	AD	HFC_ERR9	Program Check is detected on asynchronous Mailbox response.	
163	AF	HFC_EVNT4	Adapter was changed into other one by the change of the physical server by LPAR manager.	
164	B0	HFC_EVNT3	Failed to register interrupt procedure (MSI or MSI-X)	
165	B2	HFC_EVNT4	Received an interruption from unexpected LPAR# in LPAR mode.	

NO.	Error No	Error name	Error description	Remarks
166	C5	HFC_ERRF HFC_EVNT3	Failed to allocate adapter resource	
167	C9	HFC_EVNT3	Failed to read Flash-ROM	
168	D3	HFC_ISOL	Adapter state is recovered from SFP replacable status to available status.	
169	D4	HFC_ISOL	Adapter state is changed into SFP replacable status.	
170	D7	HFC_ERRF	AddWWPN or VFCWWPN is invalid.	
171	D8	HFC_EVNT3	Failed to create virtual port	
172	D9	HFC_EVNT3	Error is detected when checking PCIe Link_Width register	
173	DA	HFC_ERR9	Error is detected when checking PCIe Link_Width register (FATAL)	
174	DA	HFC_ERR2	PCIe Link_Width register inconsistency was detected (Fatal)	
175	DB	HFC_EVNT2	Detected error in Mailbox except link initialize.	
176	F0	-	Additional Driver Log is collected after softlog or mcklog gathered. (Non-display it in the event viewer.)	

(*1) The event log of ErrNo:0x17 may be recorded after installing the driver and rebooting the server in case of connecting the cascading FC-Switch.
Please set the value of "LOGI" DELAY TIME" that is larger than current one if this event log is recorded.
Refer to 'HITACHI Gigabit Fibre Channel User's Guide (Utility software edition)' to set this value.
Please set the value that is larger than previous one if this event log is still recorded even though this setting is done.

(*2) Mailbox : The operation that the driver of Hitachi Gigabit Fibre Channel Board executes its firmware in the following purpose.
a) Link establishment instruction in FC interface.
b) Frame transmission instruction of login etc.
c) Trouble information (log) collection instruction

(*3) When the server reboots, the event log of ErrNo:0x0E may be recorded if the following conditions are both met.

- a) The LUN security is effective for the connected disk device.
- b) The port of the adapter is not registered in the LUN security.

In that case, please confirm the following.

- (6) a) Each port of the disk device that should be connected with the port of the adapter that outputted the event log must be done zoning in the same zone in FC-Switch.
- b) Any port of the disk device that should NOT be connected with the port of the adapter that outputted the event log must NOT be done zoning in the same zone in FC-Switch.
- c) The port of the adapter that outputted the event log must be registered in the LUN security of the port of all the disk devices connected in the same zone in FC-Switch with the port.

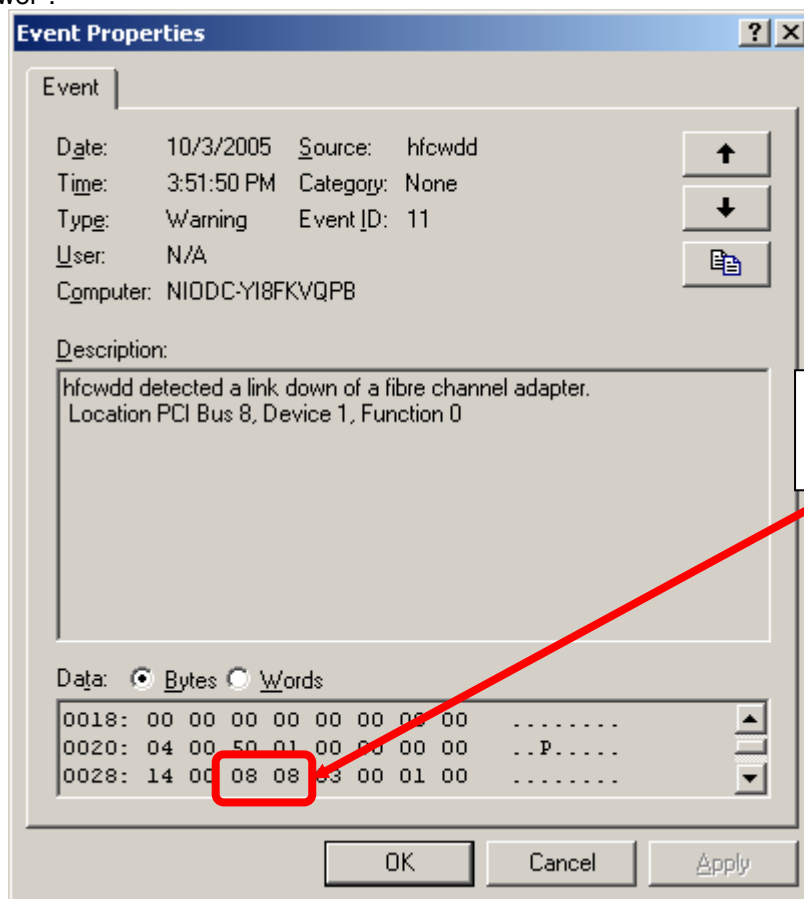
(*4) When adapter ports are not separated such as using Access Gateway Mode" a "mailbox" may be issued unexpectedly in the event of server reboot or link-down and caused to an invalid event log.

To avoid this, please set "Logging Mode" or "Login Target Filter" parameter
For detail, see 'Hitachi Gigabit Fibre Channel Adapter User's Guide' (Utility Software Edition)'.
'

