

SAN Data Gateway Installation Cookbook

Ling Pong & Forrest Wilson

Storage Systems Technical Support

www.storage.ibm.com

Preface

This cookbook is a complement to the formal documents available for the IBM Storage Area Network Data Gateway (2108-G07) and the information available on the SDG website - <http://www.ibm.com/storage/sangateway>. You should be familiar with basic SAN concepts and implementation guidelines. If you have not already done so, please read the SAN whitepaper [Sample SAN Configurations for Disk](#) by Mark Bruni which can be found at <http://ethel.sanjose.ibm.com/sanhard/documents/SANSamp120.pdf>

This cookbook will help you install, tailor and configure the SDG for attachment of the Enterprise Storage Server (2105 E or F series with SCSI interfaces) to a server with fibre channel HBAs(host bus adapters).

This book is not intended to be a substitute or to replace formal product documents nor is it intended to be used in lieu of formal IBM publications. The material in this book assumes basic knowledge of SCSI and fibre channel bus architectures, of the server platforms that are covered in here and of the ESS subsystem in a open systems environment.

This cookbook will guide you step by step in configuring and implementing a server - ESS fibre channel solution.

This publication is intended to help storage specialists, systems administrators, and storage administrators who are chartered to install a Enterprise Storage Server attached to a UNIX or NT server via a supported fibre channel adapter. The information in this publication is not intended as the specification of any programming interfaces that are provided by the San Data Gateway(SDG) or Enterprise Storage Server(ESS), or the servers to which they may be connected. See the PUBLICATIONS section of the IBM Programming Announcement for ESS (2105) and SDG (2108-G07) for more information about what publications are considered to be product documentation.

References in this publication to IBM products, programs or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service is not intended to state or imply that only IBM's product, program, or service may be used. Any functionally equivalent program that does not infringe any of IBM's intellectual property rights may be used instead of the IBM product, program or service.

Information in this book was developed in conjunction with use of the equipment specified, and is limited in application to those specific hardware and software products and levels.

The information contained in this document has not been submitted to any formal IBM test and is distributed AS IS. The information about non-IBM ("vendor") products in this manual has been supplied by the vendor and IBM assumes no responsibility for its accuracy or completeness. The use of this information or the implementation of any of these techniques is a customer responsibility and depends on the customer's ability to evaluate and integrate them into the customer's operational environment. While each item may have been reviewed by IBM for accuracy in a specific situation, there is no guarantee that the same or similar results will be obtained elsewhere. Customers attempting to adapt these techniques to their own environments do so at their own risk.

Any pointers in this publication to external Web sites are provided for convenience only and do not in any manner serve as an endorsement of these Web sites.

Reference to PTF numbers that have not been released through the normal distribution process does not imply general availability. The purpose of including these reference numbers is to alert IBM customers to specific information relative to the implementation of the PTF when it becomes available to each customer according to the normal IBM PTF distribution process.

The team that wrote this cookbook

This cookbook was developed based on the installation experiences and expertise of the storage specialists.

Ling Pong is a certified Consulting IT/Specialist of the Advanced Technical Support Organization in San Jose.

Forrest Wilson is a certified Consulting IT/Specialist from Miami. He has 20+ years of experience in the IT business. He has extensive experience with installing servers and storage in the open systems environment.

Thanks to the following people(in no specific order) for their invaluable contributions for the content of this document and much appreciated and needed review:

Karen Ward
SSD, IBM San Jose

Chris Morton
SSD, IBM San Jose

Carol Johnson
S&D, IBM San Jose

Marcee Cress
SSD, IBM San Jose

Robert Azevedo
SSD, IBM San Jose

Alex Connolly
S&D, IBM San Francisco

Paul Radu
Pathlight

Bill Worthington
S&D, IBM San Jose

Comments welcome

Your comments are important to us!

We want this cookbook to be as helpful as possible. Please send us your comments about this book to:

Ling Pong - lpong@us.ibm.com

Contents

Preface	iii
The team that wrote this cookbook	iv
Comments welcome	iv
Chapter 1. Introduction	9
Chapter 2. Installation - Common	11
Chapter 3. Installation - RS6000/AIX	17
Chapter 4. Installation Sun Servers/Solaris	23
Chapter 5. Installation - Windows NT Systems	35
Chapter 6. Installation - HP Systems	53
Appendix A. SAN Compatibility Matrix	59
Appendix B. Useful Websites	61
Appendix C. Sample SAN Data Gateway Configuration	63
Appendix D. San Data Gateway pre-install checklist	65
Glossary	71
Index	73

Chapter 1. Introduction

The Storage Area Network Data Gateway (2108-G07), hereafter referred to as the SDG, is also sometimes known as a bridge box or a protocol converter. Its function is to convert SCSI to Fibre Channel. The SDG was introduced over a year ago and has been enhanced a number of times.

1.1 Purpose

This cookbook is intended to be used with the version that was announced and made available on March 31, 2000. It may be used to a lesser degree as a guide for installing the prior versions of the SDG but a number of functions, like lun masking and SAN fabric support will not be available.

The SAN Data Gateway connects any interface as either an initiator or a target. It is a fully scalable product with fibre channel and SCSI interface options. The SDG has up to four ultra SCSI channels and presently up to two SAN interfaces, each configured using plug-in cards. These interfaces, used for host or device point-to-point and loop connections, create powerful SAN solutions. The types of hosts, devices, and fibre channel components that are usable for the SAN Data Gateway will increase over time.

The SAN Data Gateway is a high-performance and transparent product. The SDG is nearly transparent to the host and its applications. The gateway maps addresses across and between the different interfaces. The gateway maintains the address mappings across the starting up of attached systems, devices, and the gateway, supporting up to 256 unique device addresses across all of its interfaces. The SAN Data Gateway is a protocol-aware, intelligent gateway. The gateway has full enabling with SCSI-3 and SCSI-2 protocols for disk and tape.

1.2 Fibre Channel Connections

The SDG, as with other SAN products provide connectivity with different types of adapters. Each of these adapters support different modes of operation. Here is a list of connection options supported:

1.2.1 QLOGIC Adapters

- Single-port fibre channel interfaces with the **QLogic QLA2100F adapter** (QLogic ISP2100 controller) support the following private loop modes:
 - a. Target
 - b. Initiator
 - c. Target and Initiator
- Single- and dual-port fibre channel interfaces with the **QLogic QLA2200 adapter** (QLogic ISP2200 controller) support the following public- and private-loop modes:
 - a. Target
 - b. Public initiator

- c. Private initiator
- d. Target and public initiator
- e. Target and private initiator
- Single- and dual-port fibre channel interfaces with the **QLogic QLA2200** adapter support the following connection options:
 - a. Loop
 - b. Point-to-point
 - c. Loop preferred
 - d. Point-to-point preferred

1.2.2 Jaycor JNI Adapters

JNI adapters are Sun SBus adapters and support the following modes of operation:

- a. Loop
- b. Point-to-point
- c. Loop preferred
- d. Point-to-point preferred

1.3 SCSI channels

The key features and capabilities of the SAN Data Gateway SCSI channels are listed below:

- Four ultra wide SCSI channels with internal termination.
- SCSI channels have automatic speed negotiation capability for wide or narrow bus widths and standard, fast or ultra speeds. These parameters can be configured using the StorWatch SAN Data Gateway Specialist software.
- Termination on SCSI channels can be disabled through the installation of a jumper or from the StorWatch SAN Data Gateway Specialist software.
- The SCSI ID of each channel is set by default to 7 and can be changed using the StorWatch SAN Data Gateway Specialist software.
- The SDG SCSI ports are SE (single ended) UltraSCSI ports and not LVD(low voltage differential) UltraSCSI ports.

1.4 Supported Platforms

The server platforms currently supported by the SDG are:

1. **RS6000**
2. **Sun**
3. **Intel (NT)**
4. **HP** (via special request)

Please check the ESS website [ESSurl](#) for the most current list of supported servers.

Chapter 2. Installation - Common

This is a list of tasks and functions that have to be performed in the installation of the SAN Data Gateway for attachment to all server platforms

2.1 SDG Installation Guide Additions & Changes

These are the changes that need to be made for the Gateway Installation and User's Guide to clarify some of the instructions and steps.

2.1.1 No changes are needed in the Pre-installation checklist.

Checklist can be found in Appendix D, "San Data Gateway pre-install checklist" on page 65

2.1.2 Installation Checklist

2.1.2.1 Service representative installation checklist

In Table 4: Service representative installation steps, the following needs to be added

1. Give the
 - a. user name ----**StorWatch**
 - b. password -----**StorWatch**
2. The SDG Website is:
<http://www.ibm.com/storage/hardsoft/products/SANGateway/sangateway.htm>

2.1.2.2 Installation Checklist steps

1. Step 1A - provide the configuration information for the PC to be connected to the SDG or give the page number of where to go...
2. Invoke the **intializeBox** command
 - Example:
Gateway> **initiallizeBox**
3. Move **step 13** to **step 17**
 - configure the Ethernet port
 - assign a name to the SDG (see example in Figure 28 on page 63)
4. If you want to use the telnet interface, you must define user(s) for the interface
 - issue the **userAdd** command
 - issue **userAdd "username", "password"**
username is 3 to 80 characters
password is 8 to 40 characters
 - to check user(s) defined, use the **userList** command
userList will return a list of users and their encryptedpasswords
5. **Step 9A** - add the following
 - load the SDG StorWatch Specialist code on the NT (Server and client code[client code can be on different system])

- Set the server code to autostart on boot on the NT system (autostart is a suggestion, not required).
 - Make an icon for the client (also a suggestion, so it is easier to start in when desired)
6. **Step 7** - Check the firmware(microcode) level of the SDG
- check the SDG website for the most current level of microcode and SDG Specialist code
 - download and update microcode if necessary

<http://www.storage.ibm.com/hardsoft/products/sangateway/>

- select “**Downloads**”
- fill out form (to “register” for download)
- select “**Firmware downloads**”

Hint: you may want to bookmark the download webpage so you don't have to fill out the form every time

- code installation example

7. Step 9C

- a. Connect one SCSI cable to the SDG.
- b. Do a SCSI Re-Scan of the bus you just added (attached from the ESS to the SDG).
 - issue “*scsiRescan*” command
- c. repeat steps a) and b) for each of the SCSI cable attachments to the ESS **one at a time**.

Notes:

NT with Service Pack 3 and Novell will only support the first 8 devices (SCSI addresses 0 - 7).

The iterative process described in steps 1 - 3 are needed for clustering support to ensure that the devices are in the right order. NT SP 3 or higher is needed for MSCS support.

8. **Step 9D** Connect the SDG to the fibre channel adapter in the server
- make sure proper fibre channel cable connection procedures are followed,
 - clean the dual SC fibrechannel connectors
 - good (uncrimped fiber)
9. Go to the appropriate chapter for connection to the server of choice
1. FC Switch
 - IBM 2109/Brocade
 - McDATA ED5000
 2. AIX - go to chapter 3
 3. SUN - go to chapter 4
 4. NT - go to chapter 5

5. HP - go to chapter 6

At this point, an install script could be run for each server system to simplify the SDG discovery process.

2.2 SDG Installation Tips from IRT

The tips below are supplements to the MAPs when performing a 2108-G07 install. They are not meant to replace the existing documentation. Existing documentation (official manuals and service notices) can be obtained from <http://www.storage.ibm.com/hardsoft/products/sangateway/support/cdr/Document/sdgdoc.htm>.

Contents:

1. **Symptom:** 2108-G07 does not pass initial verification after install (fails POST or no Ready light)
2. **Symptom:** 2108-G07 not properly communicating with ESS
3. **Symptom:** Unable to update the firmware from StorWatch Specialist
4. **Symptom:** 2108-G07 properly sees and presents ESS LUNs, but host cannot also see the LUNs
5. **Symptom:** 2108-G07 randomly reboots itself
6. **Symptom:** 2108-G07 already at firmware 3.40.05
7. **Symptom:** 2108-G07 is attached to a host OS that requires use of a LUN 0 device
8. **Symptom:** Uncertain about settings for 2108-G07 when attaching to a particular operating system
9. **Symptom:** SCSI errors or data errors on the SCSI side of the connection
10. **Symptom:** Fibre errors or data errors on the Fibre Channel side of the connection

Tips:

Attention: *These tips are supplements to the MAPs. Please always follow the MAPs first. If you fall out of the MAPs without resolution, see if any of the below tips apply. If for any tip, the problem is still not resolved, contact your next level of support.*

1. **Symptom: 2108-G07 does not pass initial verification after install** (fails POST or no Ready light).

Cause 1: Shipping, especially outside the US, may jar loose the internal boards.

Quick Tip 1:

1. Power off the 2108-G07
2. Open the 2108-G07 chassis
3. Reseat the mainboard and any other boards that appear loose
4. Power on the 2108-G07

Cause 2: Manufacturing defect causes Power LED to not light.

Quick Tip 2:

1. Follow the Service Notice for Main Power LED available at <http://www.storage.ibm.com/hardsoft/products/sangateway/support/cdr/Document/sdgdoc.htm>

If the 2108-G07 has failed both the MAPs and the above tips, replace the unit.

2. **Symptom: 2108-G07 not properly communicating with ESS.**

Cause: Various. One cause is the 2108-G07 not at the proper firmware level.

Quick Tip:

1. Verify the SDG is at the supported firmware levels (3.40.14 except AIX host which needs 3.40.16 for fibrechannel support)
2. If not, update the firmware using the StorWatch Specialist

3. If you are not able to update the firmware using the Specialist, refer to the next tip
4. If the symptom is not resolved, see if Tip 4 applies.

3. Symptom: Unable to update the firmware from StorWatch Specialist.

Cause: Older levels of firmware only properly communicate with older levels of Specialist (which are levels 2.2x, 2.3x, 2.40). Likewise, newer levels of firmware only properly communicate with newer levels of Specialist prior to Specialist 2.40.01. This problem is avoided if the firmware is updated before the Specialist is updated.

Quick Tip:

1. If possible, update the Specialist to 2.40.02 or later. (available from <http://www.stor-age.ibm.com/hardsoft/products/sangateway/support/cdr/sdgcdr.htm>)
2. If this is not possible, the following workaround may help.
 - a. AIX host: use the "soip" utility (available from Level 3 support or oem.pathlight.com) to update the firmware. Follow the instructions that come with the utility.
 - b. Use NetTerm process as described in the SDG Service Guide
 - c. Other hosts: install old Specialist code (prior to 2.X), then update the firmware.

4. Symptom: 2108-G07 properly sees and presents ESS LUNs, but host cannot also see the LUNs.

Cause 1: Host is not aware of all the SCSI addresses of the LUNs.

Quick Tip 1:

SUN only

1. Verify the host file "sd.conf" has all the LUNs listed as presented by the 2108-G07 (The SDG presents LUNs as Target 0, ID = LUN ID of "fcShowDevs" output).
2. If the symptom is not resolved, and you have not yet done Quick Tip 2 below, continue to Quick Tip 2 below.

Cause 2: The adapter may not be set to talk to a loop device.

Quick Tip 2:

AIX host

1. On the host, type "rmdev -l fcs0 -R" (this unconfigures the adapter and all its child devices)
2. Ensure the adapter is connected to the 2108-G07 and the 2108-G07 is powered on
3. On the host, type "cfgmgr" (this configures the FC devices and the adapter resets its port mode based on the current connection type)
4. If the symptom is not resolved, and you have not yet done Quick Tip 1 above, do Quick Tip 1.

Sun Host

1. Verify the host file "fcaw.conf" has the following settings: "private_loop = 0" and "fc_nport = 1"
2. If changes were made to the file, reboot the host.

3. If the symptom is not resolved, and you have not yet done Quick Tip 1 above, do Quick Tip 1.

5. Symptom: 2108-G07 randomly reboots itself.

Cause: Uncertain.

Quick Tip:

1. Try using SDG firmware 3.40.14 or later. (available from <http://www.storage.ibm.com/hard-soft/products/sangateway/support/cdr/Firmware/sdgfw.htm>)

6. Symptom: 2108-G07 already at firmware 3.40.05

Cause: Debug attempts may have led IBM support to try firmware 3.40.05; however, this is no longer considered an acceptable code load for disk attachments (it is fine for tape).

Quick Tip:

1. Update the SDG firmware to 3.40.08 or later. (available from <http://www.storage.ibm.com/hardsoft/products/sangateway/support/cdr/Firmware/sdgfw.htm>)

7. Symptom: 2108-G07 is attached to a host OS that requires use of a LUN 0 device

Cause: Design of some operating systems (NT and AIX) require use of a LUN 0 device (which conflicts with the SDG default setting).

