

IBM TotalStorage Master Console



Installation and User's Guide

Version 2 Release 4

IBM TotalStorage Master Console



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Version 2 Release 4

Note

Before using this information and the product it supports, read the information in "Notices."

Second Edition (November 2004)

This edition applies to the IBM TotalStorage Master Console and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this guide

This topic provides information about the contents of the Installation and User's Guide.

- Chapter 1, "Overview," on page 1 provides an overview of the master console.
- Chapter 2, "Concepts," on page 3 discusses concepts that will help you understand how the master console works.
- Chapter 3, "Planning for the master console," on page 7 describes how to plan for the installation of the master console.
- Chapter 4, "Installing master console software," on page 15 provides the procedures required to install the master console, including how to use the master console installation wizard.
- Chapter 5, "Configuring the master console," on page 31 explains how to configure the master console.
- Chapter 6, "Managing the master console," on page 41 provides an overview of the tasks that you can perform from the master console.
- Chapter 7, "Uninstalling master console software," on page 49 provides a high-level overview of the procedures for uninstalling the master console software.
- Chapter 8, "Upgrading the master console to the latest version," on page 53 explains when to upgrade the master console software.
- Chapter 9, "Troubleshooting the master console," on page 55 provides information about resolving problems with the master console.

The appendices provide the following additional information:

- Accessibility features of the master console and help system
- Notices

Who should use this guide

This topic describes the audience for the *Installation and User's Guide*.

This guide should be used by the person or persons assigned to manage SAN File System or SAN Volume Controller on a regular basis.

An administrator should have experience in at least the following skills, or have access to personnel with experience in these skills:

- Microsoft Windows and Windows Advanced Server (depending on your client environment)
- Linux system administration
- Networking and network management
- SAN management
- Command-line interface scripting
- Critical business issues (such as backup, disaster recovery, and security)

Notices

This topic describes the notice conventions used in the Information Center.

The following notices are used in this Information Center and convey these specific meanings:

Note: These notices provide important tips, guidance, or advice.

Attention: These notices indicate possible damage to programs, devices, or data. An attention notice appears before the instruction or situation in which damage can occur.

CAUTION:

These notices indicate situations that can be potentially hazardous to you. A caution notice appears before the description of a potentially hazardous procedure step or situation.

DANGER

These notices indicate situations that can be potentially lethal or extremely hazardous to you. A danger notice appears before a description of a potentially lethal or extremely hazardous procedure step or situation.

Related Publications

This topic describes the publications in the master console library and in related libraries.

The following publication is available in the master console library. It is provided in softcopy on the IBM® TotalStorage® Master Console Publications CD and at www.ibm.com/storage/support. To use the CD, insert it in the CD-ROM drive. If the CD does not launch automatically, follow the instructions on the CD label.

Note: The softcopy version of these publications are accessibility-enabled for the IBM Home Page Reader.

- *IBM TotalStorage Master Console Installation and User's Guide*, GC30-4090

This publication provides detailed procedures to set up and cable the hardware, install and upgrade the master console software, configure the software components, and troubleshoot and resolve problems.

These publications are related to SAN File System:

- *IBM TotalStorage SAN File System Installation and Configuration Guide*, GA27-4316

This publication provides detailed procedures to set up and cable the hardware, install and upgrade the SAN File System software, perform the minimum required configuration, and migrate existing data.

- *IBM TotalStorage SAN File System Planning Guide*, GA27-4344

This publication provides detailed procedures to plan the installation and configuration of SAN File System.

- *IBM TotalStorage SAN File System Maintenance and Problem Determination Guide*, GA27-4318

This publication provides instructions for adding and replacing hardware components, monitoring and troubleshooting the system, and resolving hardware and software problems.

These publications are related to SAN Volume Controller:

- *IBM TotalStorage SAN Volume Controller: Installation Guide*, SC26-7541

This guide includes the instructions the service representative uses to install the SAN Volume Controller.

- *IBM TotalStorage SAN Volume Controller: Planning Guide, GA22-1052*

This guide introduces the SAN Volume Controller and lists the features you can order. It also provides guidelines for planning the installation and configuration of the SAN Volume Controller.

- *IBM TotalStorage SAN Volume Controller: Service Guide, SC26-7542*

This guide describes how to maintain the SAN Volume Controller. It also includes a parts listing.

Web sites

This topic discusses any Web sites that offer additional, up-to-date information.