Detailed Log

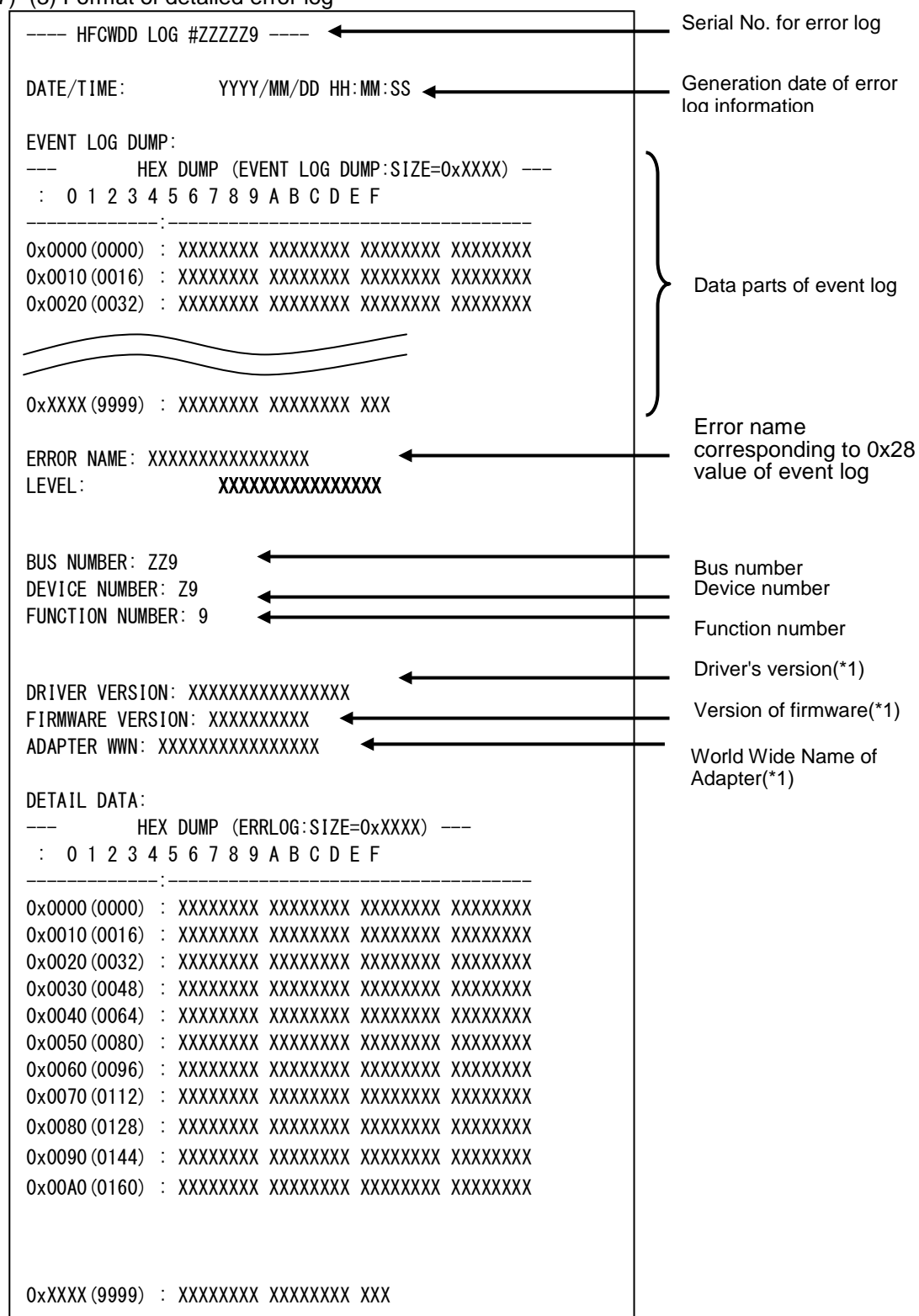
When the error occurs and the error information is registered in the event log, the detailed log information is output to a specified directory by the error log collection program. The output destination and the output file name are as follows usually.

- (1) The detailed error log output destination
It is output to the directory, "\Program Files\Hitachi\drivers\hba\errord\log" under the system disk (It is "\Program Files (x86)\Hitachi\drivers\hba" in IA-64). (Refer to clause 11.1.3 for the change procedure of the directory at the output destination.)
- (2) File name
hfcXXXX.log
XXXX corresponds to two-bytes value of Address 0x2a-0x2b of the data "ivision of ""vent viewer".



The value of XXXX is "0808" in this case.

(7) (3) Format of detailed error log



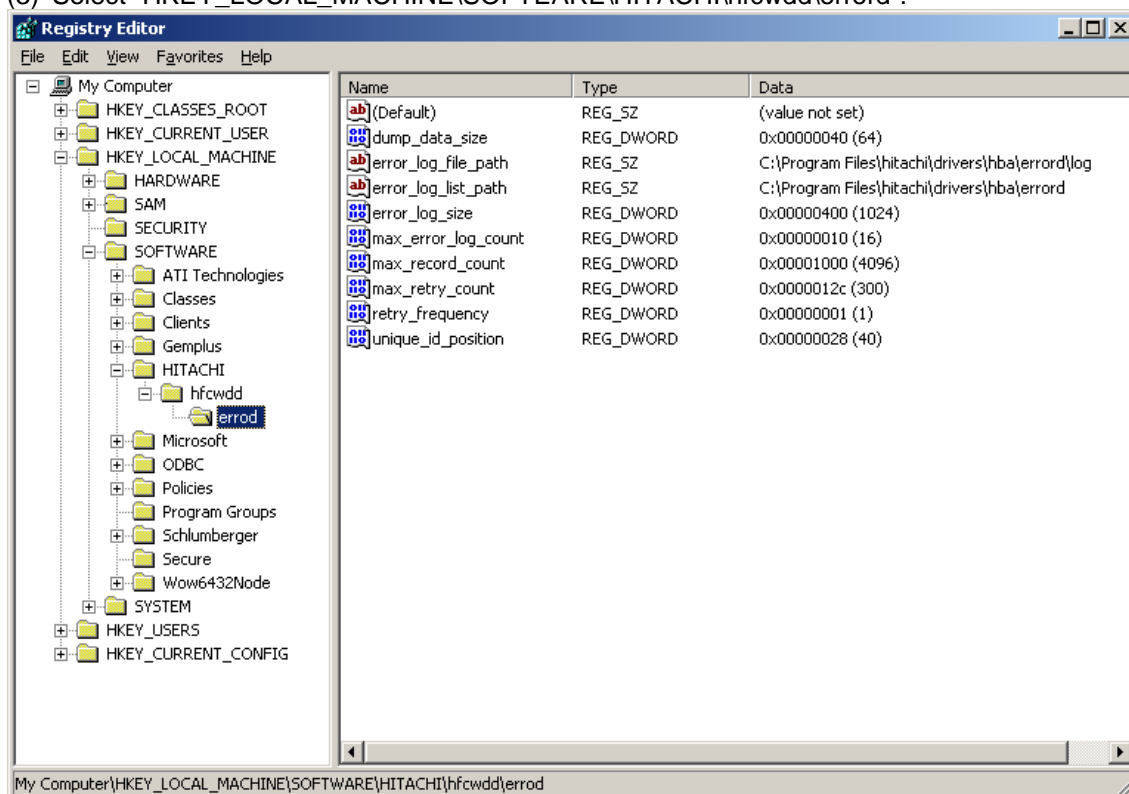
Setting registries of detailed log

You can change the output destination of detailed log and the number of recording surfaces. Below table shows the default value of the registry.

Data type	Value name	Default value	Description
REG_DWORD	max_record_count	0x1000	The number of recording surfaces to output error log files
REG_SZ	error_log_file_path	System drive, "\Program Files\Hitachi \drivers\hba\error"	Output destination directory for error log output files

Please log in the system in "Administrator" authority" when you change the registries. Moreover, there is a possibility that the trouble occurs in the system when the registries are changed by mistake. Please note the change enough.

- (1) Start "Start" - "Run".
- (2) Input "regedit" and select the "OK" button.
- (3) Select "HKEY_LOCAL_MACHINE\SOFTWARE\HITACHI\hfcwdd\error".



- (4) Double-click the Name of which you want to change the registries.
- (5) Input the value that want to set to "Value data", and select the "OK" button.

System Information

You can collect system configuration information using Windows Server 2003 standard function. Execute the following commands.

- (1) Initiate command prompt.
- (2) Execute 'systeminfo' command displays system information.

```
>systeminfo
```

You can store the results to the file xxx.txt.

```
>systeminfo > xxx.txt
```

Event log (Server Core)

There are two ways to start the error and confirm its status on Windows Server 2008.

- (1) Use MMC to confirm the event log through the remote PC.