Quick Tip:

1. Reassign the Command and Control LUN to something other than 0 (default) by issuing the "setSnaCCLun [newLun]" command on the SDG.
2. If the new LUN was already in use, issue the "mapRebuildDatabase" command on the SDG to reassign LUNs.

8. Symptom: Uncertain about settings for 2108-G07 when attaching to a particular operating system

Cause: Inexperience of CE or customer or uncertain about previous tuning made to SDG on previous installation.

Quick Tip:

1. Issue a "setHost [port] [OS]". Note, the default is set to NT. This command modifies how the SDG appears to the host.

disableCC

setHost 0,"aix"

setHost 1,"aix"

Note: in the setHost commands above, the '0' will set all FC ports to AIX mode, the 1, 2, or 3 will set the specific FC port to AIX mode. For additional information, check the release notes at the SDG download website filename ***AIX.readme.txt***

2. Issue a "reboot" for the change to take affect.

9. Symptom: SCSI errors or data errors on the SCSI side of the connection

Cause: Various. Two causes may be poor installation of SCSI cables or excessive weight of cables causing excess stress at connectors.

Quick Tip:

1. Verify the SCSI cables are properly attached to the ESS (i.e. screws tight, grounding mesh

attached to frame, cable passed through bottom of ESS).

2. Verify the SCSI cables are properly attached to the SDG (i.e. screws tight, plug perpendicular to back of box).
3. Tighten screws as necessary.
4. Use tie-wraps as necessary to relieve stress on connectors.
5. If above does not apply or fixing cable installation as stated above does not resolve problem, replace cables.

10. Symptom: Fibre errors or data errors on the Fibre Channel side of the connection

Cause: Various. Three causes may be poor alignment, excessive bend, or dirty ends of Fibre cables.

Quick Tip:

1. Reseat Fibre cables at both ends of connection.
2. Verify no bend of the Fibre cable is tighter than the curvature of a quarter.
3. Look for debris on end of cable. Clean as necessary (use compressed air/gas dust spray).
4. If the above does not resolve the problem, replace the fiber cables.

Chapter 3. Installation - RS6000/AIX

This section describes the steps that need to be executed to complete the installation of a SAN data gateway in a RS6000 environment. It is a direct continuation of the steps already performed in Chapter 2, "Installation - Common" on page 11 (steps 1 through 8).

AIX Maintenance required for Fibre Channel support

Currently the required OS Fix levels for AIX with fibre attachments is Service Level 03 (which has an APAR number of IY09047) and APAR IY08690.

Together, Service Level 3 and PTF for IY08690 will encompass the following APARs:

- IY05369
- IY03871
- IY03872
- IY03911
- IY04166
- IY04607
- IY04981
- IY06844 (Service Level 2)
- IY08960

There doesn't appear to be an easier way to check what APARs/PTFs are already included in a Service Level. Had to find all the files in the individual APARs and then compare them to the files in SL3. Think there should be a release note stating what is fixed in a given Service Level (maybe there is, but couldn't find it?).

3.1 Service Representative Installation Steps

3.1.1 Adapter and adapter microcode/firmware installation

1. **Step 9B** install the fibre channel adapter cards if not yet installed (step **9A** has not changes or tips).
2. **Step 10** install/upgrade the adapter microcode and device driver if not yet done

Note: Before you install the microcode, it is important to determine the FRU Number and Micro code level of the adapter installed in the target system. Use the following instructions to read the FRU number stored in the adapter's nonvolatile memory.

a. List the Fiber Channel PCI adapters installed in the system by typing:

```
lsdev -C | grep "fcs"
```

Note the device names of all the Gigabit Fiber Channel PCI Adapters installed. The adapter device names will be fcsX, where X is 0,1, or some other number.

b. To check the current microcode level for the adapter enter the following command:

lscfg -vl fcs0X

where **X** is the number/s of the previous command.

The Command will produce output similar to:

DEVICE	LOCATION	DESCRIPTION
scraid0	00-04	IBM Gigabit Fiber Channel PCI Adapter

Part Number.....24L0023 or 03N4167

Serial Number.....00000000

ROS Level and ID.....029022F0

Device Specific (Z9).....SS2.23

Device Specific.(YL).....P2-I5

If the ROS Level and ID is less than 029022F0 then you should update the adapter's microcode.

3.1.1.1 Updating the adapter's microcode

To update the microcode on the Adapter please follow the instructions below.

With the machine powered ON and AIX operational, perform the following steps to install the FLASH code into your adapter.

1. Log in as the **root** user
2. Download and unpack the files into the root subdirectory, being careful to follow the RS/6000 microcode download procedure.
 - This will unpack the files into /etc/microcode.
3. You are now ready to FLASH the EEPROM in the adapter using the single command:

diag -c -d fcsX -T"download"

Where X is the number found from the **"lsdev -C | grep scraid"** command. Repeat the above command for all the cards that need the update.

3.1.1.2 Step 11. Install the FC device drivers

It is recommended that you upgrade both adapter microcode and AIX device drivers at the same time.

1. Login as **root**.
2. Create an empty directory and cd into it.
3. Select your AIX version to download (**If you are downloading it from the Web**).
 - Save the file onto your system in the directory you created in step one
4. If you are not downloading from the web copy the file into the directory that was setup in step 2.
5. Run smitty install
6. Select install & update software
7. Select install & update from ALL available software
8. Use the directory from step 2 as the install device
9. Select all filesets in this directory for install
10. Execute the command
11. Exit Smit

3.2 Step 12. Install the SANMGNT code

This package only works with the IBM Fibre Channel driver, **fscsi**, it does not work with Emulex's version of the FC driver for AIX. Make sure this driver is installed and the latest APARs or PTFs have been applied to your system.

Install **vpsreg** using the **installp** command:

```
installp -a -d vps111.bff all
```

Add the following command to **/etc/rc.net** to enable periodic host registration:

```
usr/bin/vpsreg -i 15 -D &
```

You can also manually execute the command **vpsreg**; it will display information on each SAN Gateway it finds as you boot.

vpsreg options

- **-D** (upper case).. run as a daemon (must use the & to send it to background). Also sets silent mode.
- **-i** valuespecify the re-registration interval in minutes. Default is 15, the range is 1-255. A value of 0 will prevent periodic registrations.
- **-s**..... run in silent mode at the command prompt; no output produced at the command terminal.
- **-S**shutdown the daemon/background process
- **-v**..... displays more information and shows attached devices

3.2.1 Removing vpsreg

To remove the VPS registration service, execute the command

```
installp -u vps111.bff
```

Release Notes:

Issues addressed:

- **Step 12** Go to page 54 of the User Guide (Virtual Private SAN and Channel Zoning)
- Configure the drives that are needed.
- Run `cfgmgr` to attach the drives to the System

3.3 San DataGateway feature code 3020 attachment requirements

3.3.1 Non-Switched:

ESS 1.1 for Exx-model and Fxx-model hardware = JBldg0427

SDG with f/c2214 for FC3020 = 3.40.14

AIX 4.3.3 with Emulex LP7000E at 030800 device driver with 2.2.3 code

ODM timeout values at 180 and qdepth at 24

3.3.2 Switched:

ESS 1.1 for Exx-model and Fxx-model hardware = JBldg0427

SDG with f/c2214 for FC3020 = 3.40.15

AIX 4.3.3 with Emulex LP7000E at 030800 device driver with 2.2.3 code

2109 = 2.3 firmware

McData ED5000 = 2.0 firmware

ODM timeout values at 180 and qdepth at 24

3.4 Required AIX parameter changes

You can check the `queue_depth` and `timeout` values set for ESS by issuing the `list attributes` command *lsattr*. Updating the ODM, modifying `queue-depth` and `timeout` values may be required and is described below.

Note: when you change ODM values, the changes are not persistent. The ESS install script settings will be the default settings.

3.4.1 How to modify the io queue_depth

modify `queue_depth` setting to 24 for SDG operation

```
chdev -l hdiskn -a queue_depth=24
```

where 'n' is the number of the lun

Chapter 4. Installation Sun Servers/Solaris

This section describes the steps that need to be executed to complete the installation of a SAN data gateway in a Sun server environment. It is a direct continuation of the steps already performed in Chapter 2, "Installation - Common" on page 11

4.1 Service Representative Installation Steps

4.1.1 Install the necessary drivers and PTFs/patches

This README file for installing the JNI HBA drivers for Solaris 2.5.1, 2.6 and Solaris 7 contains information for using the JNI Sbus Adapters with the SAN Datagateway. This file supplements the information provided on the JNI web site. Read the installation information from JNI first.

Obtain the JNI drivers from the Jaycor Networks download page at <http://www.jni.com/drivers.html>

CAUTION: 32-bit and 64-bit drivers are not interchangeable with each host bus adapter. Please install the correct driver and refer to the list below for correct driver name.

HBA Part Number	Driver Name	Driver Package
FC-1063	(32-bit) fca	fca.pkg
FC64-1063	(64-bit) fcaw	fcaw.pkg

Note: FC64-1063 and FC64-1063-EMC are the same adapter.

4.1.2 FC-1063 INSTALLATION

4.1.2.1 FC-1063 Installation

To install the 32-bit driver, first remove any existing driver using the command

```
pkgrm JNIfca
```

Install the new driver using the command

```
pkgadd -d fca.pkg
```

4.1.2.2 FC64-1063 Installation

To install the 64-bit driver, first remove any existing driver using the command

```
pkgrm JNIfcaw
```

Install the new driver using the command

```
pkgadd -d fcaw.pkg
```

To force the 64-bit Sbus HBA to 32-bit mode, add this line to

the */etc/system* file:

```
set fcaw:force32 = 1
```

4.1.3 Install the FC adapter card(s)

Install the fibre channel adapter(s) in the server

4.2 SANMGNT Code Installation

You can assign Hard ID to the SAN Gateway using either the SAN Data Gateway Specialist (aka SAN Director) or through the Service Port.

4.2.1 San Data Gateway Specialist -

- SAN Director - select a Gateway, then choose the Fibre Channel connection and select the Controls, Fibre Channel menu item. Click on the Hard ID box and select an ID from the drop down list (make sure it is not is use by any other device on the loop). Changes made will not take effect until the Gateway or Router is rebooted - and you almost certainly will need to reboot the host as well.
- The display always shows the exact loop ID assigned to the channel, so if it does not match the selected Hard ID, there is another device set to use that address on the loop. Also, when the loop is down (nothing connected or hosts powered off), the loop ID is not meaningful.

4.2.2 Service Port

Enter the **setFcHardId** command as follows:

- Gateway> **setFcHardId 1,5**
- This will set SAN Connection 1 to a hard ID of 5 when the Gateway is rebooted.

WARNING

Changing the Hard ID may result in devices being not recognized by the host systems or the device addresses changing. You should shut down all hosts before you do this to prevent data corruption. You will also need to reconfigure devices: a reconfiguration boot on Solaris, changing hard assigned SCSI addresses such as used by some backup applications, etc.

Contents of this directory and version information:

4.3 Customization and Configuration after Installation

The JNI adapters must be configured for proper use with the SAN Gateway and attached storage devices. This section provides critical information that supplements the Jaycor JNI adapter documentation.

Scanning for LUNs

- In order to use LUNs greater than 8, the sd.conf (or st.conf for tape attach) must be modified. These files are located in **/kernel/drv**.

kernel/drv sd.conf:

- For disk devices, add lines of the following format to ***sd.conf***.

```
name="sd" class="scsi" target=0 lun=1;
```

Add one line for each LUN that needs to be scanned. The SAN Gateway supports up to 255 LUNs. LUN ID values normally incremented sequentially.

For attaching tape devices using the standard st driver, edit ***st.conf*** and add lines similar to

```
name="st" class="scsi" target=0 lun=1;
```

NOTE: Many tape applications use their own drivers and bypass the Solaris st driver. Consult your application's documentation for information on configuring the specific driver to support additional LUNs.

4.3.0.1 System Parameters

Here are three parameters that should be set in ***/etc/system*** should to optimize the JNI adapter driver for use with the SAN Gateway.

- ***sd_max_throttle***

The `sd_max_throttle` variable is the maximum number of outstanding commands that the SCSI target driver (`sd`) will attempt to queue to the targets, like `io_queue_depth` in AIX. The default value is 256, but this variable must be set to a value less than the maximum queue depth of any LUN attached to the SAN Gateway (for devices that support command queuing, such as RAID subsystems. For attachment to the IBM VSS or ESS, this value should be set to 24. Insert the line

```
set sd_max_throttle = 24
```

in ***/etc/system***. (This only affects disk devices, not tape drives.)

For other disk devices, you may need to experiment to obtain the best performance, or contact the disk subsystem vendor.

- ***maxphys***

The system variable `maxphys` determines the maximum number of bytes that can be transferred per SCSI transaction. This variable is set in the ***/etc/system*** file as

```
set maxphys = nnn
```

The default value is 126976 (124KB); however, this value may vary depending on the version of the `sd` driver. If an I/O block size exceeds the default value, the I/O request will be broken up into multiple requests - each request not exceeding the default size. This value should be tuned to the intended use and application

Requirement: Ask the customer what size block will be transferred.

NOTE: Do not set this `maxphys` value greater than 8 MB.

- ***sd_io_time***

The variable `sd_io_time` sets the time-out for disk operations. For storage attached to fibre channel interfaces (such as the SAN Gateway), this value should be set as follows:

```
set dd:sd_io_time=0x3c
```

Example: sd.conf file for an ESS using ID 20 and through a switch.

Use of ID larger than 15 indicates to Solaris that the definition is for a fibre channel device, it is an arbitrary number. The devices with SCSI target IDs within the standard SCSI address range(0-15) are SCSI devices. The WWN(worldwide name) in each FC lun definition is the WWN of the SDG.

```
# Copyright (c) 1992, by Sun Microsystems, Inc.
#
#ident "@(#)sd.conf1.8 93/05/03 SMI"
name="sd" class="scsi" target=0 lun=0;
name="sd" class="scsi" target=1 lun=0;
.
.
.
name="sd" class="scsi" target=14 lun=0;
name="sd" class="scsi" target=15 lun=0;
name="sd" class="scsi" target=20 lun=0 hba="fca-pci0" wwn="200100604516050d";
name="sd" class="scsi" target=20 lun=1 hba="fca-pci0" wwn="200100604516050d";
name="sd" class="scsi" target=20 lun=2 hba="fca-pci0" wwn="200100604516050d";
name="sd" class="scsi" target=20 lun=3 hba="fca-pci0" wwn="200100604516050d";
..
.
..
name="sd" class="scsi" target=20 lun=124 hba="fca-pci0" wwn="200100604516050d";
name="sd" class="scsi" target=20 lun=125 hba="fca-pci0" wwn="200100604516050d";
name="sd" class="scsi" target=20 lun=126 hba="fca-pci0" wwn="200100604516050d";
name="sd" class="scsi" target=20 lun=127 hba="fca-pci0" wwn="200100604516050d";
name="sd" class="scsi" target=20 lun=128 hba="fca-pci0" wwn="200100604516050d";
*
*
* SYSTEM SPECIFICATION FILE
*
* moddir:
*
* Set the search path for modules. This has a format similar to the
* csh path variable. If the module isn't found in the first directory
* it tries the second and so on. The default is /kernel /usr/kernel
*
* Example:
* moddir: /kernel /usr/kernel /other/modules
*
* root device and root file system configuration:
*
* The following may be used to override the defaults provided by
* the boot program:
*
* roots: Set the file system type of the root.
*
* rootdev: Set the root device. This should be a fully
```

* expanded physical pathname. The default is the
 * physical pathname of the device where the boot
 * program resides. The physical pathname is
 * highly platform and configuration dependent.
 *

* Example:

```
roots:ufs
rootdev:/sbus@1,f8000000/esp@0,800000/sd@3,0:a
```

* (Swap device configuration should be specified in /etc/vfstab.)