The following Web sites have additional and up-to-date information about SAN File System:

- www.ibm.com/storage/support/sanfs/
- www.ibm.com/storage/software/virtualization/sfs

The following Web site has additional and up-to-date information about SAN Volume Controller:

- www.ibm.com/storage/support/2145/

Summary of changes

This section describes the enhancements made to master console in release 2.4.

The following list describes the technical changes and enhancements made to master console in release 2.4.

Installation enhancements

SAN File System has many installation enhancements, including:

- DS4000 Storage Manager Client (FASSt Storage Manager Client) and Connection Manager are optional components
- The installation wizard checks your hardware for prerequisites before installing the software.
- The installation wizard can be restarted if the installation is interrupted or fails.

Upgrade enhancements

You can upgrade an existing master console release 2.3 using the installation wizard.

Chapter 1. Overview

This topic provides an overview of the master console.

The master console provides a single point from which to manage IBM TotalStorage products, such as the SAN File System and the SAN Volume Controller.

The master console provides you with the following capabilities:

- Access to the metadata servers in the SAN File System cluster. You can access these components:
 - SAN File System console through a Web browser.
 - Administrative command-line interface, through a Secure Shell (SSH) session.
 - Any of the metadata server engines in the cluster through an SSH session.
 - The RSA II adapter for any of the metadata server engines running SAN File System software through a Web browser.
 - Any of the SAN File System clients through an SSH session, a telnet session, or a remote-display emulation package, such as Virtual Network Computing (VNC), depending on the configuration of the client.
- Access to the SAN Volume Controller. You can access these components:
 - SAN Volume Controller console through a Web browser.
 - Administrative command-line interface, through a Secure Shell (SSH) session.

Note: When using the master console with the SAN Volume Controller, you need to install and configure the master console before configuring the SAN Volume Controller.

- Access to the fibre channel switches and views of your SAN topology using Tivoli® SAN Manager.
- Initiate a VPN connection, which allows an IBM support engineer to remotely access the master console. You can monitor that access and disconnect the session at any time. In addition, through the use of remote desktop access software, such as VNC, the IBM support engineer can view the desktop of the master console remotely.
- Manage SNMP traps through IBM Director, which can automatically notify IBM support personnel in the event of a severe error and can submit e-mail notifications to your personnel, such as a systems administrator.

Chapter 2. Concepts

This section discusses concepts that will help you understand how the master console works. Becoming familiar with the master console components and understanding the concepts in this section enables you to use the master console most effectively.

Remote access

This topic provides an overview of the Remote Access feature and explains the activities required to plan for it.

The master console provides *remote access* to the storage engines. Remote access allows IBM Support Center personnel to diagnose problems with your system. Remote access support can help to greatly reduce service costs and shorten repair times, which in turn reduces the impact of any failures on your business.

Remote access gives IBM support personnel full access to the SAN File System or the SAN Volume Controller through the master console, including querying and controlling the metadata servers and clients, and accessing metadata, log, dump, and configuration data. Remote access does not allow access without authentication. You must initiate a secure Virtual Private Network (VPN) connection from the master console to allow IBM support personnel to remotely access the master console. From the master console, the support personnel can establish a connection to the SAN File System metadata servers or SAN Volume Controller nodes. However, you can monitor that access and disconnect the session at any time.

In response to an error condition, you initiate a secure connection to the IBM VPN server using the VPN connection software on the master console called IBM Connection Manager. You must provide the customer connection ID for the newly created connection to the IBM support personnel. The IBM support personnel initiates a secure connection to their VPN server, and then establishes a secure connection to the master console over the VPN tunnel using the customer connection ID and a pre-authorized account on the master console. Finally, IBM support personnel can access the SAN File System metadata server or SAN Volume Controller node through SSH.