Using MMC(Microsoft Management Tool) on remote PC can display the event log on Server Core using GUI interface. For the settings to use MMC on Server core and remote PC, see Windows OS manuals for details.

- (2) Execute command directly on Server core.

Execute the following command can confirm the latest three system events.

```
c:\>wevtutil qe system /c:3 /rd:True /f:TEXT
```

However executing this command can not display the detailed log. If you need to confirm the detailed log information, export the event log to the file. You can check the exported file on Windows Server 2008 except Server Core.

This command exports the system event log into 'C:\systemlog.evtx'.

```
c:\> wevtutil epl system C:\systemlog.evtx
```

Error log collection batch file (hfcra)

Executing 'hfcra.bat' enables you to get log data and related information to analyze the failure of Hitachi Gigabit Fibre Channel Adapter when error occurs.

Administrator privilege is required to execute this batch file. This batch file is the same among Windows OS.

If the following conditions (1)(2)(3) are both met, BSoD may occur after executing hfcra.

Please update it by modified driver(version 4.x.8.1970 or later) and corresponding software(version 1.0.4.82 or later) before online updating firmware.

- (1) Using 16Gb FC adapter
- (2) Using driver of the version shown in the following table.

OS	Driver Version
Windows Server 2008 R2	4.2.8.1500
	4.2.8.1540
	4.2.8.1550
	4.2.8.1570
Windows Server 2012	4.3.8.1500
	4.3.8.1670
	4.3.8.1690
Windows Server 2012 R2	4.4.8.1500
	4.4.8.1670
	4.4.8.1690

- (3) After booting windows OS, link Status of the adapter port information displayed by "hfcmgr -g" command is "CHK-STP", and hfcwdd error event(ErrorNo=0x31) is NOT recorded in Windows event log..

Collected log data and information are stored in the directory named 'hfcras-<computer name>-<date>- <time>'.

Maximum size of the collected information is as follows:

Maximum size of the system event log +

Maximum size of the event log of the application +

Registry information +

Error information for each adapter port (about 5MB) × mounted adapter port number.

This batch file is stored in the directory where 'HFCTools' is installed. Directory 'HFCTools' is created at installation. Default directory is;

'Boot directory'\Program Files\Hitachi\drivers\hba\HFCTools (IA32)

'Boot directory'\Program Files(x86)\Hitachi\drivers\hba\HFCTools (IA64 and x64)

【Supported HFCTools version】

1.0.1.19 or later.

【Syntax】

hfcras [/f]

【Option】

/f : (y/n) Execute the command with omitting the confirmation message.

【Collected logs and information】

Log data collected by error

Event log and application log of the event viewer

Detailed driver log collected by driver maintenance tools dddump

Result of executing systeminf

Result of executing msinfo

Set up log of the system

Registry information (hfcwdd settings)

(All registries in 'HKLM\SYSTEM\CurrentControlSet\Services\hfcwdd' or below)

Registry information (Driver install information)

(All registries in 'HKLM\SYSTEM\CurrentControlSet\Control\Class' or below)

Registry information (PCI device information)

(All registries in 'HKLM\SYSTEM\CurrentControlSet\Enum\PCI' or below)

Registry information (errord settings)

(All registries in 'HKLM\SYSTEM\CurrentControlSet\Services\errord' or below)

MSCS Log

hfcwdd.sys

All files of 'oem*.inf' in the directory '%SystemRoot%\inf' or below.

10

Confirm firmware version and boaevision

(8) (1) Move to the directory that you install the utility software in the command line.
The default directory in the system is as follows.

\Program Files\Hitachi\drivers\hba (x86)

\Program Files(x86)\Hitachi\drivers\hba , IPF)

(9) (2) Type 'hfcls' or 'hfcmgr' depending on your HFCTool version.

```
C:\Program Files\Hitachi\drivers\hba\HFCTools>hfcmgr -ls
--- Device symbolic name      : scsi4
  PCI Vendor id/Device id    : 1054/3020
  EC level                   : F → Board revision
  PCI Bus/Device/Function number : 3/0/0
  Parts Number               : 3HAC81100-A
  Model Name                 : HFCE0802
  Driver version             : 1.1.6.630
  Firmware version           : 00300429 → Firmware version
  World wide port name       : 500008700056a114
  World wide node name       : 500008700056a115
  Connection type            : Point to Point[fabric]
  Link speed                 : 8 Gbps
```

This example shows that the firmware version is 300429、the board revision is 'F'.

11

Update firmware of Hitachi Gigabit Fibre Channel Adapter

Outline of firmware update

The firmware update file contains 1) On-board firmware, 2) Boot code whose controls the SAN-boot from the disk device connected to the Hitachi Gigabit Fibre Channel Adapter and 3) Hardware initialization information. The term 'Firmware update' means the control of the Hitachi Gigabit Channel Adapter is moved from the current firmware to the new firmware contained in the update file.

'Firmware update' needs two operations. One is to store the firmware update file to the FLASH-ROM in Hitachi Gigabit Fibre Channel Adapter. Second is to transfer the FLASH-ROM data into the hardware of the Hitachi Gigabit Fibre Channel Adapter.

There are three operations to access FLASH-ROM.

Opertions	Contents
FLASH update	Update the firmware data of the FLASH-ROM in Gigabit Fibre Channel adapter.
FLASH backup	Backup the data of FLASH-ROM in Gigabit Fibre Channel adapter. This operations creates 'Firmware backup file'.
FLASH restore	Store the 'Firmware backup file'. into the FLASH-ROM in Gigabit Fibre Channel adapter.

There are two operations to transfer the FLASH-ROM data into the hardware of the Hitachi Gigabit Fibre Channel Adapter.

Operations	Contents	Activated item		
		1) On-board firmware	2) Boot code	3)Hardware initialization information
Offline update	Update the FLASH-ROM and turn the Power off of your system. Then FLASH-ROM data is transferred from FLASH-ROM to the hardware when the system is booted.	○	○	○
Online update	Update the FLASH-ROM. Executing the special commands transfer the FLASH-ROM data to the hardware without turning the power Off and on.	○		

The following sections describe the precautions on the firmware update, the procedure how to update FLASH-ROM and the procedure how to transfer the FLASH-ROM data into the hardware.

The firmware Online-update operation requires that all of the Gigabit Fibre Channel Adapter, the driver and the firmware support the firmware Online-update feature. Also, you may not update the firmware by online when the version of the current working firmware and update firmware have dependencies.

For details, refer to 'HITACHI Gigabit Fibre Channel User's Guide (Support Matrix Edition)'.