* exclude:

* Modules appearing in the moddir path which are NOT to be loaded,
 * even if referenced. Note that `exclude' accepts either a module name,
 * or a filename which includes the directory.
 *

* Examples:

```
exclude: win
exclude: sys/shmsys
```

* forceload:

* Cause these modules to be loaded at boot time, (just before mounting
 * the root file system) rather than at first reference. Note that
 * forceload expects a filename which includes the directory. Also
 * note that loading a module does not necessarily imply that it will
 * be installed.
 *

* Example:

```
forceload: drv/foo
```

* set:

* Set an integer variable in the kernel or a module to a new value.
 * This facility should be used with caution. See system(4).
 *

* Examples:

* To set variables in 'unix':

```
set nautopush=32
set maxusers=40
```

```
*      To set a variable named 'debug' in the module named 'test_module'
*
*      set test_module:debug = 0x13
```

```
* The shmsys:shminfo_shm lines below are added during jumpstart
set shmsys:shminfo_shmmax=16777216
set shmsys:shminfo_shmseg=64
set shmsys:shminfo_shmmni=1024
* See http://www.sun.com/sun-on-net/performance/priority\_paging.html
set priority_paging=1
* pt_cnt and npty set the number of ptys available
set pt_cnt=1024
set npty=1024
* The watchdog_enable line below restarts a hung machine
set watchdog_enable=1
* The noexec_user_stack lines below reduce the risk of security breaches
set noexec_user_stack=1
set noexec_user_stack_log=1
set sd:sd_max_throttle=24
set sd:sd_io_time=0x3c
* vxvm_START (do not remove)
forceload: drv/atf
forceload: drv/pln
forceload: drv/ses
forceload: drv/vxdmp
forceload: drv/vxio
forceload: drv/vxspec
forceload: drv/sd
forceload: drv/scsi
forceload: drv/pci
forceload: drv/ssd
forceload: drv/sf
forceload: drv/soc
forceload: drv/socal
rootdev:/pseudo/vxio@0:0
set vxio:vol_rootdev_is_volume=1
* vxvm_END (do not remove)
```

```
* vxfs_START -- do not remove the following lines:
```

```
*
* VxFS requires a stack size greater than the default 8K.
* The following values allow the kernel stack size
* for all threads to be increased to 16K.
*
set lwp_default_stksize=0x4000
set rpcmod:svc_run_stksize=0x4000
* vxfs_END
```

```
*****
*****
```

File Viewer- fca-pci.conf

```

*****
*****
## fca-pci.conf - JNI FCA DRIVER (Solaris SCSI-IP HBA) CONFIGURATION FILE

# Configuration variable scsi-initiator-id
# Type: integer, 0-125; default: none (must be explicitly set for PCI driver)
# Defines the adapters SCSI ID (and hence FC AL_PA) on the loop
scsi-initiator-id = 0x7d;

# Configuration flag fca_nport
# Type: boolean; default: 0 (false)
# If false (0), then fca initializes on a loop
# If true (1), then fca initializes as an N_Port
#   and fabric operation is enabled
fca_nport = 1;

# Configuration flag publicly
# Type: boolean; default: 0 (false)
# If false (0), then fca-pci initializes according to what fca_nport is set to
# If true (1), then fca initializes as an N_Port on a public loop
#   and fabric operation is enabled via the FL_Port of the switch
# if public_loop = 1, then fca_nport is overridden to be 0
public_loop = 0;

# Configuration flag ip_disable
# Type: boolean; default: 0 (false)
# if false (0), then the IP side of the driver is enabled
# if true (1), the IP side of the driver is completely disabled
ip_disable = 0;

# Configuration variable qfull_retry_count
# Type: integer, count; default: 0
# Defines the number of times a command is retried by the HBA if a target
# rejects it with a queue full status.
# if 0, then the HBA will retry forever
# if > 0, then the HBA tries at least qfull_retry_count times
# if qfull_retry_count exceeded, then the HBA returns the command to the target
# driver with reason set to transport error.
qfull_retry_count = 0;

# Configuration variable qfull_retry_interval
# Type: integer, milliseconds; default: 1000
# Time the HBA waits before retrying a rejected command due to queue full
qfull_retry_interval = 1000;

# Configuration variable failover
# Type: integer, seconds; default: 30
# Defines the number of seconds after target is declared "offline"

```

```
# before target is declared "failed" and all pending commands
# are flushed back to the application.
# See failover_extension for additional info.
failover = 0;

# Configuration variable failover_extension
# Type: integer, seconds; default: 0
# Extends a target's failover period by this number of seconds to perform target rediscovery.
# If defined and the target has pending commands at the time it is declared "failed",
# the target will first be declared "missing" for this period before being declared "failed".
# When a target is declared "missing" the link will be reset once and targets will be rediscovered.
# This provides a "last chance" opportunity for the target to go "online" before
# the target is declared "failed" and all pending commands are flushed.
# See failover for additional info.
failover_extension = 0;

# Configuration variable recovery_attempts
# Type: integer, count; default: 5
# Defines the number of times login_recovery is attempted before failed
recovery_attempts = 5;

# Configuration flag class2_enable
# Type: boolean; default: 0
# If set to 1 (true), then FC Class 2 exchanges (ACK_1 model) are enabled for
# devices which support it [even when connected to a loop].
class2_enable = 0;

# Configuration variable fca_heartbeat
# Type: value, microseconds; default: 0
# Defines the number of microseconds between "heartbeat" frames.
# Only used for debugging.
fca_heartbeat = 0;

# Configuration flag reset_glm
# Type: boolean; default: 0
# If non-zero, then the Gigabit Link Module will be reset before
# adapter initialization. This is a workaround for specific boot-up
# conditions.
reset_glm = 0;

# Configuration flag time-out_reset_enable
# Type: boolean; default: 0
# When a command times out to a target, the driver can attempt to clear the problem in two ways:
# 1. (time-out_reset_enable = 1) Reset the target.
# 2. (time-out_reset_enable = 0) Send an abort exchange (ABTS_LS) request to the target.
time-out_reset_enable = 0;

# Configuration flag busy_retry_delay
# Type: unsigned int; default: 100
# Sets delay between retries after a SCSI device returns a BUSY response for a command.
```

```

# The delay is in milliseconds with a 10 millisecond resolution.
busy_retry_delay = 500;

# Configuration flag link_recovery_delay
# Type: unsigned int; default: 1000
# Sets delay between link up state and login recovery.
# This delay helps ensure link stability before recovery of communications to ports.
# The delay is in milliseconds with a 10 millisecond resolution.
# for combined SCSI/IP operation, this should be set to at least 1000
link_recovery_delay = 1000;

# Configuration flag scsi_probe_delay
# Type: unsigned int, milliseconds; default: 500
# Sets delay before SCSI probes are allowed to occur during boot.
# This allows time for the driver to build a network port list for target binding.
# The delay is in milliseconds with a 10 millisecond resolution.
scsi_probe_delay = 500;

# Configuration flag def_hba_binding
# Type: string; default: "fca-pci*" (means all target/lun instances will be initialized by all fca-pci instances)
# Sets the default HBA binding for every target/lun instance which does not explicitly define one.
#   - A "*" following an hba name indicates all instances of that hba driver
# *See technote for details on hba bindings
def_hba_binding = "fas*";

# Configuration flag def_wwXn_binding where X is either n for node or p for port.
# Type: string; default: "$xxxxxxxxxxxxxxxx" (means WWXN is "static don't care")
# Sets the 16 digit hexadecimal default wwXn binding for every target/lun instance which does not
# explicitly define one.
#   - A "$" preceding the string indicates static binding enabled
#   - A "x" in place of a digit indicates "don't care" for that digit
# *See technote for details on wwn bindings
def_wwpn_binding = "$xxxxxxxxxxxxxxxx";
def_wwnn_binding = "$xxxxxxxxxxxxxxxx";

# Configuration flag def_port_binding
# Type: string; default: "xxxxxx" (means PORT is "non-static don't care")
# Sets the 6 digit hexadecimal default port binding for every target/lun instance which does not
# explicitly define one.
#   - A "$" preceding the string indicates static binding enabled
#   - A "x" in place of a digit indicates "don't care" for that digit
# *See technote for details on port bindings
def_port_binding = "xxxxxx";

# Configuration flag fca_verbose
# Type: boolean; default: 1
# Determines how many messages are displayed directly to the console.
#   - A "0" will quiet the driver messages to the console, but still print them to the
#     system message log.
#   (NOTE: a "boot -v" will override this setting and make the driver verbose again)

```

```
# - A "1" will make the driver print all messages to the console and to the system
# message log.
fca_verbose = 0;
```

```
*****
*****
```

Lun Visibility with ESS and Gateway at boot time

```
*****
*****
```

What is seen at boot time in *dmesg* is below.

This is with a completely standard *sd.conf* (unmodified).

Rather than see two LUNS which are assigned , or no LUNS as the sample *sd.conf* does not include 93(?) and 123(?) There are four LUN0's one for each of four targets as can be seen below.

None of these LUNS appears when the *format* command is issued.

```
fca-pci0: JNI Fibre Channel Adapter model FCI-1063
fca-pci0: SCSI ID 125 / AL_PA 0x1
fca-pci0: Fibre Channel WWNN: 100000e069c011a9 WWPN: 200000e069c011a9
fca-pci0: FCA SCSI/IP Driver Version 2.4.1, Feb 14, 2000 for Solaris 2.5,2.6
fca-pci0: All Rights Reserved.
fca-pci0: < Total IOPB space used: 1145024 bytes >
fca-pci0: < Total DMA space used: 8458269 bytes >
NOTICE: pci1242,46430 NPORT Initialization Complete, SID=c011a9
NOTICE: pci1242,46430 got_plogi_acc: fffffc Returned version_bb_credit
2006001b common_featu
res_size 80000840
fca-pci0: New Fabric Parameters Received. Resetting...
fca-pci0: LINK DOWN
NOTICE: pci1242,46430 NPORT Initialization Complete, SID=c011a9
fca-pci0: LINK UP (180002ff)
NOTICE: pci1242,46430 got_plogi_acc: fffffc Returned version_bb_credit
2006001b common_featu
res_size 80000840
root on /pci@1f,4000/scsi@3/disk@0,0:a fstype ufs
WARNING: forceload of drv/atf failed
WARNING: forceload of drv/pln failed
```

(This the WWN address of the gateway for each FC port from the Gateway....)

```
fca-pci0: Host: Port 011000 (100000e069c011a9:200000e069c011a9)
fca-pci0: Port 0118ef (10000604516050d:200100604516050d) available.
fca-pci0: Port 011cef (100006045160842:2002006045160842) available.
fca-pci0: Port 0218ef (100006045160842:2001006045160842) available.
fca-pci0: Port 021cef (10000604516050d:200200604516050d) available.
```

NOTICE: pci1242,46430 fffc01 logging out fffc01=new id
/kernel/drv/fcaw symbol ddi_model_convert_from multiply defined

(This is the Gateway control, This address is not seen in the format file)

fca-pci0: **Target 0: Port** 0118ef (100000604516050d:200100604516050d) online.
fca-pci0: **Target 0 Lun 0:** Port 0118ef (100000604516050d:200100604516050d)
present.

fca-pci0: **Port Target 1** 011cef (1000006045160842:2002006045160842) online.
fca-pci0: **Target 1 Lun 0:** Port 011cef (1000006045160842:2002006045160842)
present.

fca-pci0: **Target 2: Port** 0218ef (1000006045160842:2001006045160842) online.
fca-pci0: **Target 2 Lun 0:** Port 0218ef (1000006045160842:2001006045160842)
present.

fca-pci0: **Target 3: Port** 021cef (100000604516050d:200200604516050d) online.
fca-pci0: **Target 3 Lun 0:** Port 021cef (100000604516050d:200200604516050d)
present.

WARNING: forceload of drv/ses failed

Do a ***boot - - - r*** (reconfiguration re-boot to recognize new/changed devices)

Chapter 5. Installation - Windows NT Systems

This section describes the steps that need to be executed to complete the installation of a SAN datagateway in a NT environment. This is a real customer example of a SDG installation in a MSCS 2-node cluster environment. It is a direct continuation of the steps already performed in Chapter 2, "Installation - Common" on page 11 (steps 1 through 8)

5.1 Service Representative Installation Steps

5.1.1 Adapter and adapter microcode/firmware installation

This is an example of the installation of one fibre channel adapter (QLOGIC). The following are the steps executed to install:

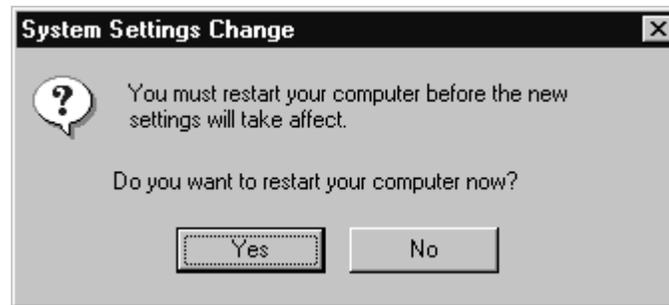
1. Install Qlogic driver
2. CP – SCS – drivers – add
3. Select OEMsetup.INF

Figure 1. Driver Install



4. No to *restart*

Figure 2. Reboot prompt



5. Press OK to complete

6. Regedit

- LargeLUNs = 1

Figure 3. Large LUNs 1

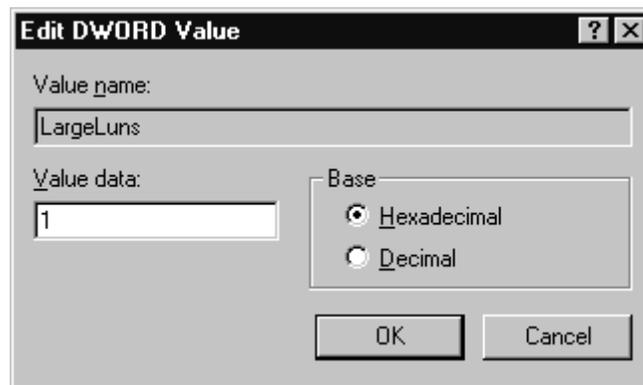
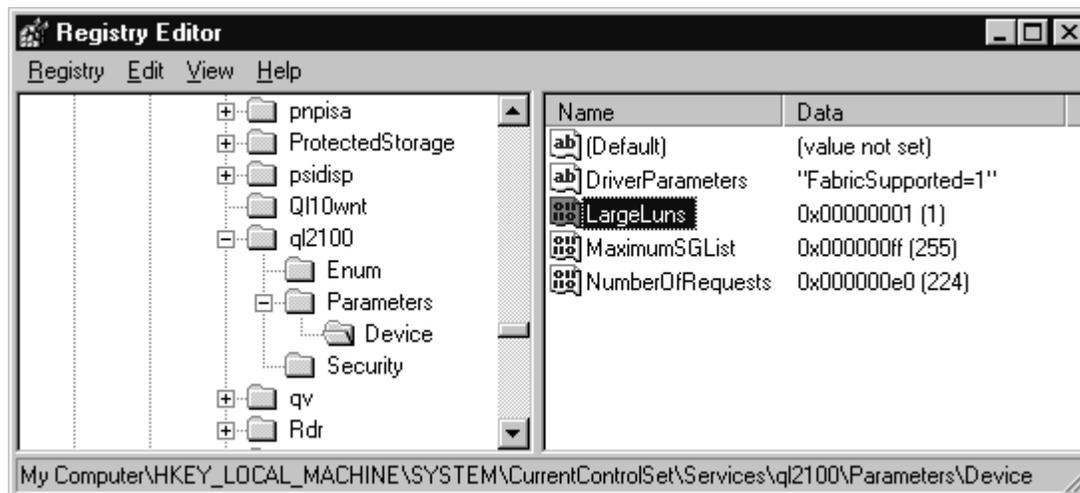