The following figure shows the remote access architecture:

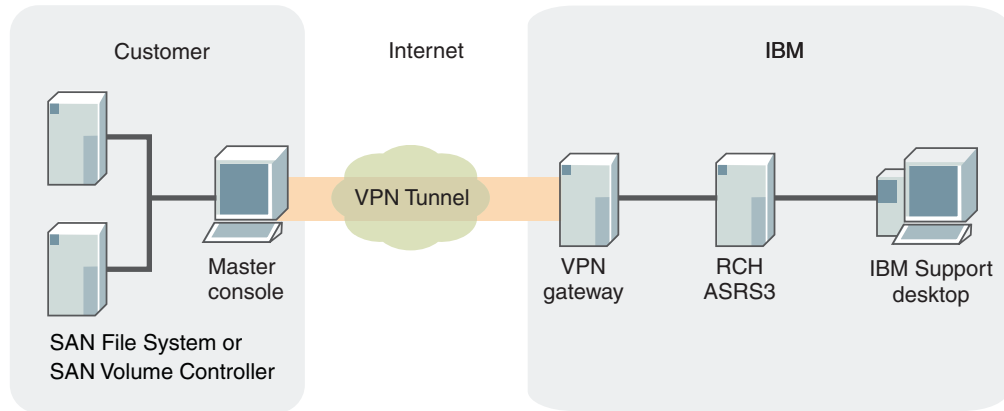


Figure 1. Remote access architecture

Service alert

This topic provides an overview of the service alert.

Service alert is a feature of the master console that enables SAN Volume Controller to proactively notify the IBM Support Center of significant errors or failure conditions. This enables IBM to respond quickly to problems that occur, sometimes before the problem has been noticed by your system administrator. For SAN File System, service alert notifies the system administrator of significant errors or failure conditions.

SAN Volume Controller

In response to a sever error condition, SAN Volume Controller issues a Simple Network Management Protocol (SNMP) trap and sends that trap to the IBM Director Server running on the master console. The IBM Director Server catches the trap and converts it into a Simple Mail Transfer Protocol (SMTP) e-mail message. Two e-mail messages can be produced: one to the systems administrator in the same way as in SAN File System, and another optional e-mail to the IBM support system. The optional e-mail to the IBM support system is sent to your SMTP mail server and then forwarded to the IBM support system, where it is converted into a problem record.

This figure shows the service alert architecture for SAN Volume Controller:

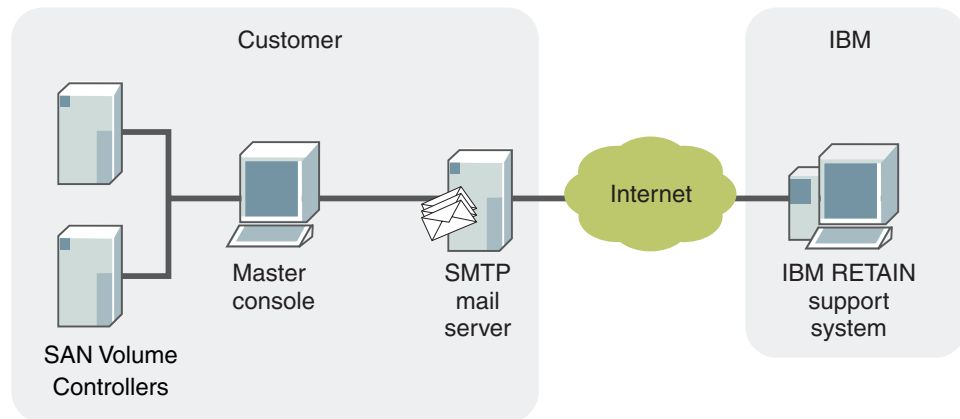


Figure 2. Service alert architecture for SAN Volume Controller

SAN File System

For SAN File System, service alert notifies the system administrator of significant errors or failure conditions. SAN File System issues an Simple Network Management Protocol (SNMP) trap and sends that trap to the IBM Director Server running on the master console in response to a sever error condition. The IBM Director Server catches the trap and converts it into a Simple Mail Transfer Protocol (SMTP) e-mail message. The e-mail message is then sent to your SMTP mail server and then forwarded to the system administrator. The system administrator can then call the IBM Support Center.

This figure shows the service alert architecture for SAN File System:

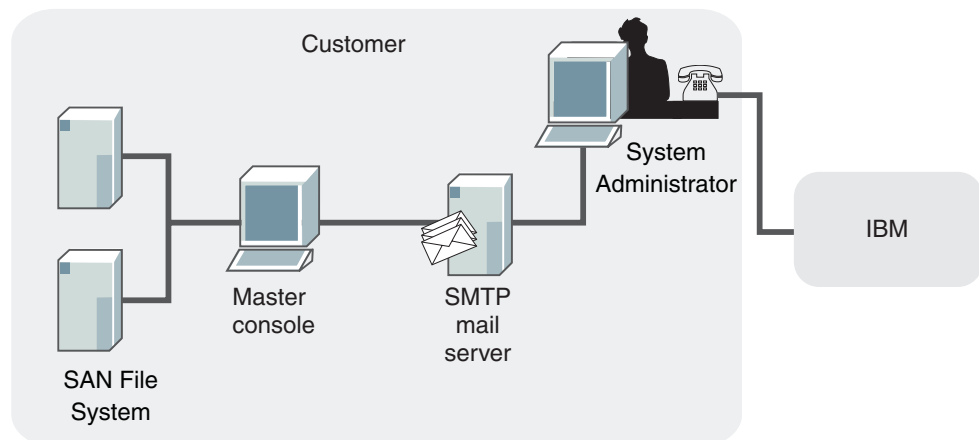


Figure 3. Service alert architecture for SAN File System

Secure Shell (SSH)

This topic provides an overview of Secure Shell (SSH).

Secure Shell (SSH), which is implemented through PuTTY, is the communication vehicle between the host system that you are using and the following components:

- The SAN File System command-line interface (CLI)
- The SAN Volume Controller CLI
- The master console.

- Each of the metadata server engines in the SAN File System cluster, using SSH from the master console.

SSH provides a secure communications channel between systems. You can configure SSH to use a private/public key pair to establish the secure connection. This private/public key pair is required for SAN Volume Controller, but it is optional for SAN File System.

If you are using a private/public key pair, the public key must be placed on any system to which you want to create an SSH connection (such as the SAN Volume Controller nodes or the SAN File System metadata servers and clients). In addition, any system to which you want to create an SSH connection must be running an SSH server.

Software components

This topic describes the software components that are provided for the master console.

The following software is provided for the master console:

- Adobe Acrobat Reader, version 6.0.
- DB2[®], version 8.1 (including DB2 FixPak 4a).
- DS4000 Storage Manager Client (FASSt Storage Manager Client), version 8.42.G5.00.
- IBM Director, version 4.2.
- PuTTY, version 0.55.
- SAN Volume Controller Console, version 1.2.0.6.
- Tivoli Storage Area Network Manager (TSanM), version 1.4.1.43
- IBM VPN Connection Manager.

Chapter 3. Planning for the master console

This topic provides an overview of the planning tasks you need to complete before you install the master console.

Perform the following steps to plan for the installation of the master console:

- Verify that you have met the hardware and software prerequisites.
- Determine the cabling required for your configuration.
- Determine how the ports on the master console will be configured.
- Determine the IP addresses to be used for the master console.
- Determine the switch zoning that will be used for the master console.

It is recommended that the master console must be in the same room as the devices that are supported by the master console. In addition, it is recommended that it be placed within 50 feet of the SAN File System metadata servers or SAN Volume Controller nodes.

Master console prerequisites

This topic defines the hardware and software prerequisites that you need to obtain for the master console.

Hardware prerequisites

SAN File System supports a single master console that can be shared with other IBM TotalStorage products, such as SAN Volume Controller. If you do not already have a master console, you must obtain a rack-mounted, high-performance, highly-reliable Intel[™] server (such as the IBM eServer[™] xSeries[®] 306 or equivalent) with the following options:

- One Pentium[®] 4 processor, minimum 2.6 GHz.
- Minimum of 1 GB of system memory.
- Two IDE hard disk drives, minimum 40 GB each. During installation, you will mirror these drives.
- CD-ROM and diskette drives.
- Two 1Gb ports for Ethernet connections (fiber or copper).
- One 2Gb Fibre Channel host bus adapter (HBA) port, such as QLogic 2342 (dual port) or QLogic 2340 (single port) FC-2 cards or equivalent.
- Keyboard, such as the Space Saver NLS keyboard or equivalent.
- Monitor, such as Netbay 1U Flat Panel Monitor Console kit without keyboard or equivalent.
- Mouse or equivalent pointing device.

Example hardware configuration

- IBM xSeries 306 server (1U).
- Intel Pentium 4 2.8 GHz processor.
- 1GB memory DIMM (256 MB comes with base unit).
- Two 40 GB IDE hard disk drives (one comes with base unit).
- Two 10/100/1000 Copper Ethernet ports on planar.

- One 1-port 1/2 Gb/s Fibre Channel host bus adapter.
- NetBay 1U Flat Panel Monitor Console Kit with US keyboard.