Precautions

- Make sure to stop IO operation when updating the FLASH-ROM to avoid serious system damage due to unpredictable failure on the Hitachi Gigabit Fibre Channel Adapter.
- If you use the Hitachi Gigabit Fibre Channel Adapter as the shared FC, the firmware cannot be updated from the shared guest when the driver and the firmware do not support corresponding feature. For details, refer to 'HITACHI Gigabit Fibre Channel User's Guide (Support Matrix Edition)'.
- You need to switch BASIC mode when LPAR manager is operating on Xeon server module and exclusive mode when LPAR manager is operating on IPF server module to update the firmware if the driver and the firmware do not support firmware update feature from the guest. Note that you have to re-set LUN security when you switch between BASIC and exclusive or shared LPAR mode since these modes assign the different WWPN and WWNN to the Hitachi Gigabit Fibre Channel Adapter.
- When updating FLASH-ROM, do not close the working window, terminate the command forcibly, turn the power off or reboot the system. There operation causes the disruption of the FLASH-ROM and may lead the failure of the Hitachi Gigabit Fibre Channel Adapter.
- Backup the firmware before updating the firmware.
- When all of the Gigabit Fibre Channel Adapter, the driver and the firmware do not support the firmware Online-update feature, you need to power off and power on to make the updated firmware working on the Gigabit Fibre Channel Adapter.
- Command details how to backup and update the firmware, see 'HITACHI Gigabit Fibre Channel User's Guide (Utility software edition)' for details. Also you are required the administrator privilege to execute the command.
- To update, backup or restore the FLASH-ROM usually requires 5 to 10 minutes. However over 60 minutes may be required depending on your server configuration. If your system does not complete these operations over the 10 minutes, see the section 'How to shorten the firmware update process'.
- After having updated FLASH-ROM, you should execute offline or online update as soon as possible in order to transfer the data of the FLASH-ROM to the hardware. If the following events occur after having updated FLASH-ROM, the FLASH-ROM data might be automatically transferred to the hardware.
 - (1) The hardware failure of the adapter occurred, and the driver automatically recovered from it.
 - (2) You executed isolate SFP command and recover SFP command for hot-swapping S-P. (hfcmgr -sfp <Device> clear)

Backup FLASH-ROM

Please move to the directory that installs the utility software in the command line and TYPE the following command. The default directory is as follows.

\Program Files\Hitachi\drivers\hba (x86)
\Program Files(x86)\Hitachi\drivers\hba (x64, IPF)

Execute 'hfcmcu' or 'hfcmgr' depending on HFCTools version.

☐ hfcmcup

```
hfcmcup -d <logical device name> -o backup -f <backup target directory>
```

☐ hfcmgr

```
hfcmgr -f <logical device name> backup<backup target directory>
```

If you backup the firmware of the all adapters at once, execute the following command.

```
hfcmgr -f all backup <backup target directory>
```

The following example is an example of executing the FLASH backup of the Adapter whose logical device is scsi5.

```
C:\Program Files\Hitachi\drivers\hba\HFCTools>hfcmgr -f scsi5 backup E:\
Time:XXXX/XX/XX XX:XX:XX
hfcmcup Ver. 2.4.0.12 Copyright (C) 2003, 2004, 2005, 2009. Hitachi, Ltd.
--- The current microcode level for 421FF03(scsi5)
backup is OK?
(Y/N) : y
--- Flash ROM Read-1
--- Flash ROM Read-2
backup finished.
backup file is E:\54100B30.21FF03.EF.500008700030ED34.BK
```

Backup file name contains PCI vendor ID, Device ID and the firmware version.

Update FLASH-ROM

This section describes how to update FLASH-ROM. The same procedure is applied when restoring FLASH-ROM. Updating FLASH-ROM stores the firmware update file into the FLASH-ROM in Hitachi Gigabit Fibre Channel Adapter. You need to execute Offline update or Online update to operations to transfer the FLASH-ROM data into the hardware of the Hitachi Gigabit Fibre Channel Adapter.

Note that if you need to update FLASH-ROM into one of the ports in Hitachi Gigabit Fibre Channel Adapter if there are two or more ports in Hitachi Gigabit Fibre Channel Adapter.

Please move to the directory that installs the utility software in the command line and type the following command. The default directory is as follows.

\Program Files\Hitachi\drivers\hba (x86)
\Program Files(x86)\Hitachi\drivers\hba (x64, IPF)

Execute 'hfcmcu' or 'hfcmgr' depending on HFCTools version.

□ hfcmcup

```
hfcmcup -d <logical device name> -o download -f <update file name>
```

□ hfcmgr

```
hfcmgr -f <logical device name> update <update file name>
```

If you update the firmware of the all adapters at once, execute the following command.

```
hfcmgr -f all update <update file name>
```

The following example is an example of executing the FLASH update of the Adapter whose logical device is scsi6.

```
C:\Program Files\Hitachi\drivers\hba\HFCTools>hfcmgr -f scsi6 update "C:\Program
Files\Hitachi\drivers\hba\HFCTools\54102030.01300422.E7"
Time:2010/02/17 13:38:26
hfcmcup Ver. 2.4.0.18 Copyright(C) 2003, 2010, Hitachi, Ltd.
scsi6 HITACHI FC Adapter
*** NOTICE *** NOTICE *** NOTICE ***

The microcode installation occurs while the
adapter and any attached drives are available
for use. It is recommended that this installation
be scheduled during non-peak production periods.

As with any microcode installation involving
drives, a current backup should be available.

Use 'y' to continue the installation.
Use 'n' or Ctrl-c to cancel the installation.
(Y/N) : y
--- The current microcode level for 300429(scsi6)
--- Select microcode file: C:\Program Files\Hitachi\drivers\hba\HFCTools\5410203
0.01300422.E7

CURRENT SYSREV:00300429
UPDATE SYSREV:01300422

Update is OK?
(Y/N) : y

sector26 [*****] 100%

Microcode Update finished.
The Update microcode level for 1300422(scsi6)
Need reboot the system to update this.
```

Note that if hfcmgr terminates with error message 'HFCAPI related application(mcup) terminated.', the error message is added to the log file hfcmcup.log in the same directory as hfcmgr. For details of error messages, see 'HITACHI Gigabit Fibre Channel User's Guide (Utility Software Edition)'.

Online Update of firmware

The firmware updated or restored into FLASH-ROM by executing procedure described in Update FLASH-ROM does not take control of the Hitachi Gigabit Fibre Channel Adapter. You need to transfer the FLASH-ROM data into the hardware of the Hitachi Gigabit Fibre Channel Adapter.

There are two ways, online and offline, to transfer the FLASH-ROM data into the hardware of the Hitachi Gigabit Fibre Channel Adapter as described in Outline of firmware update . This section describes about the online update of the firmware.

The outline of the online update is below.

- (1) Execute 'hfcmgr' and initiates the online update of the firmware to the firmware currently working on the hardware of Hitachi Gigabit Fibre Channel Adapter. The firmware received the initiation outputs the error 0xA6, and notifies the user that the online update process is started.
- (2) The firmware currently working on the hardware checks whether the conditions meet the requirements of the online update of the firmware.
- (3) When the hardware and the firmware are ready to update the firmware on the hardware, the firmware reads the on-board firmware from the FLASH-ROM and transfers it to the hardware.
- (4) The firmware outputs the error 0xA7, and notifies the user that the update of the on-board firmware on the hardware has completed.

- Be sure that the output of the error 0xA6 does not mean the update of the on-board firmware on the hardware has completed. You have to wait until the firmware outputs the error 0xA7 to confirm the completion of the process.

The firmware can transfer the on-board firmware to the hardware only when the firmware does not handle any IO or other operation. That means that the process of the transferring the on-board firmware from FLASH-ROM never ends while the firmware is too busy. You should initiate the online update of the firmware when the load of the firmware on the target board

- is low.