Figure 4. Large LUNs 2



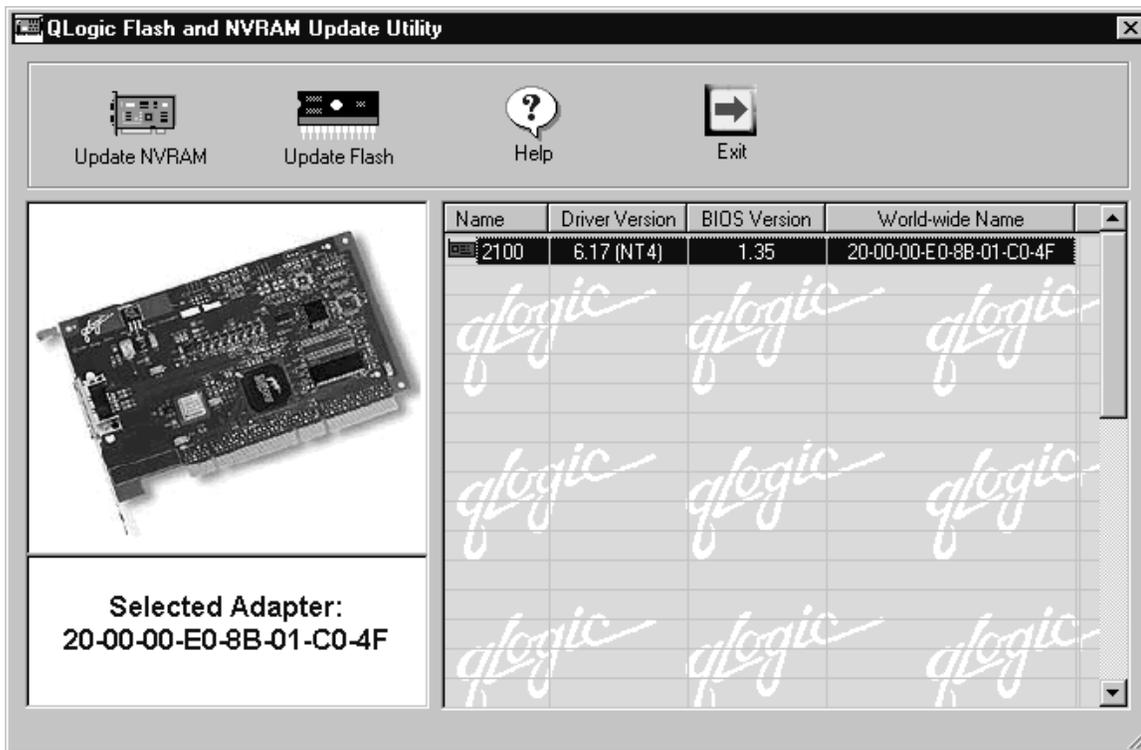
7. Reboot

8. Install QLgix utility from BIOS directory

9. Run QUTIL.EXE

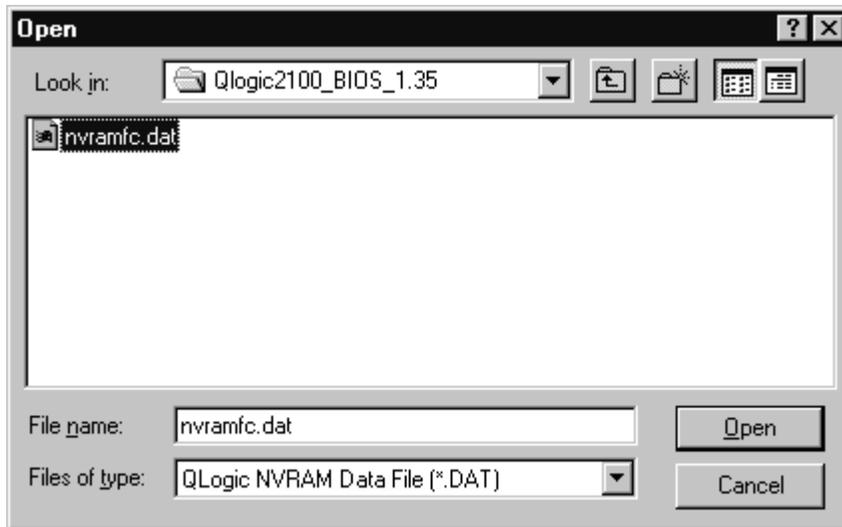
10. After QLogic splash screen, press Next
11. Accept default path and program folder
12. Complete installation
13. Run QLogic BIOS and NVRAM Update Utility

Figure 5. QLogic Flash and NVRAM Update Utility



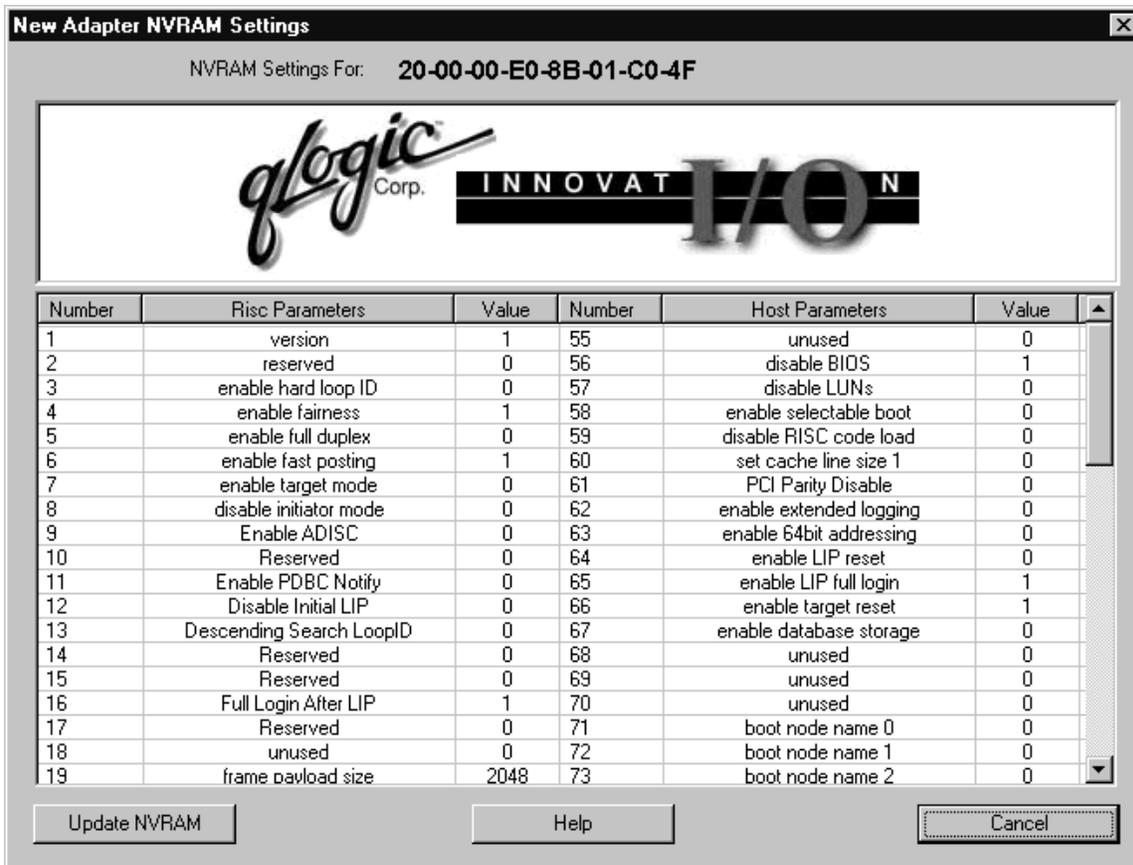
14. Note the WWN for the adapter (20-00-00-E0-8B-01-C0-4F)
15. Update both the NVRAM and BIOS and update if necessary
 - a. Press the NVRAM button
 - b. Select the NVRAMFC.DAT file

c. Selecting NVRAMFC.DAT file



d. Settings windows will be displayed, press update NVRAM

Figure 6. Updating NVRAM



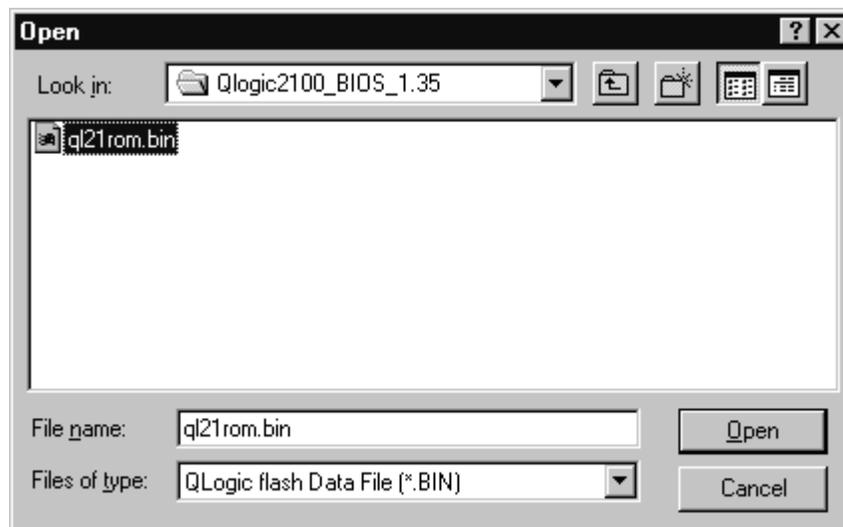
- e. Accept warning and update the NVRAM

Figure 7. Accepting NVRAM setting message



16. Now press **Update Flash** as shown in Figure 5 on page 37 and select the QL21ROM.BIN

Figure 8. Update Flash



- a. Accept the warning and the BIOS will be updated

Figure 9. Flash update message



- b. The BIOS should be listed as version 1.35 in the update utility
 c. Exit from the QLogic update utility

17. Install PathLight SAN Explorer (includes vps111.bff[VPSREG])

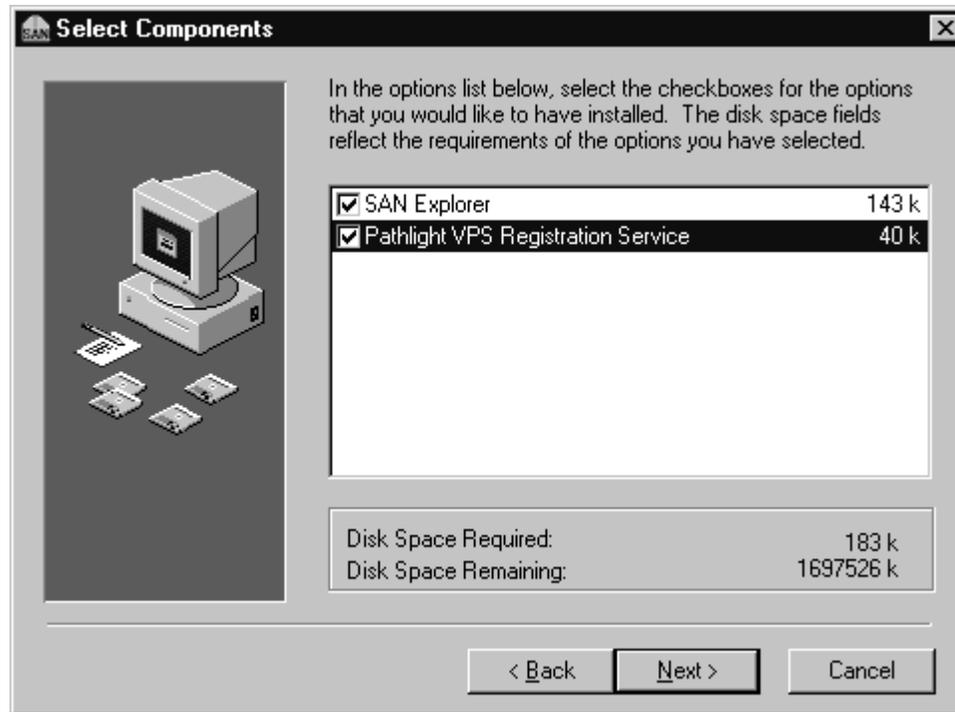
18. Run SANexp.EXE

5.2 NT Disk Administrator Setup

5.2.1 Installing SAN Explorer

1. On Setup welcome window, Press Next, accept license and default path
2. Select both SAN explorer and VPSservice

Figure 10. Selecting SDG options



3. Press next and complete the installation
4. Accept reboot

5.2.2 Configuring the QLogic Adapter

1. When the server is starting watch the storage card BIOS messages
 - Adaptec SCSI
 - ServRAID
 - QLogic 2000/2100 BIOS
2. When QLogic adapter is presented, press Alt-Q to access the Fast!util BIOS settings screen and make changes as follows:
 - Select Host Adapter Settings – Advanced Settings.
 - Use the down arrow to select each setting and press enter to select values:
 - "LUNs per target" – set to 0
 - "Enable Target Reset" – "Yes"
 - "Enable LIP Reset" – "No"
 - "Enable Full LIP Login" – "No"

- Press Esc to back out of the menus and select save changes and Exit Fast!Util
3. Power off the NT system when the Qlogic Fast!Util exits

5.2.3 MSCS Setup (if required)

1. Complete process on MSCS cluster node - A and cluster node - B and provide WWNs to managed storage managers
2. Bring up NT node - A attached to fibre
3. Storage manager will observe the WWN in SAN expert / StorWatch and will assign the drives in the ESS
4. Reboot system
5. Check to make sure the devices made available are visible – use CP – SCSI – expand the Qlogic device or use the SAN explorer

Example for 6 drives

Figure 11. CP - SCSI

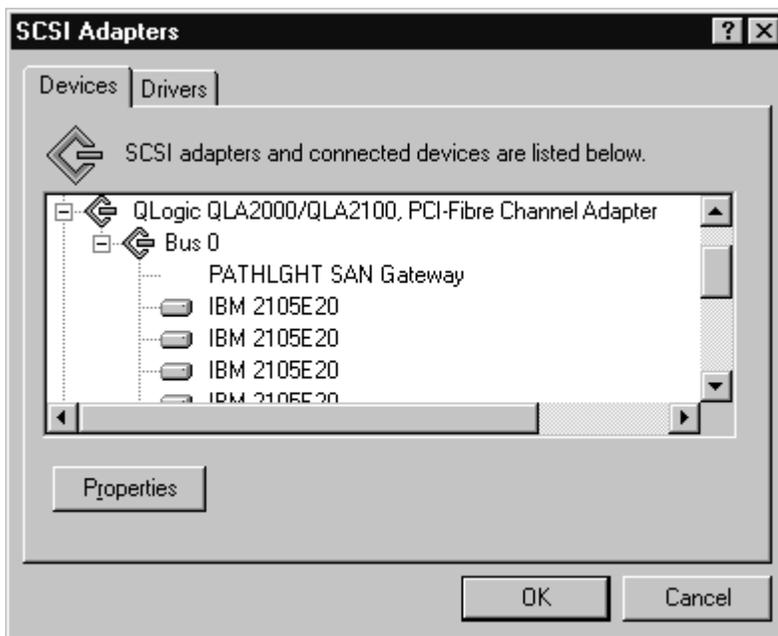
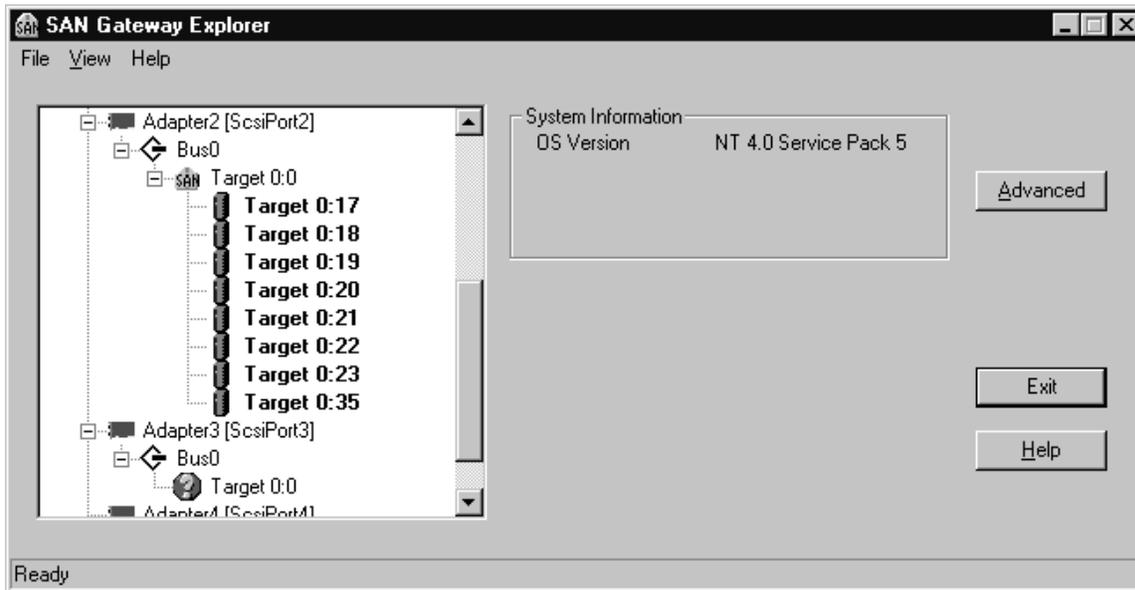


Figure 12. Expand the device



6. Use disk administrator to partition the SAN drives on 1 system. Provide drive letters (at least Q) and quick format with NTFS