Software prerequisites

The master console requires that you obtain the following software:

- Antivirus software (not required but strongly recommended).
- Microsoft® Windows® Internet Explorer version 6.0 with Service Pack 1.
- Microsoft Windows 2000 Server Edition with Service Pack 4 or higher.
- Microsoft Windows 2000 Update 818043. To obtain this update:
 1. Point your browser to this Web site:

v4.windowsupdate.microsoft.com/catalog/en/default.asp
 2. Click **Find updates for Windows operating systems**.
 3. Select **Windows 2000 Professional SP4**.
 4. Select **Advanced Search**.
 5. In the field, **Contains these words**, enter **818043**, and then click **Search**.
 6. Follow the directions on the Web site to download the update.
 7. After you download the update, you will need to navigate to the location where the update was downloaded and run the .exe file to install the update.
- J2SE Java™ Runtime Environment (JRE) 1.4.2.
You can obtain JRE 1.4.2 by going to the following Web site and then clicking **Downloads, Java & Technologies, Java 2 Platform, Standard Edition 1.4**, and then **Download J2SE JRE**:

www.sun.com/

Cabling options

This topic describes the various options for cabling the master console.

There are a variety of ways to cable a master console, depending on your environment:

- A single master console that is used for a single SAN File System or SAN Volume Controller installation.
- A single master console that is shared between a SAN File System installation and a SAN Volume Controller installation.
- Two master consoles, one for a SAN File System installation and one for a SAN Volume Controller installation.

In all cases, the ports on the master consoles are cabled as follows:

- One Ethernet port is cabled to your corporate intranet.
- One Ethernet port is cabled to the Internet through a corporate firewall. This port will be used for remote access functionality.

Cabling a single master console

This topic illustrates a cable configuration in which you have a separate master console for SAN File System and SAN Volume Controller.

The following figure shows how you can cable a single master console that is used by a single SAN File System or a single SAN Volume Controller installation:

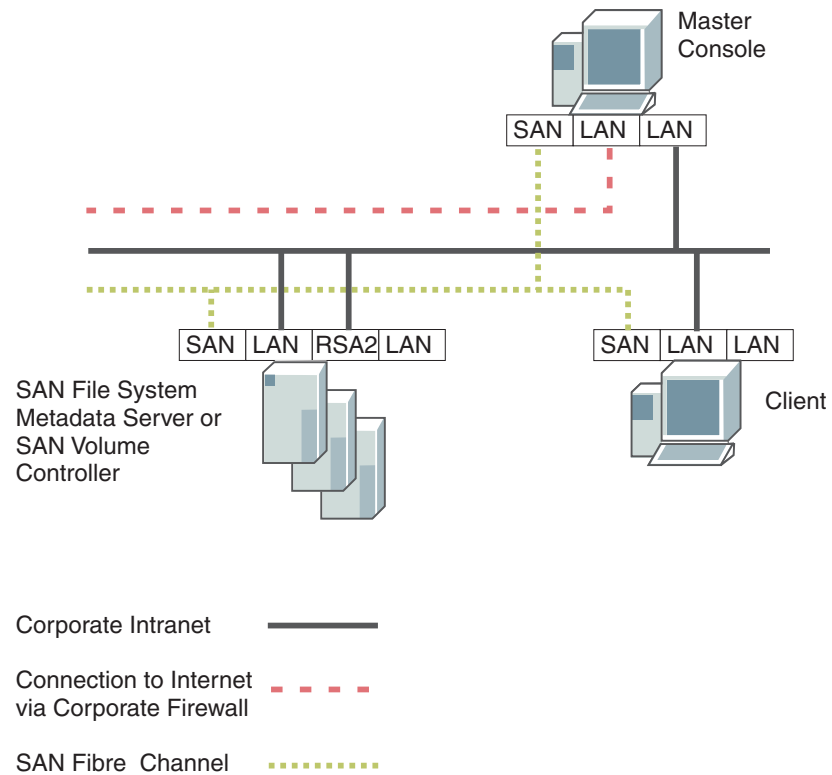


Figure 4. Cabling a single master console

Cabling a shared master console

This topic illustrates how to cable a master console that is shared between the SAN File System and the SAN Volume Controller.