You can update the entire firmware of the hardware on Hitachi Gigabit Fibre Channel Adapter if you initiate the online update of the firmware to one of the ports of the Hitachi Gigabit Fibre Channel

- Adapter.

The following phenomenon (1)(2) may occur while online updating firmware of 16Gbps FC adapter by using utility software shown as below table. Please update it by modified utility software(version 1.0.4.82 or later) and corresponding driver(version 4.x.8.1970 or later) before online updating firmware, otherwise offline update

- the firmware.

<phenomenon>

- (1) hfcwdd error event(ErrorNo x2C) is recorded in Windows event log.
- (2) Versions of flash and current are illegally displayed when 'hfcmgr -u' command is executed.

<utility software version>

Operating System	utility software version
Windows Server 2008 R2	1.0.4.58
	1.0.4.72
Windows Server 2012	1.0.4.58
	1.0.4.81

Windows Server 2012 R2	1.0.4.58 1.0.4.81
------------------------	----------------------

Please move to the directory that installs the utility software in the command line and type the following command. The default directory is as follows.

- \Program Files\Hitachi\drivers\hba (x86)
- \Program Files(x86)\Hitachi\drivers\hba (x64, IPF)
- (1) Execute 'hfcmgr' to make firmware check whether the conditions meet the requirements of the online update of the firmware.

```
hfcmgr -u
```

The following is an example of executing 'hfcmgr -u'.

```
C:\Program Files\Hitachi\drivers\hba\HFCTools>hfcmgr -u
hfcmgr Ver. 1.0.0.12 Copyright(C) 2010, Hitachi, Ltd.
Device    BUS:DEV.FUNC  Flash    Current  Status (Flash -> Current)
scsi4     3: 0. 0      00300429 00300429 No need
scsi5     3: 0. 1      00300429 00300429 No need
scsi6     46: 0. 0     01300429 00300422 Applicable
scsi7     46: 0. 1     01300429 00300422 Applicable
```

See 'HITACHI Gigabit Fibre Channel User's Guide (Utility Software Edition)' for details of the specification of the 'Status (Flash -> Current)'.

Initiate the online update of the firmware.

```
hfcmgr -u <logical device name>
```

If you initiate the online update of the firmware to all adapters mounted on the system at once, execute the following command.

```
hfcmgr -u all
```

The following is an example of executing 'hfcmgr -u all'.

```
C:\Program Files\Hitachi\drivers\hba\HFCTools>hfcmgr -u all
hfcmcres Ver. 1.0.0.12 Copyright (C) 2010, Hitachi, Ltd.
DEVICE : scsi4
FLASH   SYSREV: 00300429
CURRENT SYSREV: 00300429

FLASH->CURRENT Update is OK? (Y/N) :y

Already update.

DEVICE : scsi5
FLASH   SYSREV: 00300429
CURRENT SYSREV: 00300429

FLASH->CURRENT Update is OK? (Y/N) :y

Already update.

DEVICE : scsi6
FLASH   SYSREV: 01300429
CURRENT SYSREV: 00300422

FLASH->CURRENT Update is OK? (Y/N) :y

Update command finished (scsi6). please check F/W update status

DEVICE : scsi7
FLASH   SYSREV: 01300429
CURRENT SYSREV: 00300422

FLASH->CURRENT Update is OK? (Y/N) :y

Update command finished (scsi7). please check F/W update status
```

Execute the following command to confirm whether the online update of the firmware has completed.

```
hfcmgr -u
```

The following is an example of executing 'hfcmgr -u'. At the point when the status changed from 'Waiting' to 'No need' and the version on Flash column equals to the version on Current column, you can identify that the firmware has been transferred to the hardware.

```
C:\Program Files\Hitachi\drivers\hba\HFCTools>hfcmgr -u
hfcmcres Ver. 1.0.0.12 Copyright (C) 2010, Hitachi, Ltd.
Device   BUS:DEV.FUNC  Flash   Current  Status (Flash -> Current)
-----
scsi4    3: 0. 0       00300429 00300429 No need
scsi5    3: 0. 1       00300429 00300429 No need
scsi6    46: 0. 0      01300429 01300429 No need
scsi7    46: 0. 1      01300429 01300429 No need
```

For details of error messages, see 'HITACHI Gigabit Fibre Channel User's Guide (Utility Software Edition)'

How to shorten firmware update process

To update, backup or restore the FLASH-ROM usually requires 5 to 10 minutes on Windows. However over 60 minutes may be required if multiple processors are mounted on your server blade and OS is Windows Server 2008 or Windows Server 2008 R2.

You can avoid this situation executing the following operations.

- (1) Execute 'taskmgr.exe' to start task manager in the command line.
- (2) Select 'hfcmgr.exe' from 'process' tab of 'taskmgr.exe' and right-click
- (3) Select 'Set Affinity' from right-click menu.
- (4) Remain only one 'CPU x' (information: 0, 1, 2, ...) from some of checked 'CPU x's and Uncheck any other 'CPU x' in the 'processor affinity'.

12

Hot-swap procedure of the optical transceiver

You can replace the optical transceiver (SFP) mounted on Hitachi Gigabit Fibre Channel Adapter while OS is in operation without shutting down the server. It is called SFP hot-swap feature. Some models of Hitachi Gigabit Fibre Channel Adapter products don't have SFP hot-swap feature. Refer to 'HITACHI Gigabit Fibre Channel User's Guide (Support Matrix Edition)' for detail.

This section describes the preconditions SFP hot-swap feature.

Preconditions

- The driver detects various errors including SFP failure (Error ID = 0x9E), Link Down (Error ID = 0x14) or FC interface failure and so on when SFP failure occurs. For details of the error, see section 'Error log information'.
- We recommend that you shutdown the server before replacing the optical transceiver to avoid risks, in periodical maintenance or in conditions where shutdown of OS is allowed.
- Only Hitachi-specified SFP is available for Hitachi Gigabit Fibre Channel Adapter.
- The SFP hot-swap operation requires that all of the Gigabit Fibre Channel Adapter, the driver and the firmware support the firmware SFP hot-swap feature.
- This feature is not available when you use LPAR mode on LPAR manager.
- For details of the command to use SFP hot-swap feature, see 'HITACHI Gigabit Fibre Channel User's Guide (Utility Software Edition)'.
- SFP hot-swap operation may not be available depending on your server configuration for the necessity of SFP replacement, procurement of parts (SFP) and the maintenance operation, contact support section.

13

Back up and restore procedure of the driver parameters when replacing Hitachi Gigabit Fibre Channel Adapter

This chapter explains the prerequisites and the procedures how to back up and restore driver and BIOS parameter settings when replacing Hitachi Gigabit Fibre Channel Adapter.

The procedures how to restore parameter settings of Hitachi Gigabit Fibre Channel Adapter after shutting down the server

This section explains the prerequisites and the following procedures, how to back up and restore parameter settings when replacing Hitachi Gigabit Fibre Channel Adapter after shutting down the server.

1. Record HBA BIOS and the driver parameter settings before replacing the adapter.
2. Set HBA BIOS and the driver parameters after replacing the adapter.
3. Confirm the HBA BIOS and the driver parameters are properly set.