Figure 13. Partitioning drives

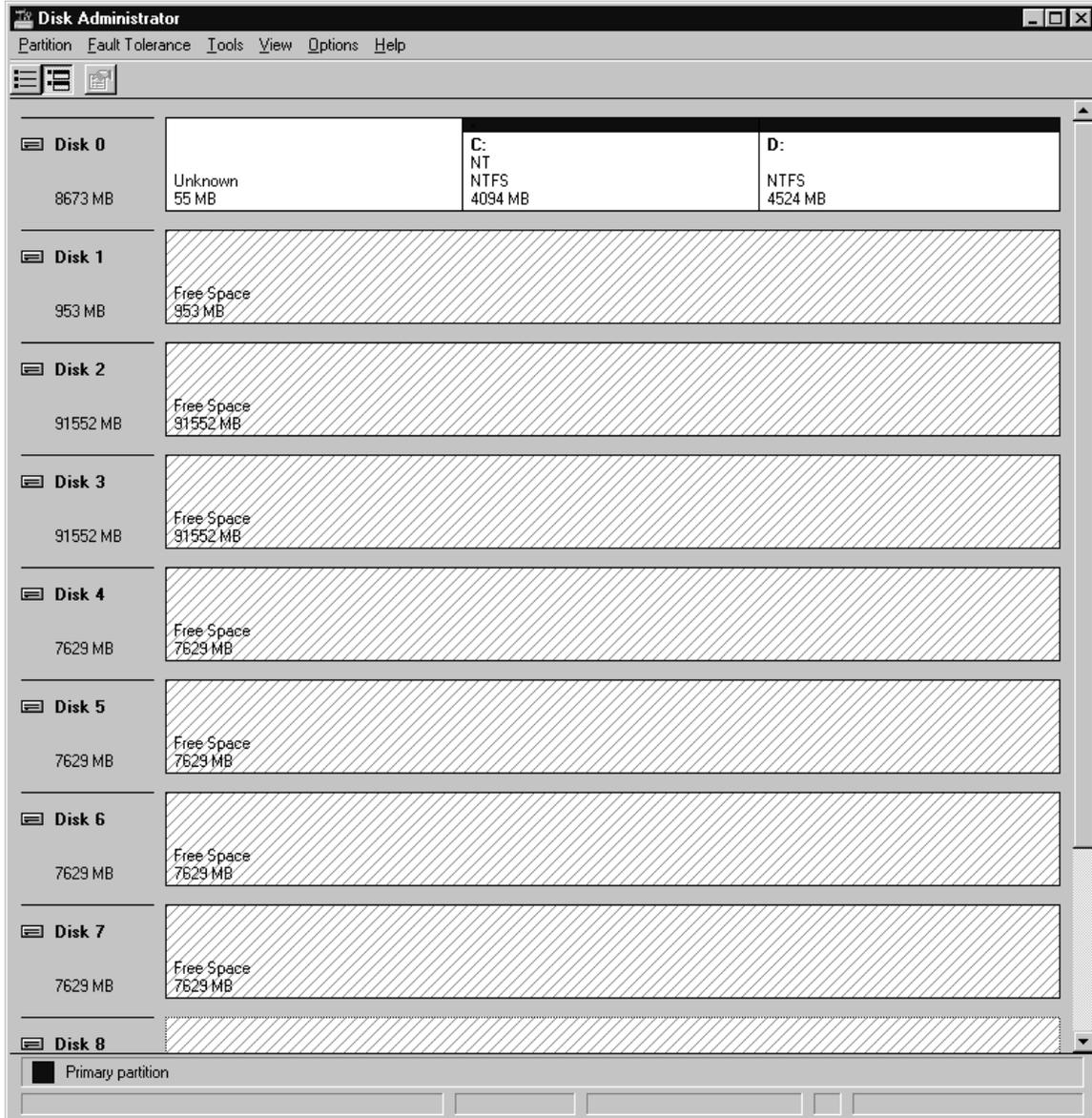
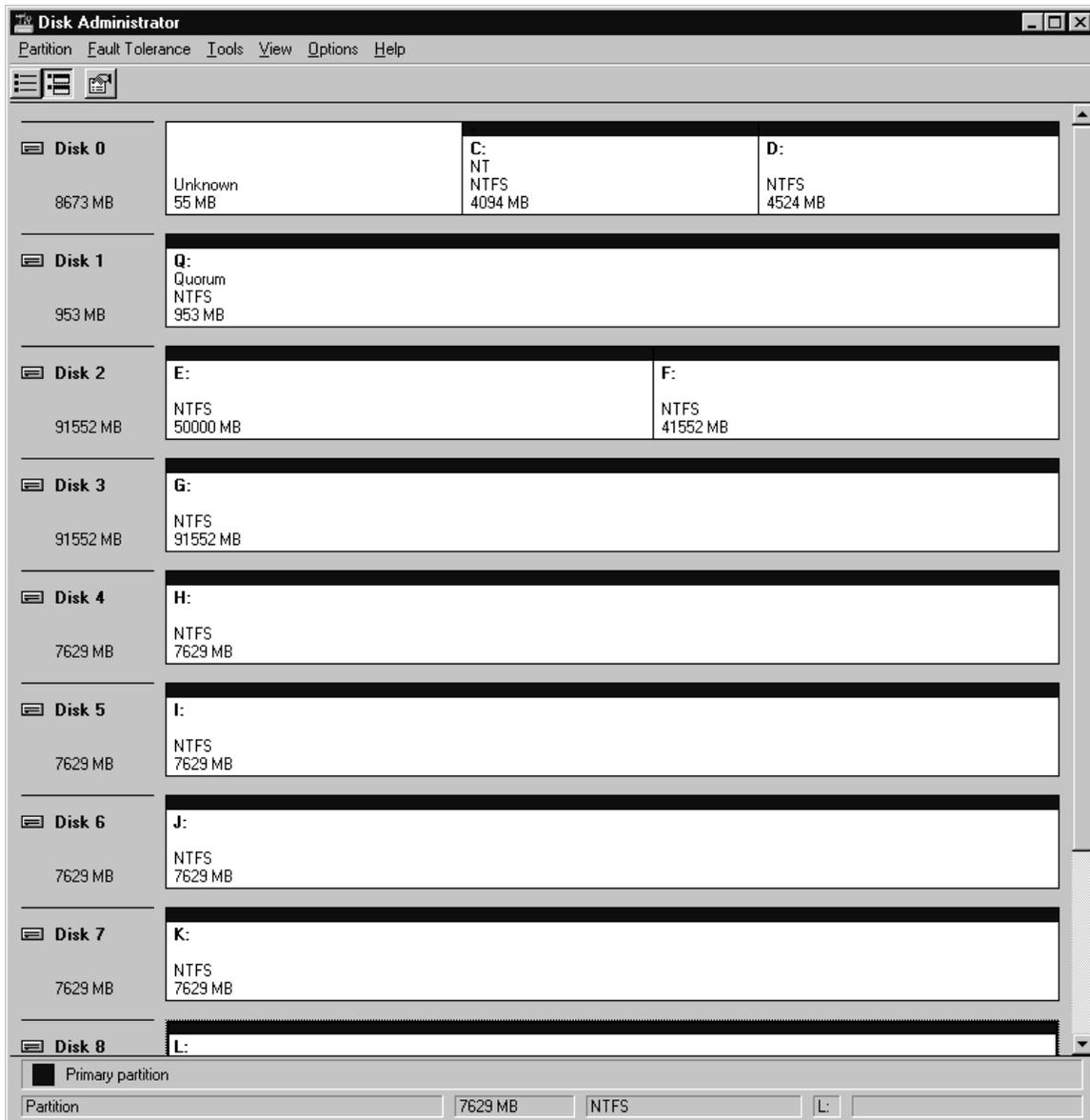
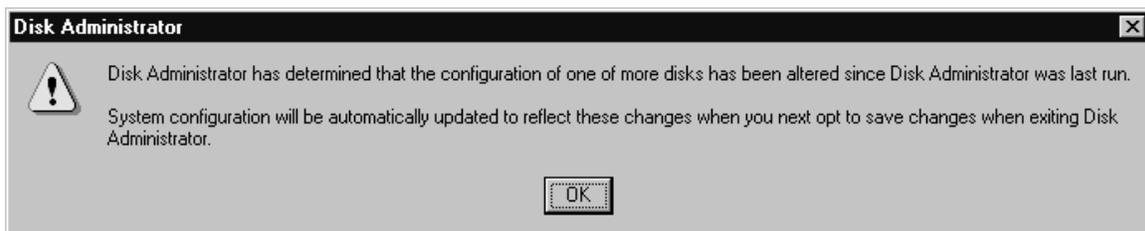


Figure 14. Assigning drive letters



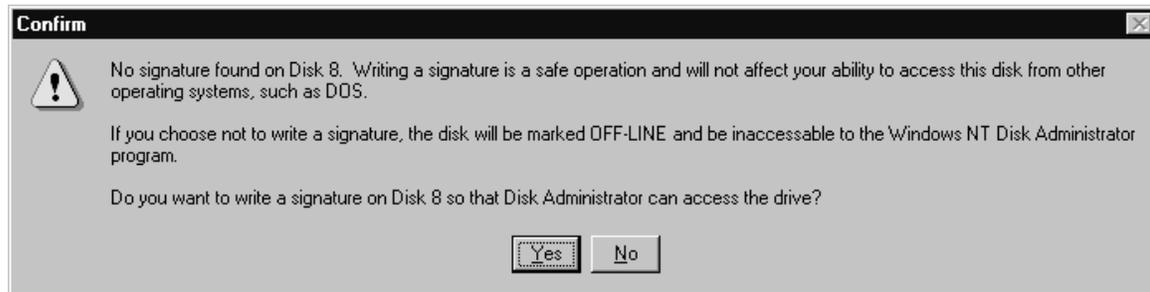
7. With system (node A)1 off and system 2 (node B) on. Assign drive letter the same as in system 1 with disk administrator
8. Disk administrator will recognize new disks

Figure 15. Disk administrator drive reconciliation



9. NT will write disk signatures to new disks (select **yes** as in Figure 17 on page 46).

Figure 16. New Signatures written



10. Check that disks are assigned correctly and change letters / disk number if necessary
11. Now start the other NT system (both started both connected)

12. Install MSCS

Figure 17. MSCS setup (step 1)

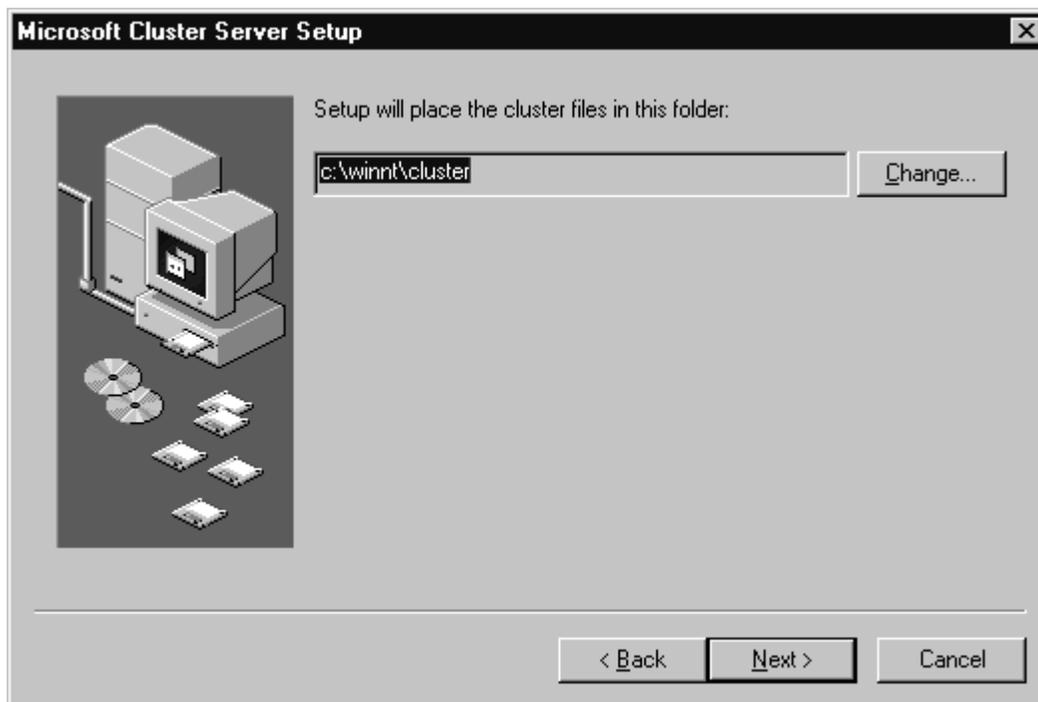


Figure 18. MSCS setup (step2)

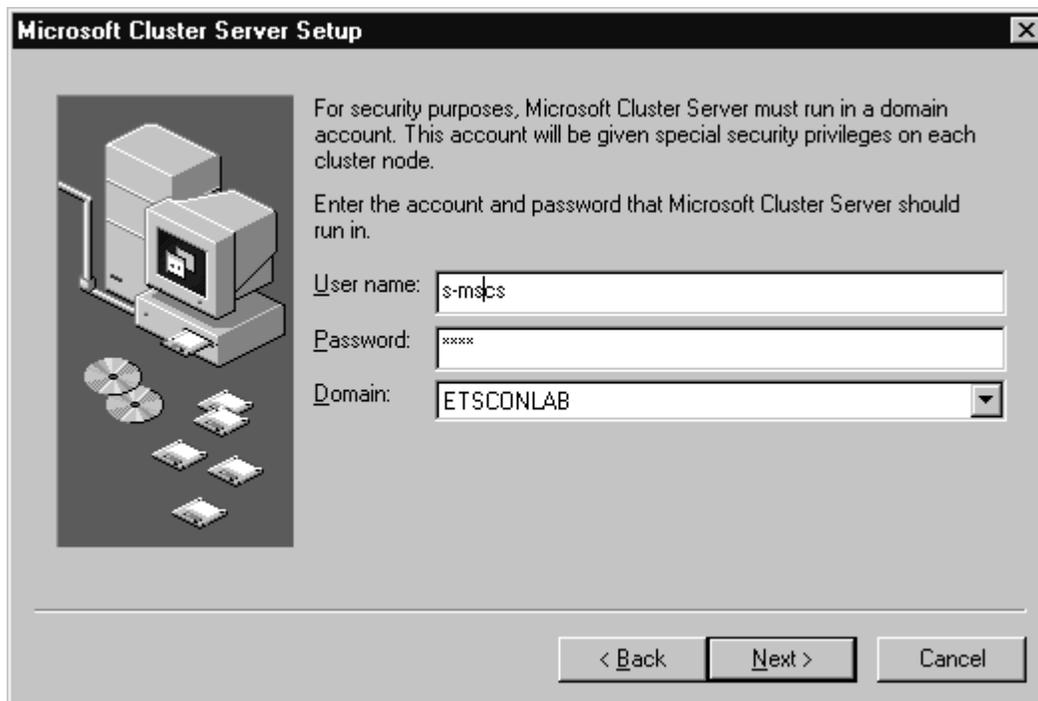


Figure 19. MSCS setup (step 3)

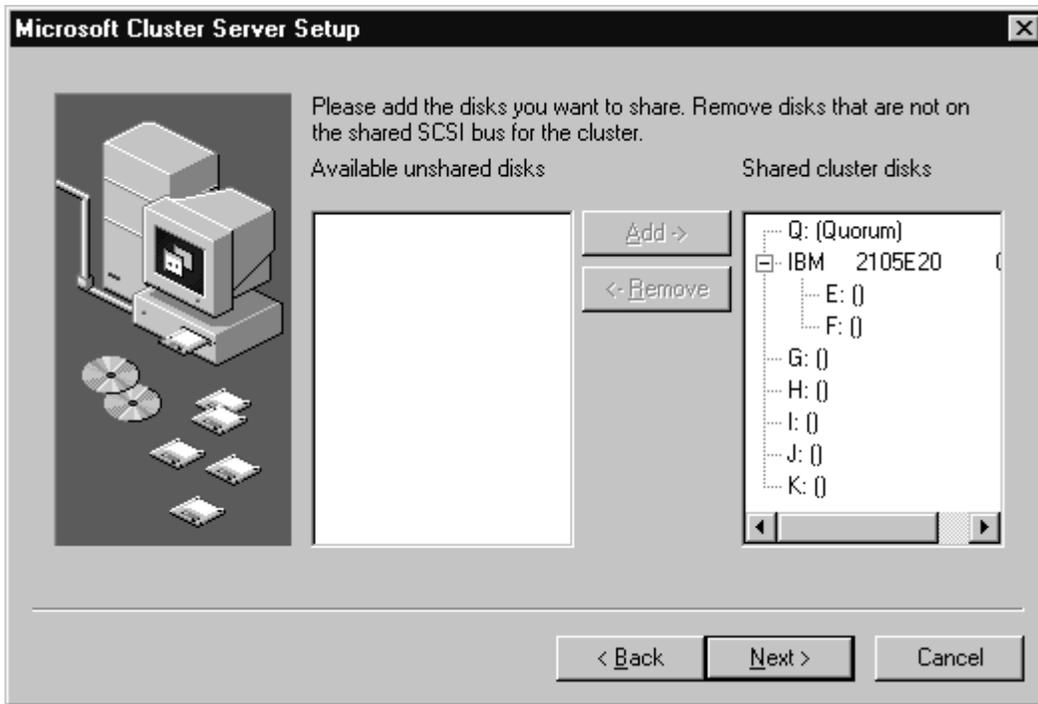


Figure 20. MSCS setup (step 4)