Figure 5 on page 10 shows how you can cable a master console in a shared environment:

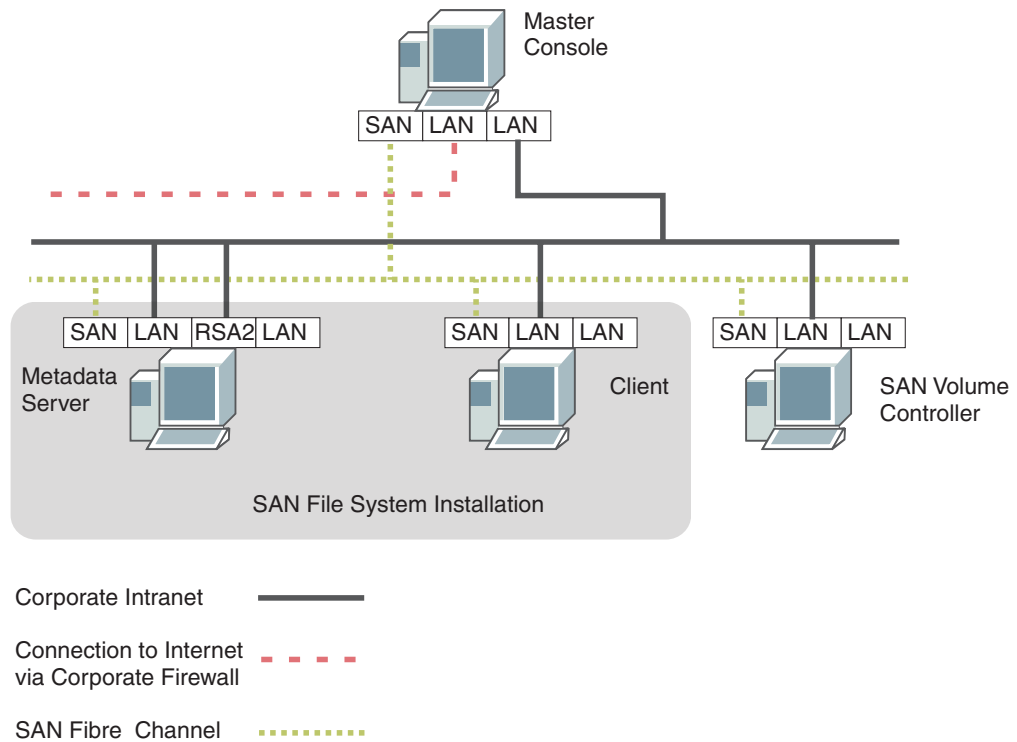


Figure 5. Cabling a shared master console

Cabling multiple master consoles

This topic illustrates a cable configuration in which you have a separate master console for SAN File System and SAN Volume Controller.

The following figure shows how you can cable multiple master consoles; one for each installation of SAN File System and one for each installation of SAN Volume Controller:

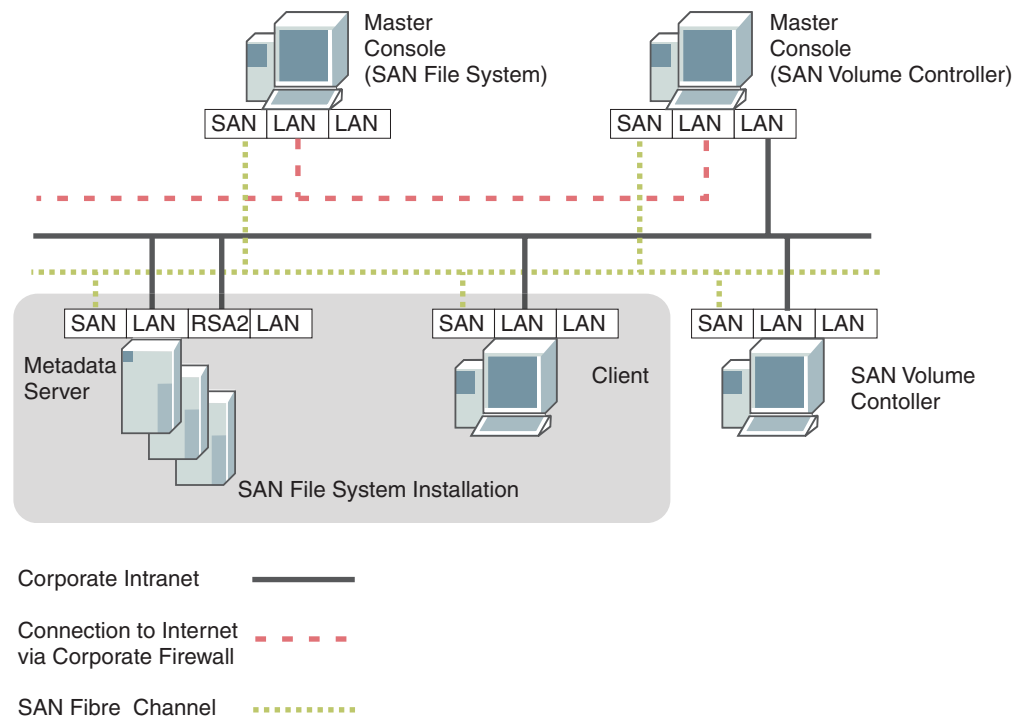


Figure 6. Cabling multiple master consoles

Specifying port assignments

This topic describes the port assignments that you specify for the master console.

Complete the port assignment table for the master console. Use these port assignments to determine the number of Ethernet and Fibre Channel cables that you will need.

When filling out the port assignment table, as shown in Table 1, use the following descriptions

- Ethernet port 1: Used for your VPN connection. This port is required if you configure your master console to enable remote access. A remote access connection can only be enabled when this port has access to an external Internet connection. For added security you can disconnect this port when a remote access connection is not being used.
- Ethernet port 2: Used to connect to the same IP network to which the SAN Volume Controllers or SAN File System metadata server engines are connected.
- Fibre channel port 1 or 2: Used to connect to a fibre channel switch in one SAN Volume Controller or SAN File System fabric.

Table 1. Port assignment table

Master console	Ethernet		Fibre channel port 1	Fibre channel port 2
	VPN	Public Network		

Table 2 shows a port assignment table with data:

Table 2. Port assignment table when filled in

Master console	Ethernet		Fibre channel port 1	Fibre channel port 2
	VPN	Public Network		
Master console	Ethernet hub 1, port 6	Ethernet hub 1, port 5	FC switch 1, port 9	

Specifying IP information

This topic describes the IP configuration information that you specify for the master console.

Complete the master console IP configuration worksheet for the master console. When filling out the port assignment table, use the following descriptions.

- **Machine name** — A fully-qualified Domain Name Server (DNS) name for the master console.
- **Master console IP addresses** — The addresses that will be used for access to the master console.
- **Gateway IP address** — The default gateway IP address used by the master console.
- **Subnet mask** — The subnet mask for the master console.

Master console IP configuration worksheet

Machine name:

	Ethernet port 1	Ethernet port 2
IP address		
Gateway IP address		
Subnet mask		

Fibre channel zoning considerations

This topic provides an overview of the fibre channel zoning considerations for the master console.

Zoning considerations for SAN Volume Controller

This topic provides fibre channel zoning considerations for the SAN Volume Controller.

If you are using the master console with the SAN Volume Controller, you need to create a new fibre channel switch zone that contains the master console and all of the SAN Volume Controller fibre channel ports.

For hosts, use switch zoning to ensure that each host fibre-channel port is zoned to exactly one fibre-channel port of each SAN Volume Controller node in the cluster. The SAN Volume Controller and the master console must exist in both zones.

For more information on zoning your switches, refer to *IBM TotalStorage SAN Volume Controller Configuration Guide*.

Configuring firewall support

This topic provides information about your firewall configuration.

Local Area Connection 1 on the master console must be allowed to connect to the IBM Remote Support Gateway through UDP port 500 and UDP port 1701. If you have a NAT (network address translation) firewall, you will also need to allow Local area connection 1 on the master console to connect to the IBM Remote Support Gateway through UDP port 4500.

Note: For Remote Support to work, a maximum of two ports will need to be permitted to connect to the Local Area Connection 1 on the master console. Check with your network system administrator to find out if you have access to the necessary ports and to gain access if necessary.

Ports and protocol requirements:

- L2TP - UDP 500, UDP 1701
- NAT-T - UDP 4500
- ESP - IP protocol 50

Chapter 4. Installing master console software

This topic describes the procedures for installing the master console software.

Before you begin: Before installing the master console software, you should have completed these tasks:

- Installed all hardware prerequisites in the master console.
- Cabled the master console.
- Installed all software prerequisites, such as Windows 2000 Server.
- Enabled SNMP services by completing the following steps:
 1. Click **Start -> Programs -> Control Panel**.
 2. Double-click **Add or Remove Programs**.
 3. Select **Add/Remove Windows Components**.
 4. Click on the text for *Management and Monitoring Tools* and click **Details**.
 5. Click the check box for *Simple Network Management Protocol* and click **OK**.