For how to replace Hitachi Gigabit Fibre Channel Adapter, please refer your server's user's guide.

Prerequisites

- We recommend that you back up the parameter settings and preserve them to the file every time you setup the parameters.
- Please note that if you back up the parameters when Hitachi Gigabit Fibre Channel Adapter is in error condition, you may not back up the parameters properly. Also if you apply these parameter settings for the restoration of Hitachi Gigabit Fibre Channel Adapter, Hitachi Gigabit Fibre Channel Adapter may become fault condition.
- You have to install the utility software to back up and restore the parameter settings.
- For prerequisites, please refer the chapter 2, 'Before use' and the chapter 3 'Install Utility Software' in the Hitachi Gigabit Fibre Channel Adapter User's Guide (Utility Software Edition) .
- Administrator privilege is required to execute the utilisoftware.

(10) A. Record HBA BIOS and the driver parameter settings before replacing the adapter

(1) Record HBA BIOS settings

If you don't use LPAR manager in your system, you need to record the parameters for HBA BIOS and preserve them to the file.

Refer to the Hitachi Gigabit Fibre Channel Adapter User's Guide (BIOS/EFI edition) for the procedures how to confirm the parameter settings of HBA BIOS at BIOS Setup screen.

If you configure LPAR manager in your system, you do not need to execute this procedure.

The equivalent information of HBA BIOS settings (EFI driver settings) is recorded and retained in the server system.

(2) Record the location of the adapter port

Using any of the following procedures, please confirm the PCI slot location (or Bus, Device and Function number) of the adapter port, and record the information.

The PCI slot location corresponds uniquely to Bus, Device and Function number in the system. If HBA is mounted on the same slot before and after replacing the adapter, the same Bus, Device and Function number is assigned.

(11)a) Confirm PCI slot location using System (SVP) console

If SVP on your system can display WWPN of HBA, you can confirm the PCI slot location of the adapter port from system (SVP) console referring WWPN of the adapter port.

Refer to Hitachi Compute Blade User's Guide for the detailed procedures.

Please note that SVP must be installed on your system.

b) Confirm Bus, Device and Function number executing the following command.

Refer to the Hitachi Gigabit Fibre Channel Adapter User's Guide (Utility Software Edition).

```
# hfcmgr -ls
```

(3) Record the logical device name of the adapter port

Please record the logical device name of the adapter port referring WWPN of the adapter port. Refer to the 'Display General Information' of Hitachi Gigabit Fibre Channel Adapter User's Guide (Utility Software Edition) for the procedure how to confirm the logical name.

B. Set HBA BIOS and the driver parameters after replacing the adapter

(1) Set HBA BIOS settings

b-1) If you do not configure LPAR manager on your system, set previous setting to the replaced adapter port. Refer to the Hitachi Gigabit Fibre Channel Adapter User's Guide (BIOS/EFI Edition) for the procedures how to set the parameters for HBA BIOS.

If you configure LPAR manager on your system, you do not need to execute this procedure.

The equivalent information of HBA BIOS settings (EFI driver settings) is recorded and retained in the server system.

(2) Update settings bound with WWPN of the adapter port.

In some cases, such as when you set the parameter to each port, the driver parameters is stored bound with its corresponding WWPN of the adapter port.

Executing 'hfcmgr -ex' command allows you to check whether these parameters are already set in your system. If the settings bound with their corresponding WWPN exist in your system, you have to update these bindings from old WWPN to new WWPN after replacing the adapter.

When executing 'hfcmgr -ex' command, the previous WWPN bound with parameters before replacement may be displayed. If any WWPN exists, modify WWPN. If no WWPN is displayed, you can safely ignore this operation.

For the details how to execute 'hfcmgr -ex' command, refer to the section, 'Update or Delete WWPN in the configuration file' of Hitachi Gigabit Fibre Channel Adapter User's Guide (Utility Software Edon).

Notes:

- (12)1) If you use N+M Cold Standby or LPAR manager, the special WWPN, registered in the system is using instead of using the physically assigned WWPN of each adapter port.

This special WWPN is not changed before and after the replacement of the adapter, so you can omit executing 'hfcmgr' command.

- (13)2) When you do not execute 'hfcmgr -ex' command even if the parameters bound with their corresponding WWPN of the adapter port exist in your system, you may face the following symptoms after replacing the adapter.

A: The different parameter settings are applied.

C. Confirm the HBA BIOS and the driver parameters are properly set

(1) Confirm HBA BIOS settings.

If you do not configure LPAR manager on your system, confirm that the previous setting data is restored in the replaced adapter. Refer to the Hitachi Gigabit Fibre Channel Adapter User's Guide (BIOS/EFI Edition) for the procedures how to confirm the parameters for HBA BIOS.

If you configure LPAR manager on your system, you do not need to execute this procedure.

The equivalent information of HBA BIOS settings (EFI driver settings) is recorded and retained in the server system.

- (2) Confirm PCI slot location or PCI Bus, Device and Function number.

Confirm the following C-1) result is equal to C-2) referring to the (2), Record the location of the adapter port in the section A.

C-1) Current PCI slot location or Bus, Device and Function number of the adapter port.

C-2) Previous PCI slot location or Bus, Device and Function number of the adapter port recorded on the section (2), Record the location of the adapter port in the section A.

- (3) Confirm the driver parameters.

Confirm whether the new settings are applied to the adapter port with reference to the section 'Display or Set the Port Information'

The procedure when hot-plugging of Hitachi Gigabit Fibre Channel Adapter

You can replace the Hitachi Gigabit Fibre Channel Adapter while OS is in operation without shutting down the server. It is called hot-plug feature. Some models of Hitachi Gigabit Fibre Channel Adapter products don't have hot-plug feature. Refer to 'HITACHI Gigabit Fibre Channel User's Guide (Support Matrix Edition)' for detail.

This section describes that the preconditions and back up and restore procedures at hot-plugging of Hitachi Gigabit Fibre Channel Adapter.
For detailed procedure how to replace hot-pluggable devices including Hitachi Gigabit Fibre Channel Adapter on Hitachi Compute Blade 2000, refer to 'Hitachi Compute Blade 2000 Hotplug operation Guide'.

You can set various parameters for HBA BIOS and the driver depending on your server configuration. When you have set these parameters, you need to back up the parameters and restore the parameters after replacing the Hitachi Gigabit Fibre Channel Adapter.

Please execute the following procedures to back up and restore the parameters.

1. Back up HBA BIOS and the driver parameters.
2. Restore HBA BIOS and the driver parameters to the Hitachi Gigabit Fibre Channel Adapter after replacement.
3. Confirm the HBA BIOS and the driver parameters.

Preconditions

- We recommend that you back up the parameters and preserve them to the file when you setup the parameters.
- If you back up the parameters when Hitachi Gigabit Fibre Channel Adapter is in error condition, you may not back up the parameters properly. Also if you restore these parameters to the Hitachi Gigabit Fibre Channel Adapter, Hitachi Gigabit Fibre Channel Adapter may not work properly.
- You have to install the utility software to back up and restore the parameters.
- Administrator privilege is required to execute the utility software.
- For more prerequisites for the hot-plugging of the Hitachi Gigabit Fibre Channel Adapter, refer to 'Hitachi Compute Blade 2000 Hotplug operation Guide'.