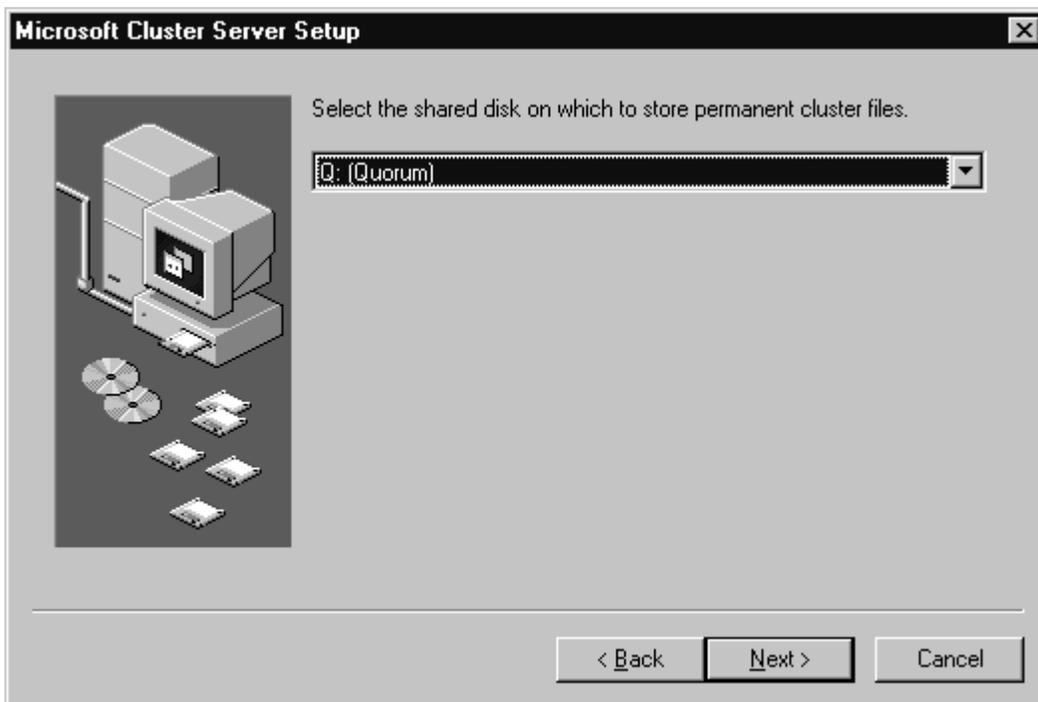
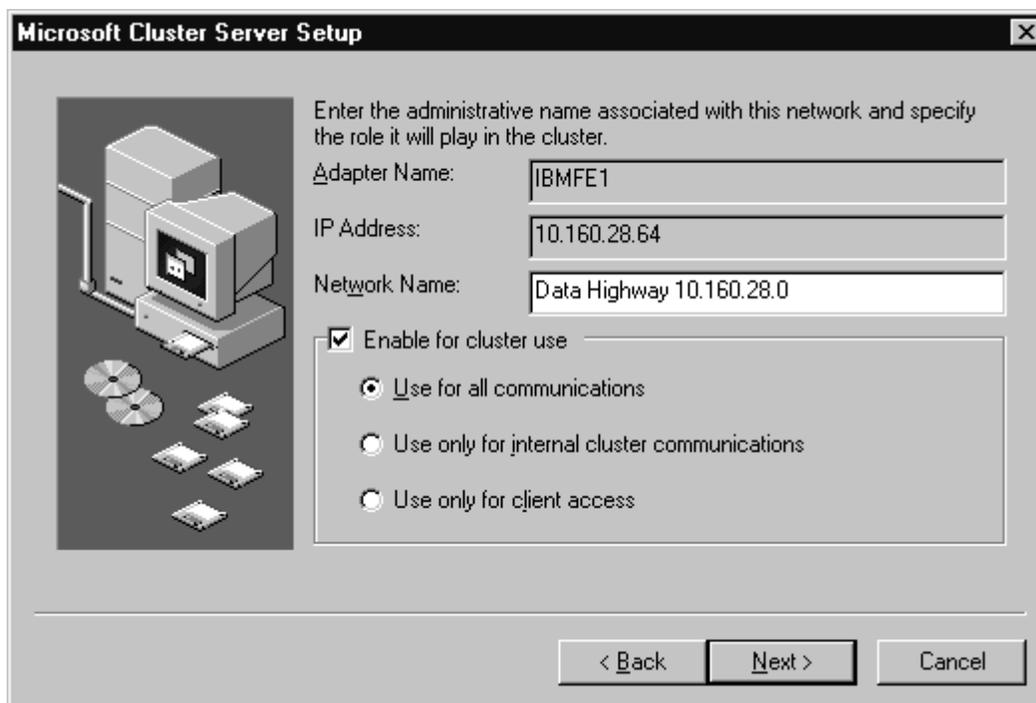


Figure 21. MSCS setup (step 5)



Microsoft Cluster Server Setup

Enter the administrative name associated with this network and specify the role it will play in the cluster.

Adapter Name: IBMFE1

IP Address: 10.160.28.64

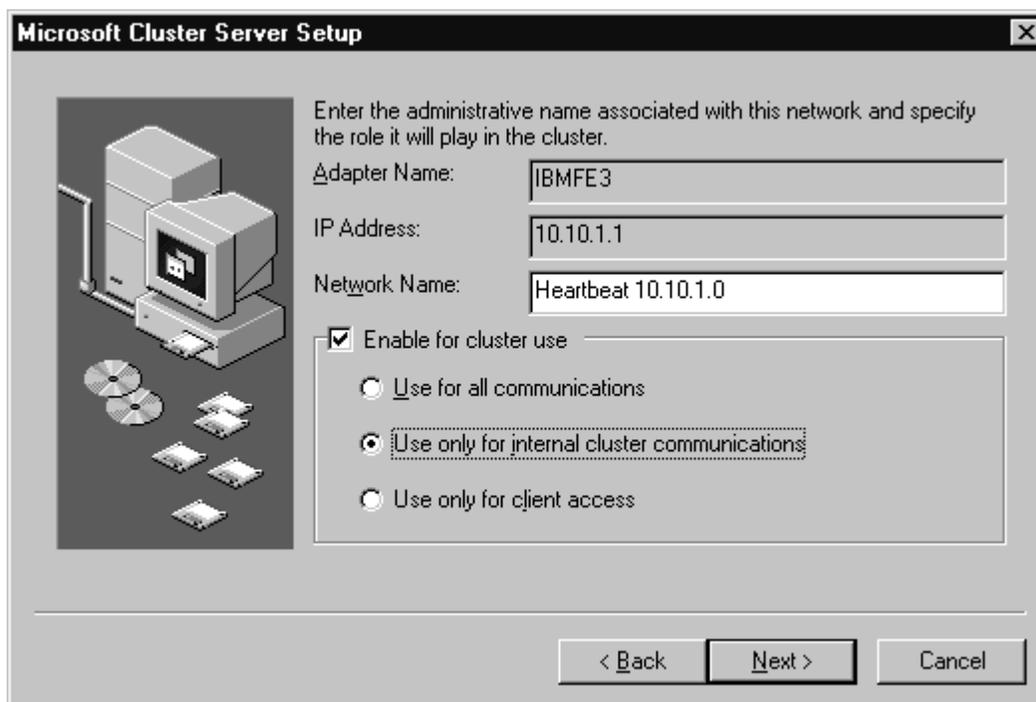
Network Name: Data Highway 10.160.28.0

Enable for cluster use

- Use for all communications
- Use only for internal cluster communications
- Use only for client access

< Back Next > Cancel

Figure 22. MSCS setup (step 6)



Microsoft Cluster Server Setup

Enter the administrative name associated with this network and specify the role it will play in the cluster.

Adapter Name: IBMFE3

IP Address: 10.10.1.1

Network Name: Heartbeat 10.10.1.0

Enable for cluster use

- Use for all communications
- Use only for internal cluster communications
- Use only for client access

< Back Next > Cancel

Figure 23. MSCS setup (step 7)

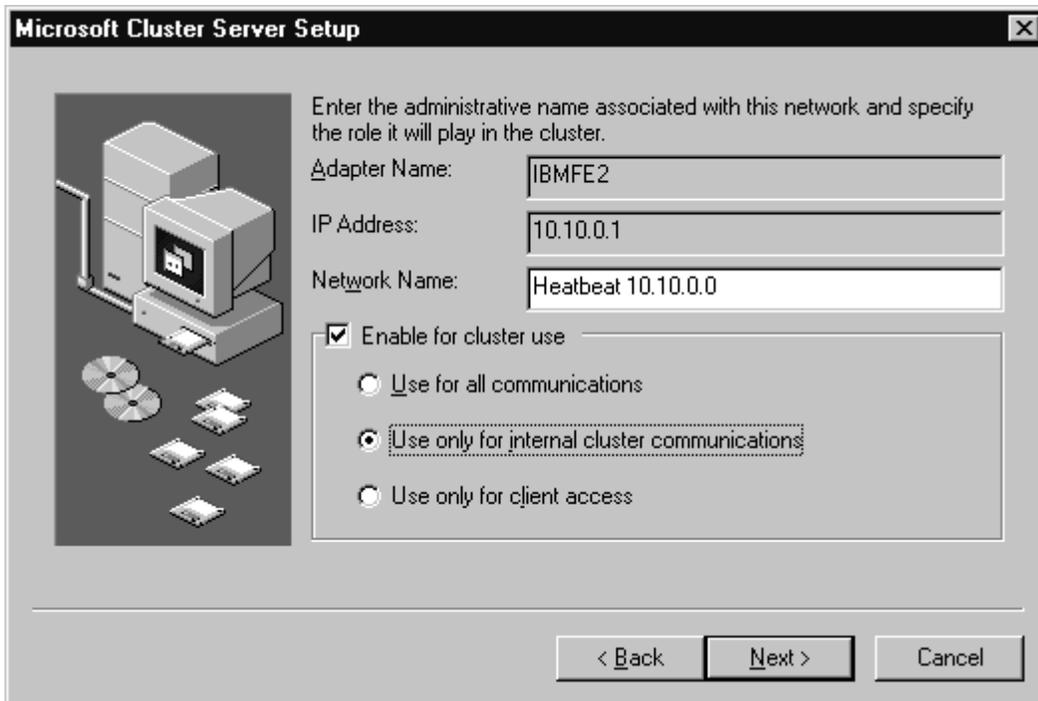


Figure 24. MSCS setup (step 8)

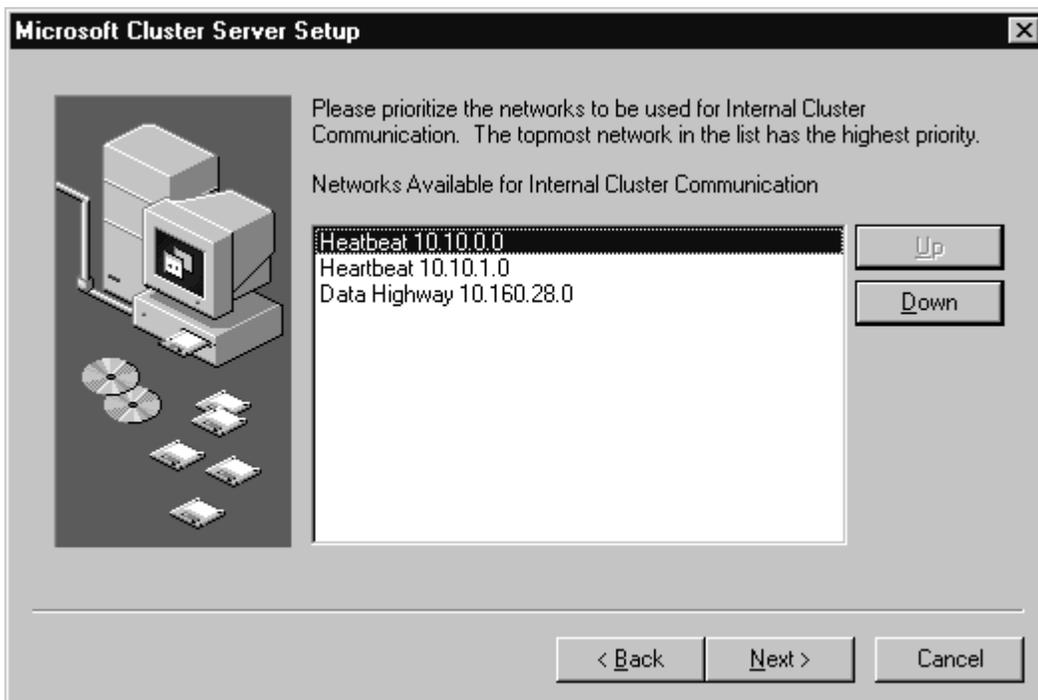
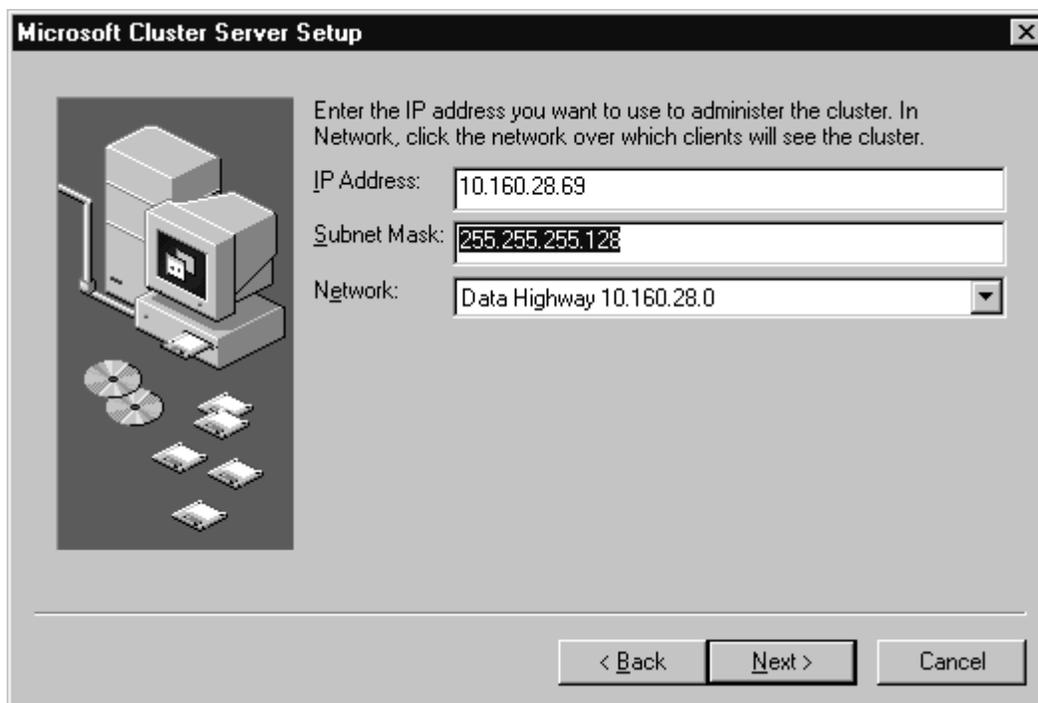


Figure 25. MSCS setup (step 9)