Hereinafter, please refer the specified section in 'HITACHI Gigabit Fibre Channel User's Guide (Utility Software Edition)'.

A. Back up HBA BIOS and the driver parameters

(1) HBA BIOS

Search the logical device name of the target adapter port with reference to the section 'Search the System Mounted Devices'

Then back up HBA BIOS parameters with reference to the section 'Back up the HBA BIOS Setup Data'.

Write down the WWPN of the target er port.

(14)(2) Driver parameters

You do not need to back up the driver parameters.

B. Restore HBA BIOS and the driver parameters

(1) HBA BIOS

Search the logical device name of the replaced adapter port with reference to the section 'Search the System Mounted Devices'

Then restore HBA BIOS parameters with reference to the section 'Restore the HBA BIOS Setup Data'.

In case if you do not have the back up file of HBA BIOS parameters, set previous setting again with reference to the section 'Display or Set the Port Infomation' and 'Display or Set the Boot Information'.

(2) Driver parameters

if you do not use the additional WWN for N+M Cold Standby or the virtual WWN for LPAR manager in your system, you do not need to execute the following procedure.

Seatch the logical device name of the replaced adapter port with reference to the section 'Search the System Mounted Devices'

Then update the WWPN with reference to the section 'Update or Delete WWPN in the configuration file'.

C. Confirm the HBA BIOS and the driver parameters

(15)HBA BIOS

Seatch the logical device name of the replaced adapter port with reference to the section 'Search the System Mounted Devices'

Then confirm that the new settings are the same as the previous settings with reference to the section 'Display or Set the Port Information' and 'Display or Set the Bootormation'.

(16)(2) Driver parameters

Seatch the logical device name of the replaced adapter port with reference to the section 'Search the System Mounted Devices'

Then confirm whether the new settings are applied to the adapter port with reference to the section 'Display or Set the Port Infomation'.

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WMI, HBA API

This adapter driver is supporting following WMI and HBAAPI. Please refer to the document of Microsoft for operation of each API.

NO.	WMI class	WMI method	Remarks
1	MSFC_FCAdapterHBAAttributes		
2	MSFC_FibrePortHBAAttributes		
3	MSFC_FibrePortHBAStatistics		*1
4	MSFC_HBAAdapterMethods	GetDiscoveredPortAttributes	
5		GetPortAttributesByWWN	
6		RefreshInformation	
7		SendCTPassThru	
8		SendRNID	
9		GetFC3MgmtInfo	
10		SetFC3MgmtInfo	
11		SendRPL	
12		GetFC4Statistics	
13		ScsiInquiry	
14		ScsiReadCapacity	
15		ScsiReportLuns	
16	MSFC_HBAFCPInfo	GetFcpTargetMapping	

* 1 It is necessary to use the following adapter drivers and a F/W version.

adapter driver version is equals to ver x.y.6.670 or later, 4Gbps adapter F/W version is equals to 2x0786 or later, 8Gbps adapter F/W is supported by all versions.

NO.	HBAAPI	Remarks
1	HBA_RefreshInformation	
2	HBA_GetAdapterName	
3	HBA_GetAdapterAttributes	
4	HBA_GetAdapterPortAttributes	
5	HBA_GetDiscoveredPortAttributes	
6	HBA_GetPortAttributesByWWN	
7	HBA_GetPortStatistics	
8	HBA_GetFC4Statistics	
9	HBA_GetFcpTargetMapping/HBA_GetFcpTargetMappingV2	
10	HBA_SendScsiInquiry/HBA_ScsiInquiryV2	
11	HBA_SendReportLUNs/HBA_ScsiReportLunsV2	
12	HBA_SendReadCapacity/HBA_ScsiReadCapacityV2	
13	HBA_SendCTPassThru/HBA_SendCTPassThruV2	
14	HBA_SetRNIDMgmtInfo	
15	HBA_GetRNIDMgmtInfo	
16	HBA_SendRNID	
17	HBA_SendRPL	

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Virtual fibre channel feature in Windows Server 2012 and 2012 R2 with Hyper-V roll installed

Before use

Confirm the version

Use the following version of Gigabit Fibre channel adapter's driver and utility software.

Type of Fibre channel adapter	Driver Version		Utility Software Version
	Windows Server 2012	Windows Server 2012 R2	
8Gbps FC-HBA	4.3.7.1080 or later	4.4.7.1110 or later	1.0.3.48 or later
16Gbps FCHBA	4.3.8.1650 or later	4.4.8.1650 or later	1.0.4.60 or later

Update the firmware which supports virtual fibre channel feature.

For details, refer to 'HITACHI Gigabit Fibre Channel User's Guide (Support Matrix Edition)'

Update all the firmware of the Gigabit Fibre Channel adapters in case of using some 8Gbps Fibre Channel adapters in a server module.

All version of 16Gbps Fibre channel adapter firmware supports virtual fibre channel feature.

Configure the NPIV mode(8Gbps Fibre Channel Adapter)

Execute 'hfcmgr -p' command, and confirm the current NPIV mode.

Don't define virtual fibre channel adapters with Hyper-V manager in the case of "NPIV: disable"

```
C:\Program Files (x86)\Hitachi\drivers\hba\HFCTools>hfcmgr -p scsi5
Time:2013/xx/xx xx:xx:xx
```

```
-----
WWPN:500008700057702e Device:scsi5 [LinkUp]
-----
```

```
Connection Type      : Point to Point[fabric] (Auto)
Link Speed           : 2 Gbps (Auto)
Max Transfer Size    : 16 MB (-)
~
```

```
Logging Mode         : default (-)
Login Target Filter   : pid (-)
Performance Option    : enable (-)
NPIV                  : disable(-)
```

Execute the following command for enabling NPIV mode .
After executing the command, reboot the server module.

```
C:\Program Files (x86)\Hitachi\drivers\hba\HFCTools> hfcmgr -p all npiv enable  
Time:2013/xx/xx xx:xx:xx  
  
Succeeded.  
You need reboot system to reflect setting changes to the system.
```

Configure the NPIV mode(16Gbps Fibre Channel Adapter)

Execute 'hfcmgr -p' command, and confirm the current NPIV mode.

Don't define virtual fibre channel adapters with Hyper-V manager in the case that either "NPIV: disable", "Multiple PortID:enable", or "Connection:FC-AL" is set.

```
C:\Program Files (x86)\Hitachi\drivers\hba\HFCTools>hfcmgr -p scsi5  
Time:2013/xx/xx xx:xx:xx  
  
-----  
WWPN:500008700057702e Device:scsi5 [LinkUp]  
-----  
  
Connection Type      : Point to Point[fabric] (Auto)  
Link Speed           : 2 Gbps (Auto)  
Max Transfer Size    : 16 MB (-)  
~  
Logging Mode         : default (-)  
Login Target Filter   : pid (-)  
Performance Option   : enable (-)  
NPIV                 : disable(-)
```

Execute the following command for enabling NPIV mode .

```
C:\Program Files (x86)\Hitachi\drivers\hba\HFCTools> hfcmgr -p all npiv enable  
  
Succeeded.  
  
C:\Program Files (x86)\Hitachi\drivers\hba\HFCTools> hfcmgr -p scsi5 mpid disable  
  
Succeeded.  
  
C:\Program Files (x86)\Hitachi\drivers\hba\HFCTools> hfcmgr -p scsi5 ct ptop  
  
Succeeded.
```

After executing the command, execute either in the following operation to enable NPIV mode.