13. Install SP5 when setup completes

14. Restart.

15. Install MSCS on node B (join a cluster)

Figure 26. Join nodes into a cluster (TNYCMCL20)

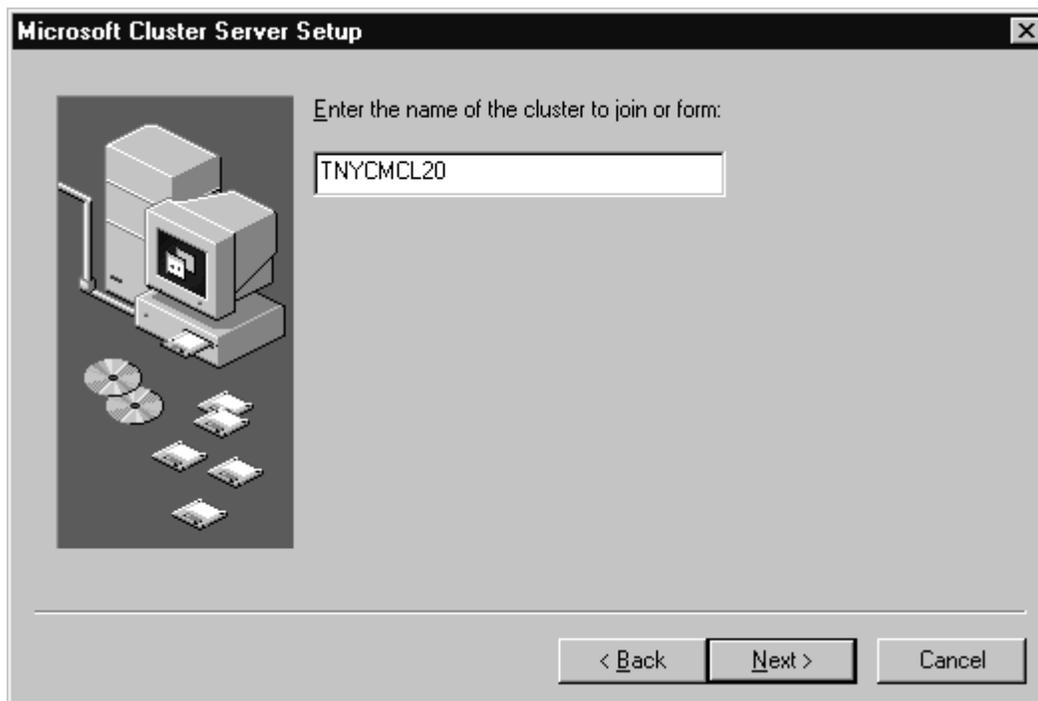
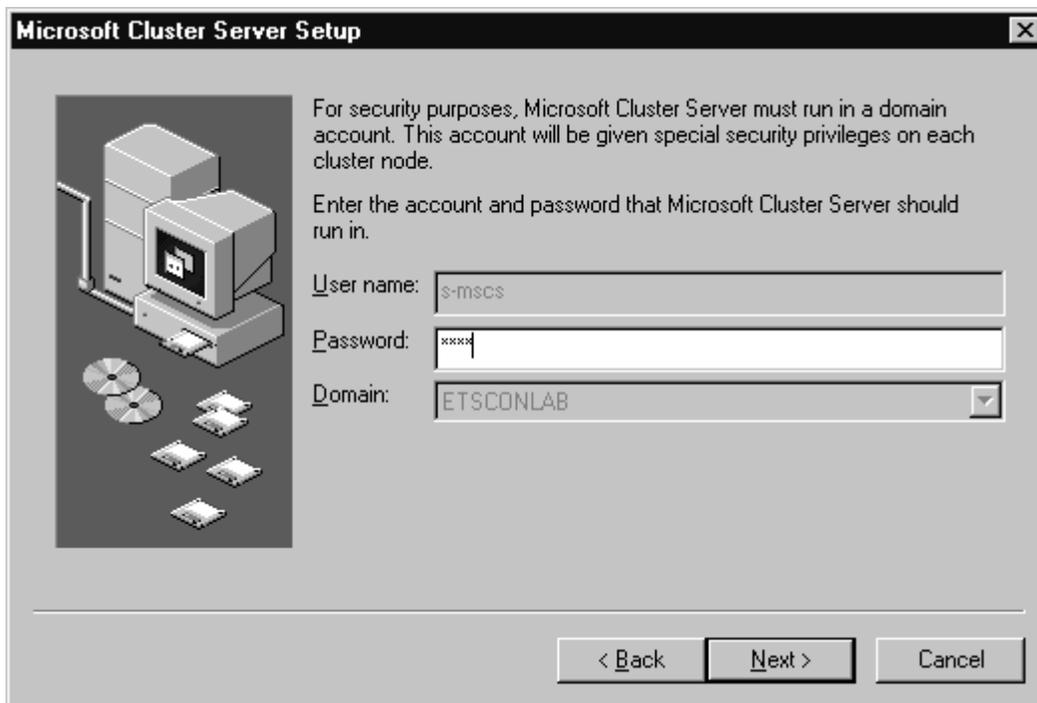


Figure 27. Establish domain account



16.SP5

17.Restart node B

The installation process is now complete with a MSCS cluster of node A and node B sharing a set of six fibre channel LUNs on an ESS accessed via two SAN Datagateways.

Chapter 6. Installation - HP Systems

This section differs somewhat from the preceding section because it documents installation experiences for an unsupported server platform. The information presented here does not represent any exhaustive testing or installation experience, thus it should be ***taken at face value***.

6.1 Service Representative Installation Steps

6.1.1 Adapter and adapter microcode/firmware installation

As with the HP HSC and PB SCSI adapters, TIBN (target initiated bus negotiation) is not supported and thus must be turned off in the SDG/ESS. (You must contact your service representative (CE) to have this done)

6.2 HP Operating System Requirements

6.2.1 HP-UX Maintenance

We recommend that you apply the latest patch bundles available from HP. The patches can be requested from the following website:

[Http://www.software.hp.com/SUPPORT_PLUS](http://www.software.hp.com/SUPPORT_PLUS)

Note: allow 30 days for delivery of patches if you don't have a support contract).

6.2.1.1 Recommended bundles

(there may be order dependencies)

Check with HP Services for additional patches.

Sample patch bundle retrieval

General Patch Bundles (click on Try now):

http://www.software.hp.com/cgi-bin/swdepot_parser.cgi/cgi/displayProductInfo.pl?productNumber=B3782XSW

Individual Patches:

<http://us-support.external.hp.com/wpsl/bin/doc.pl/screen=wpslSrchHPUXpatches>

/sid=217551a406d8334e23?OS=HP-UX

From that file, this is what Pathlight recommends (so use later when available)

OnlineDiag B.11.00.08.07 HP-UX 11.0 Support Tools Bundle

XSWG1100 B.11.00.45 HP-UX Extension Pack, May 1999 [.47 avail]

XSWHWCR1100 B.11.00.46 Hardware Enablement and Critical Patches for HP-UX 11.00 (September 1999) [.47 avail]

Y2K-1100 B.11.00.B0315 HP-UX Core OS Year 2000 Patch Bundle

Here are the additional patches that Pathlight recommends

PHKL_20207	Fibre Channel Mass Storage Driver Patch
PHNE_15537	Fibre Channel cumulative patch
PHCO_16341 PHCO_21310)	HP AutoRAID Manager cumulative patch (use
PHCO_19571 (use PHCO_20218)	HPArray Manager/60 Cumulative Patch
PHCO_20078	Software Distributor (SD-UX) Cumulative Patch
PHKL_20629	scsi3 cumulative patch

6.3 SDG (feature code 3020) attachment requirements

6.3.1 Non-Switched

none

6.3.2 Switched:

San Data Gateway Installation Tips

There are two SDG components that you need to pay particular attention to when installing. The components are the SDG StorWatch Specialist (aka SAN Director), and VP SAN (the lun masking feature of the SDG).

Component Version

VPS Host Registration Service 1.11

SAN Director 2.4.02

Each component has a separate installation procedure, which is noted in the README.TXT file in each of the sub directories. Information is included to assist in the installation and configuration of the SAN Gateway and Router on HP-UX 11.0 systems. This file is divided into several sections:

Prerequisites - Lists OS requirements

Installation - Covers connection of the SAN Gateway or Router to an HP-UX system and configuring the host to recognize the devices.

Configuration Information - Explains some of the terms used when connecting to a HP-UX system and provides details of device mapping.

6.3.3 Minimum requirements:

HP-UX 11.0 with the patches (see bottom of note) and the port on the SDG defined as a HP server

1. SDG 3.40.14 with 2.40.02 on StorWatch

2. Quick Loop is required if an IBM 2109 is attached (firmware 2.1.3)
3. 3.40.10 is a suitable level for this configuration if the ESS is 1.0.
4. 3.40.16 is the required level for this configuration if the ESS is 1.1
5. 3.40.16 is also required if a 2109 is in the configuration.
6. Do not use HP-UX 10.2.
7. You must be using the version of the SDG (dual port FC modules (with SDG fc 2214only) or 2105 FC3020). Do not use the older SDGs you/customer may have around.
8. Additionally, zoning is best done using VP-SAN, although channel zoning could be used, just make sure you use the setHost command on the SDG.

6.3.4 HP Attachment

6.3.4.1 The Readme file:

Contents of this directory and version information:

ComponentVersion

VPS Host Registration Service 1.11

SAN Director 2.4.02

Each component has a separate installation procedure, which is noted in the README.TXT file in each of the subdirectories.

Information is included to assist in the installation and configuration of the SAN Gateway and Router on HP-UX 11.0 systems. This file is divided into several sections:

- Prerequisites - Lists OS requirements
- Installation - Covers connection of the SAN Gateway or Router to an HP-UX system and configuring the host to recognize the devices.
- Configuration Information - Explains some of the terms used when connecting to an HP-UX system and provides details of device mapping.

6.3.4.2 Prerequisites

- The HP-UX host should have a fibre channel adapter installed, and all applicable driver bundles and patches applied (see below for recommendations).
- The SAN Gateway should not be connected at this point.

6.3.4.3 Installation

- The SAN Gateway and Router can be connected to an HP-UX 11.0 system using HP Fibre Channel Adapters (HSC or PCI).
- Because HP-UX uses a different LUN address method, please follow these procedures to ensure a successful connection to systems running HP-UX 11.0. The procedure differs slightly from installation on other platforms due to the unique nature of addressing fibre channel devices on HP-UX. Connect a terminal or emulator to the SAN Gateway as described in the Installation and User Guide and proceed as follows:

1. Before connecting the SAN Gateway to an HP-UX system, set the FC Host type for the connected port to HP-UX:
 - **setHost <port>, "HP-UX"**

<port> refers to the SAN Connection (1-6). This must be done BEFORE you connect the host.
2. (Recommended) Configure the Fibre Channel SAN Connection to use a "Hard ID".
 - **setFcHardId <port>, <id>**

Pick an <id> value between 0 and 125 only. If more than one Gateway is connected to the host, make sure they each have unique IDs (although this won't prevent the Gateway from working, it might cause devices to move around and could lead to data corruption).
3. Reboot the SAN Gateway with all attached devices powered up. You can connect the HP-UX host at this time.
4. Issue the following commands on the Host (HP-UX) system as root:
 - **ioscan -fn**
 - **insf -e**

The first command(*ioscan*) will locate all new devices. The second command(*insf*) will ensure that device special files are created for each device attached to the SAN Gateway.

[Note: ioscan will show multiple instances of PATHLGHY SAN Gateway Invl. These do not indicate a problem and they will not result in extra device files. These are related to the LUN mapping method imposed by HP-UX.]

At this point, devices are ready for use and you can create file systems, do backups, etc.

6.3.4.4 Configuration Information

LUN Mapping

- Since HP-UX only supports a three-bit LUN value (0-7) on each target ID, HP has implemented a mapping mechanism that converts system allowable addresses (in bus/target/lun format) to volume set addresses. The device driver uses Target IDs and virtual busses to allow addressing up to 16,384 devices on a fibre channel loop. LUNs range from 0-7 (three bits), Targets range from 0-15 (four bits) and busses range from 0-127 (seven bits).

Hardware Path

Devices on HP-UX are represented by a hardware path, an example of which is:

```

8 / 8 , 8 . 0 . 255 . 0 . 5 . 0
| | | | | | | |
| | | | | | | LUN
| | | | | | \- Target
| | | | | \---- Bus
| | | | \----- Port (255 for direct attach to an FC device)

```

```

| | | \----- Area (0 = private loop)
| | \----- Protocol type (8 = mass storage)
| \----- Adapter address
\----- Bus Converter

```

This is how the SAN Gateway will be addressed on HP-UX if the Loop ID (using Hard IDs) is set to 5.

Devices attached to the SAN Gateway use volume set addressing and an example of an attached device (Assigned LUN 12 on the SAN Gateway) will look like this instead:

```
8 / 8 . 8 . 0 . 5 . 0 . 1 . 4
```

Looking only at the last three values (bus/target/lun) we can show that this corresponds to an Assigned LUN (what the Gateway presents to the host) of

$$(bus * 128) + (target * 8) + lun = (0 * 128) + (1 * 8) + 4 = 12$$

Volume Set Addressing

ANSI SCC-2 Documentation specifies three different modes of addressing LUNs on SCSI-3 compliant systems. When used with the SAN Gateway, two of the three methods are used: peripheral device addressing (used to access the Gateway itself) and volume set addressing (used to access attached devices). From the Gateway viewpoint, the main difference is the LUN numbers (in ANSI 8 byte LUN format) are 0 for the SAN Gateway and 4001 - 40ff for attached devices (4000 also represents the Gateway itself - so there are actually two addresses assigned to it).

Hard ID

You must use Hard IDs on the SAN Gateway. This can be set using either the SAN Director or from the Service Port.

ioscan

The HP-UX command 'ioscan' will look for all devices. This will also reveal "extra" devices, that is, LUN 0 on each "Target" will appear as a device "PATHLGHTSAN Gateway Invl" if a real device does not exist at that address (LUNs 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88, 96, 104, 112, 120).

These exist because HP-UX doesn't support discontinuous LUNs and does not properly use the Report LUNs information.

insf

The HP-UX command 'insf' creates (or recreates) device special files, such as /dev/dsk/c6t1d4 and /dev/rscsi/c11t0d0. These files allow communication with the SAN Gateway and attached devices.

Patches

See the recommended patches listed at the beginning of this chapter.

Check with HP Services for additional patches.

- Configuration Information
- LUN Mapping
- Volume Set Addressing

- ANSI SCSI-2 Documentation specifies three different modes of addressing LUNs on SCSI-3 compliant systems. When used with the SAN Gateway, two of the three methods are used: peripheral device addressing (used to access the Gateway itself) and volume set addressing (used to access attached devices).

- From the Gateway viewpoint, the main difference is the LUN numbers (in ANSI 8 byte LUN format) are 0 for the SAN Gateway and 4001 - 40ff for attached devices (4000 also represents the Gateway itself - so there are actually two addresses

6.3.5 SAN Environments and Restrictions

The same SDG can not be used (at this time) for tape and disk. This is still a restriction.

HP is supported but on an individual basis or you could say a Controlled Availability (CA or I also call it Beta). The requests for HP or HP with 2109 are coming through the War Room or via Marketing. Each request is considered and if the request is a good candidate for the Beta. The IRT and PFE team works with the account to ensure a successful installation.

At this time the 2109 Switch attachment is not supported. If and when it is available, the Quick Loop RPQ will be required for the Switch to attach to the HP system.

Next, DPO/SDD is not supported with SDG/SFO2 on ESS 1.1. The above accounts are using VP-SAN included with SFO2. We do not recommend that they use Channel zoning. VP-SAN is a better solution.

Clustered pairs is currently not supported.

Appendix A. SAN Compatibility Matrix

SAN Attachment Compatibility Matrix.

(See information in the IRT forum at
<http://snjInt01.sanjose.ibm.com/cyda/sansupport.nsf/>)

Appendix B. Useful Websites

The following are the URLs that provide useful information and reference material for ESS and SDG installation.