- (1) Reboot the server module.
- (2) Execute the enabling virtual fibre channel command (hfcmgr -reset). This command enable virtual fibre channel feature without rebooting the server.

```
C:\Program Files (x86)\Hitachi\drivers\hba\HFCTools> hfcmgr -p all npiv enable  
Time:2013/xx/xx xx:xx:xx  
  
Succeeded.  
You need reboot system to reflect setting changes to the system.
```

After executing the operation, confirm that the virtual fibre channel has enabled with the following command.

```
C:\Program Files (x86)\Hitachi\drivers\hba\HFCTools>hfcmgr -p scsi5  
Time:2013/xx/xx xx:xx:xx
```

```
-----  
WWPN:500008700057702e Device:scsi5 [LinkUp]  
-----
```

```
Connection Type      : Point to Point[fabric] (Auto)  
Link Speed           : 2 Gbps (Auto)  
Max Transfer Size    : 16 MB (-)
```

```
~
```

```
Logging Mode         : default (-)  
Login Target Filter   : pid (-)  
Performance Option    : enable (-)  
NPIV                 : enable(-)
```


Precaution

- 1) The Gigabit Fibre Channel adapter which supports virtual fibre channel feature is 8Gbps Gigabit Fibre Channel adapter or later products. For details, refer to 'HITACHI Gigabit Fibre Channel User's Guide (Support Matrix Edition)'.
- 2) You should connect disk devices via FC-switch which supports NPIV feature to use virtual fibre channel feature.
- 3) When the 8Gbps Gigabit Fibre Channel Adapter with virtual fibre channel and the 8Gbps Gigabit Fibre Channel Adapter without virtual fibre channel are in the same server module, you should set the connection type in FC-AL not Auto in the case that the 8Gbps Gigabit Fibre Channel Adapter without virtual fibre channel directly connects the disk device.
- 4) The number of virtual fibre channel which you can configure in one port of 8 Gigabit Fibre Channel adapter is up to 15, and in one port of 16 Gigabit Fibre Channel adapter is up to 30.
- 5) You should configure the fibre channel adapter in Link-UP, or you may fail to start virtual machine.
- 6) When you set LUN security of the disk device per virtual fibre channel, you should register the WWN of virtual fibre channels. You should also register the WWN of the adapter port in the host OS even though you won't connect the adapter port to the 'UN. If you don't register the WWN of the adapter port in the host OS, the warning event log(ErrNo.0x0E:LUN security is not registered) will be recorded.
- 7) When LPAR manager is operating on server module, Gigabit Fibre Channel adapter doesn't support virtual fibre channel feature.

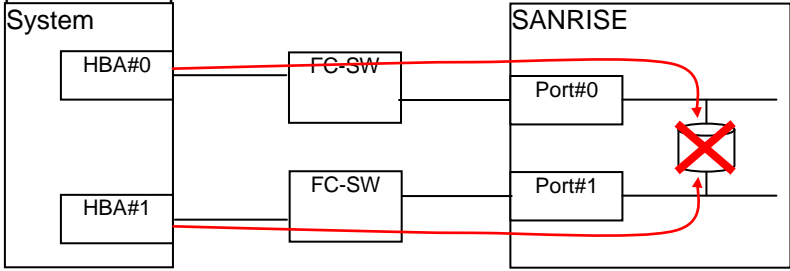
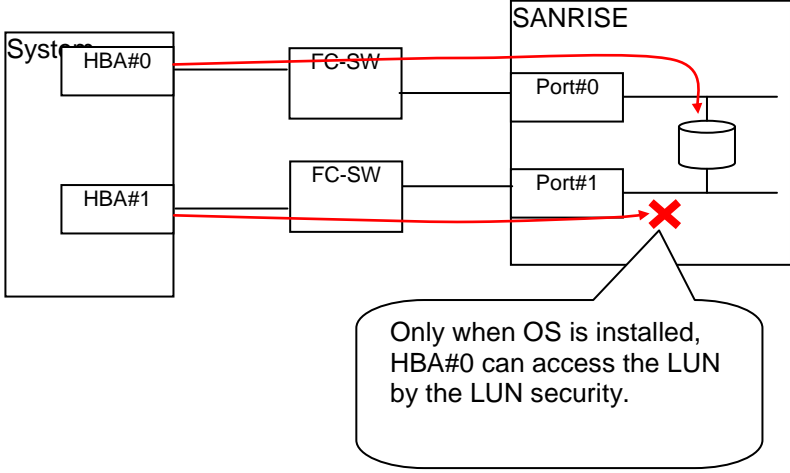
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Restrictions

Common issues

#	Restrictions
1	FC HUB is not supported.
2	If the version of the firmware update tools is 1.2.0.1 or earlier, updating the firmware clears the settings in HBA-BIOS screen. If you need to store the HBA-BIOS settings when updating firmware, use the firmware update tools version 1.2.0.1 or later.
3	<p>The ErrNo:0x16 logs may be recorded in the Windows event log, when the adapter (except 16Gbps) is connected to Hitachi Virtual Storage Platform G200, G400, G600 or G800. However, there is no influence of this phenomenon on using the adapter except recording ErrorNo:0x16 logs in the event log. ErrorNo:0x16 log is information level.</p> <p>This phenomenon may occur at the following cases.</p> <p>While booting the OS</p> <ul style="list-style-type: none">▪ After hot-swapping the adapter▪ After linking up between the adapter port and the connecting device(FC-Switch or disk device).▪ After linking up between the FC-Switch and the disk device.▪ After recovering from hardware failure of the adapter

Windows Server 2003

#	Restrictions
1	When SAN is booted from the Hitachi Fibre Channel Adapter, it is necessary to limit the number of target devices connected with an Adapter to 16 devices or less. There is a possibility that the crash dump cannot be normally acquired when 16 devices are exceeded.
2	For OS installation, only LU number '0' is possible.
3	<p>The system that adopts the composition that can be referred from two or more paths for LU that installs OS cannot install OS. Use the LUN security function (*1) of the disk device so that the LUN can be referred from the system only by one path if you install OS in the composition that corresponds to this limitation.</p> <p>Composition example of limitation</p>  <p>Corrective action</p>  <p>Only when OS is installed, HBA#0 can access the LUN by the LUN security.</p>

(*1) Function to make only logical device (LUN) decided beforehand for system accessible.

Windows Server 2008 and Windows Server 2008 R2

#	Restrictions
1	<p>When you install OS to the LU, only the target LU should be accessed. If multiple LUs are identified by OS installer, OS installer shows these LUs for installation candidate. However the identified order and the number of the LU by OS installer are not stable. If you choose the wrong LU for installation target, the data contained the selected LU is destroyed. See the information provided by Microsoft.</p> <p>http://support.microsoft.com/kb/937251</p>

HITACHI

Gigabit Fibre Channel Adapter

USER'S GUIDE

(Windows driver Edition)

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