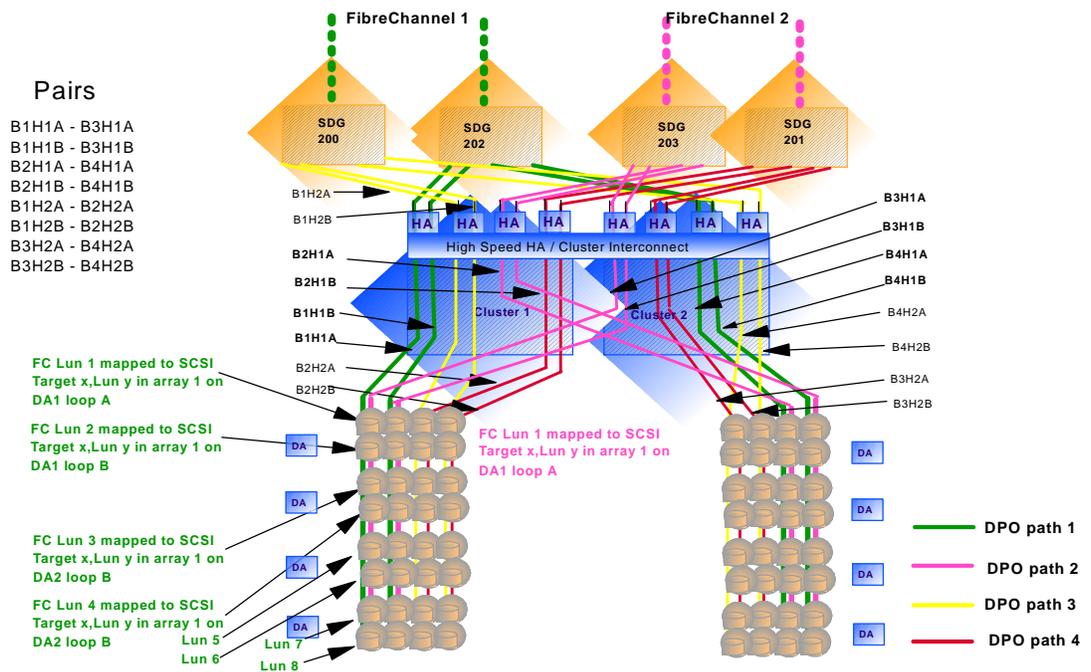
1. <http://www.storage.ibm.com/hardsoft/products/ess/supserver.htm> - ESS supported server list
2. <http://www.storage.ibm.com/hardsoft/products/sangateway/gatewayspec.htm> - SAN datagateway mainpage
3. <http://ssddom01.storage.ibm.com/techsup/swtechsup.nsf/support/sddupdates> - SDD webpage
4. <http://www.storage.ibm.com/software/dpo/dpohome.htm> - DPO webpage
5. <http://www.mcdata.com/efcdirector/supdevice.html> - McDATA ED5000 supported attachment webpage
6. <http://www.storage.ibm.com/hardsoft/products/fcswitch/supserver.htm> - Fibre Channel Switch supported attachment webpage
7. <http://www.redbooks.ibm.com/> - ITSO Redbook Webpage
8. <http://www.jni.com/products/index.html> - JN1 webpage
9. <http://www.qlogic.com/> - QLogic webpage
10. <http://www.emulex.com/> - Emulex webpage
11. <http://www.pathlight.com/> - Pathlight webpage

Appendix C. Sample SAN Data Gateway Configuration

This is an illustration of a SDG implementation with sixty-four(64) LUNs mapped for four (4) SDGs attached to a RS6000. The SDGs are mapped as DPO/SDD pairs with eight(8) 12GB LUNs on each of four SCSI buses in each SDG mapped to one FC connection.

Figure 28. Sample SDG Implementation.

Logical Mapping and Connection - SDG and DPO



Appendix D. San Data Gateway pre-install checklist

2108-G07 Checklists from the 2108-G07 Service Guide (version 03)

© Copyright IBM Corp. 2000

Chapter 2. Installation

This section covers installation of the IBM Storage Area Network Data Gateway, 2108 Model G07, the attached SCSI devices, and the host adapter. Before you install the SAN Data Gateway, ensure that the customer has performed the steps in the "Customer pre-installation checklist".

Customer pre-installation checklist

To ensure a successful installation of the SAN Data Gateway, it is important that the items in this checklist are verified before you begin. Some steps will vary, depending on which host platform you choose to attach.

Table 3. Customer pre-installation checklist

Step	Customer Action or Decision	Comments and References
1	* Desktop installation of the gateway * Rack mount installation of the gateway	Inform the service representative whether it is a desktop or rack mount installation.
2	Required host platform operating system, service pack or PTFs installed. For example, Windows NT 4.0 with Service Pack 5 (or later) and required patch fixes.	For a current list of supported platforms, required host platform code, updates, and information on how to obtain them, see the Web site: http://www.ibm.com/storage/SANGateway
3	Required fibre channel host bus adapter firmware, HBA BIOS, and device driver	For a list of supported HBA firmware, required BIOS and device driver, see the Web site: http://www.ibm.com/storage/SANGateway For information about the host bus adapter setup, refer to the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> .
4	If you are connecting more than one host to the SAN Data Gateway, you might need to choose an access control option.	For information about setting up access control, see the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> .
5	If you chose the virtual private SAN access option, install the host registration service on the fibre channel hosts that are connected to the SAN Data Gateway.	For Windows NT, see Installing the SAN Data Gateway explorer and host registration service section in the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> . For Solaris, AIX®, and other platforms, see the Installing the host registration service section in the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> .
6	All host fibre channel cables: * Have been ordered with the product or have been pre-installed and checked * Marked with:	See the host bus adapter (HBA) specification provided with your host bus adapter and the product description and features section in the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> .
—	Host server identifier	
—	SAN Data Gateway identifier	

Table 3. Customer pre-installation checklist (continued)

Step	Customer Action or Decision	Comments and References
7	<p>Ensure that IBM VSS and ESS, or tape system installation has been completed.</p> <ul style="list-style-type: none"> * For IBM tape attach, tape device driver installed or updated * Mark both ends of each SCSI cable with: <ol style="list-style-type: none"> 1. Target ID and channel number 2. SAN Data Gateway ID and channel number <p>specific target device ID, specific SAN Data</p>	<p>Usually done by a service representative on target installation.</p> <p>This is simply a way to label the cables with the Gateway name, and the specific SCSI channel number where the cable is attached in case it needs to be disconnected and reconnected later.</p>
8	<p>Install Ethernet TCP/IP protocol hardware for StorWatch SAN Data Gateway Specialist server and client with:</p> <ul style="list-style-type: none"> * Ethernet adapter and device drivers * Ethernet cabling * Ethernet hubs <p>Determine the SAN Data Gateway network parameters. Assign the following:</p> <p>Ethernet port configuration:</p> <ul style="list-style-type: none"> * Static IP address _____ * Netmask (optional) <p>_____</p> <ul style="list-style-type: none"> * User defined SAN Data Gateway name (optional) <p>_____</p> <p>If the SAN Data Gateway is not the same TCP/IP subnet as the server, assign the default network gateway address and/or route table entries. _____</p> <p>Attention: Save this configuration information for future reference.</p>	<p>Obtain your SAN Data Gateway network parameters from your network administrator.</p> <p>Attention: Use of incorrect network parameters can cause problems on the Ethernet network.</p> <p>The default name is gateway. If you choose a different name, it becomes the prompt displayed on the service terminal. Choosing a different name can be useful if you have more than one SAN Data Gateway.</p> <p>Give the information to the service representative during the SAN Data Gateway installation so that the parameters can be set from the SAN Data Gateway service port.</p>
9	<p>Run the Ethernet cable from the NT server to the network hub.</p>	
10	<p>Run the Ethernet cable from the network hub where the SAN Data Gateway will be installed. Leave it unconnected for the service representative to install.</p>	

„Server in this context means the computer used for the StorWatch SAN Data Gateway Specialist server.

Note: Service representatives cannot install non-IBM software, hardware, or device drivers unless there is a previous maintenance contract in place for the equipment.

Service representative installation checklist

Table 4. Service representative installation steps

Step	Service Representative Actions	Comments and References
1	<p>Upon initial customer contact, acquire information for the SAN Data Gateway installation.</p>	<p>Refer to Table 3 on page 13, step 8.</p>
2	<p>Unpack the SAN Data Gateway. Check the components against the ship group list.</p>	<p>If any MES kits are included, follow the MES installation instructions before proceeding with the rest of this check list.</p>

Table 4. Service representative installation steps (continued)

Step	Service Representative Actions	Comments and References
3	If desktop, install four rubber feet (SAN Data Gateway supplied parts) If rack mount, install rack mounting (SAN Data Gateway supplied parts)	Refer to Table 3 on page 13, Step 1. If desktop, go to "Desktop configuration" on page 18. If rack mount, go to "Rack mount configuration" on page 19.
4	Connect the power cord to the SAN Data Gateway	Go to "Connecting power" on page 22.
5	Connect the service terminal to the service port and start a terminal emulation session.	See "Connecting the service terminal" on page 67 for the required parameters.
6	Turn on the SAN Data Gateway and observe the startup messages on the service terminal.	Look for done executing startup message (see "Appendix E. Startup message reference" on page 113). Within one minute, the Ready LED should start flashing once per second. If the done executing startup message is not displayed or the Ready LED is not flashing as expected, go to "Start MAP" on page 27.
7	Issue the initializeBox command from the service terminal. After issuing this command the SAN Data Gateway restarts automatically.	See "Appendix B. Service port command reference" on page 71. Attention: This command erases all configuration information. It should be used only during initial SAN Data Gateway installation.
8	Look for the done executing startup message on the service terminal, then turn off the SAN Data Gateway.	
9	The SCSI target devices (such as the VSS and ESS, or tape subsystem) must be installed and verified before the SAN Data Gateway installation can continue.	
10	Connect the SCSI cables from the target devices to the SAN Data Gateway. Turn on the SCSI target devices.	Go to "Attaching SCSI devices" on page 20.
11	Turn on the SAN Data Gateway.	Within 1 minute, the Ready LED should start flashing once per second and the done executing startup message should be displayed on the service terminal
12	Issue the targets command from the service terminal.	See "Appendix B. Service port command reference" on page 71. If all attached SCSI targets are not shown, go to "SCSI MAP" on page 34.
13	1. Configure the Ethernet port (host name, address, routes, enable ethernet, restart). 2. Connect the customer's Ethernet cable from the network hub to the SAN Data Gateway. 3. Observe the Ethernet link LED.	1. Configure the Ethernet port using information from Step 1 of this checklist. 2. Go to "SAN Data Gateway network setup" on page 23. 3. If the Ethernet link LED is not on, go to "Ethernet MAP" on page 47.

Table 4. Service representative installation steps (continued)

Step	Service Representative Actions	Comments and References
14	<ol style="list-style-type: none"> 1. Tell the customer to power down the fibre channel hosts. 2. Connect the fibre channel cables from the fibre channel host bus adapters to the SAN Data Gateway. 3. Tell the customer to power up the fibre channel hosts. 	<p>If SAN Connection Status LED for the attached host(s) are not on, check the fibre channel cables. You might have to change the polarity of the fibre channel cables. If the problem persists, go to "Fibre channel MAP" on page 40.</p>
15	<ol style="list-style-type: none"> 1. Issue the fcShow command from the service terminal to show the status of each fibre channel interface that is installed and connected. 2. Issue the fcShowDevs command from the service terminal to show SCSI target devices that are connected as seen by the fibre channel interface. 	<p>See "Appendix B. Service port command reference" on page 71.</p> <ol style="list-style-type: none"> 1. Look for FW State=03 (Ready) for each fibre channel interface. If FW State NOT=03, go to "Fibre channel MAP" on page 40. 2. Check that all SCSI target devices are seen by each fibre channel interface. If not, go to "SCSI MAP" on page 34.
16	Ask the customer to verify that all target devices are available to the host systems.	Use the appropriate host system utilities for disk and tape. If all devices are NOT available, ask the customer to restart the system and check again. If the problem persists, go to "Start MAP" on page 27.
17	Ask the customer to complete the Customer post-installation checklist.	<p>In SAN configurations, two specific issues require understanding and attention.</p> <ul style="list-style-type: none"> * Access Control * Save Configuration <p>For more information on these issues, see the Understanding and maintaining SANs section in the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i>.</p>
18	End of the service representative installation process.	Complete the call with service code 20.

Note: Installation time is approximately 1-1/2 hours.

Customer post-installation checklist

The following actions are to be performed by the customer after the service representative has completed the installation.

Table 5 is for reference only, and is included here to give the service representative an understanding of what the customer does.

Table 5. Customer post-installation steps

Step	Customer Action	Comments and References
1	<p>Install the StorWatch SAN Data Gateway Specialist software.</p> <p>For an updated list of supported systems, see the http://www.ibm.com/storage/SANGateway Web site.</p> <p>For an updated version of the SAN Data Gateway Specialist software, see the http://www.ibm.com/storage/SANGateway Web site.</p>	<p>See the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> for information about installing the software.</p> <p>The designated system is used as the central point for monitoring and controlling SAN Data Gateway management and configuration. It is <i>not</i> connected to the SAN Data Gateway fibre channel interface.</p>

16 Service Guide, 2108 Model G07

Table 5. Customer post-installation steps (continued)

Step	Customer Action	Comments and References
2	Ensure that the designated system has access to the same Ethernet subnet as the SAN Data Gateway.	Consult with your network administrator.
3	Start up the StorWatch SAN Data Gateway Specialist server.	See the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> for information about starting the server.
4	Start up the StorWatch SAN Data Gateway Specialist client: 1. Connect to the server. 2. Logon. 3. Add the new administrator account and password. 4. Log off and log on again, using the new administrator account.	See the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> for information about starting the client application. Connect using the name or IP address of the designated server system. See the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> for information about initial configuration.
5	From the client, connect to the desired SAN Data Gateway.	See the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> for information about the tools menu group, connecting to the SAN Data Gateway. If a connection is not successful, check the network parameters with the network administrator. If the problem persists, perform the process in "Ethernet MAP" on page 47.
6	Save your user/administrative setup.	See the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> for information about the file menu group, save setup.
7	Perform the following for each SAN Data Gateway (if necessary): * Update firmware * Restart	To download the latest available firmware, see the following Web site: http://www.ibm.com/storage/SANGateway See the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> for information about the controls menu group.
8	If you have more than one host system connected to the SAN Data Gateway, you might need to enable access control.	See the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 G07</i> for information about access control.
9	At this time you <i>must</i> save your SAN Data Gateway configuration.	See the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> for information about saving the SAN Data Gateway configuration.
10	Become familiar with using the IBM StorWatch SAN Data Gateway Specialist.	See the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> for information about using the IBM StorWatch SAN Data Gateway Specialist application.

Table 5. Customer post-installation steps (continued)

Step	Customer Action	Comments and References
11	<p>You must use the StorWatch SAN Data Gateway Specialist to monitor and maintain your storage area network.</p> <p>If a trap or event is reported by the StorWatch SAN Data Gateway Specialist, perform the following:</p> <ol style="list-style-type: none"> 1. Check the reported event code against the following tables in the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i>. <ul style="list-style-type: none"> * Event trap descriptions table * Heartbeat notification codes table * Health check description table 2. Go to "Action reference table" on page 31 and perform the recommended action. 	<p>See the <i>IBM Storage Area Network Data Gateway Installation and User's Guide, 2108 Model G07</i> for information about remote service.</p>

Note: It is highly recommended that you save your SAN Data Gateway configuration periodically. You *must* save your configuration if you make changes to access control or operating parameter settings.

Glossary

HBA. Host bus adapter

SCSI...Small Computer system interface

FC-AL...fibre channel arbitrated loop

WWN...world wide name, a unique 64 bit address assigned to each adapter (like a ethernet MAC address)

LUN...logical unit address

Target...a SCSI device address in the range of 0 - 15 for SCSI2

RPC...remote call procedure

GLM...gigabit link module

GBIC...gigabit interface connector

N-Port...node port, also known as a F-port or fabric port. A fibre channel port that has the capability to perform a fabric login

E-Port...a node port that is acting as a interswitch connection

G-Port...a node port that has not been assigned and can assume the role of a F-port or a E-port

F-Port...a fabric port or adapter that has the capability to login to a SAN fabric

NL-Port...a port or adapter that is capable of performing arbitrated loop functions and protocols but cannot execute a fabric login. Also known as a FL-port.

FL-Port...a fibre channel port that is only capable of performing arbitrated loop functions and protocols. Also known as a NL-port.

Public loop...a fibre channel loop that is defined in a switched environment whose nodes are accessible to all fabric attached nodes.

Private loop...a fibre channel loop that is defined on a fibre channel switch but is only accessible to loop members that are defined to it and are part of a dedicated loop defined within that switch or hub.

Index