In addition, you should view the release notes for the master console software (available on the IBM support Web site) for the latest information.

You can use the installation wizard to assist you in installing the master console software.

Perform these steps to install the master console:

1. Use the port assignment information and cabling options to cable the master console.
2. Use the IP configuration information to enter the host name and IP addresses.
3. Start the installation wizard to install the master console software.

Important: It is strongly recommended that the master console software be the only software installed on the hardware that you are using for the master console.

Setting up the master console

This topic provides an overview of the steps that are required to set up the master console in preparation for installing master console software.

Perform the following steps to set up the master console:

1. Connect the fibre channel cables.
2. Configure the IP address for the Ethernet port that is to be connected to the external Internet (Ethernet port 1).
3. Configure the IP address for the Ethernet port that is to be connected to the internal IP network (Ethernet port 2).
4. Configure the host name for the master console.
5. Install the SNMP service (if you did not install it when you installed the operating system).

Connecting the fibre channel cables

This topic describes how to cable the fibre channel ports.

1. Verify that no cables are connected to the Ethernet ports.

2. Connect the fibre channel cables from the master console to an unused fibre switch port.

Note: *For SAN Volume Controller users:* The recommended configuration for SAN Volume Controller is that it should be connected to two independent SANs. The configuration of the second SAN should duplicate the first SAN. To enable problem determination of SAN problems, Tivoli SAN Manager on the master console needs to have access to both SANs through the fibre channel ports. Hence, one of the fibre channel cables from the master console must be connected to a fibre channel switch on the first SAN and the other cable should be connected to a fibre channel switch on the second (duplicate) SAN.

Entering IP address for Ethernet port 1

This topic describes how to configure the IP address for the external Internet connection for Remote Access (Ethernet port 1).

Tip: After configuring the connection, you can disable it when you are not using remote access.

1. From the desktop, right-click on the **My Network Places** icon.
2. Select **Properties**.
3. Right-click **Local Area Connection 1**.
4. Select **Properties**.
5. Select **Internet Protocol (TCP/IP)**.
6. Select **Properties**.
7. Enter all required information for the IP and DNS addresses.
8. Connect Ethernet port 1 to the network.

Entering IP address for Ethernet port 2

This topic describes how to configure the IP address for the internal IP network connection (Ethernet port 2).

1. From the desktop, right-click on the **My Network Places** icon.
2. Select **Properties**.
3. Right-click **Local Area Connection 2**.
4. Select **Properties**.
5. Select **Internet Protocol (TCP/IP)**.
6. Select **Properties**.
7. Enter all required information for the IP and DNS addresses.
8. Connect Ethernet port 2 to the network.

Setting up the master console host name

This topic describes how to configure the master console host name.

1. From the desktop, right-click on the **My Computer** icon.
2. Select **Properties**.
3. Select **Network Identification**.
4. Select **Properties**.
5. Enter the master console name in the **Computer name** field.
6. Select **More**.

7. Enter the Full path information in the Primary DNS suffix of this computer field.

Setting up the browser

This topic describes the Internet browser configurations.

Perform the following steps to configure the browser:

1. Ensure that the browser allows new windows (pop-ups) to automatically open when you visit a Web site.
2. Uninstall or turn off any applications on the browser that block or suppress pop-up windows.

Installing the SNMP service

This topic describes how to install the SNMP services.

You need to install the SNMP service if it was not installed when you installed the operating system. Perform the following steps to install the SNMP service:

1. Click **Start-->Settings-->Control Panel**.
2. Double-click **Add/Remove Programs**.
3. Click **Add/Remove Windows components** on the left side of the panel.
4. Click **Management and Monitoring Tools**, and then click **Details**.
5. Check **Simple Network Management Protocol**, and click **OK**.
6. Click **Next** to complete the installation process.
7. From the Control Panel, double-click **Administrative Tools**.
8. Double-click **Computer Management**.
9. Expand **Services and Applications**.
10. Click **Services**.
11. In the list of services, double-click **SNMP Service**.
12. On the General tab, select **Automatic** as the Startup Type.
13. On the Security tab, click the **Add** button underneath the Accepted Community Names field, and enter *public* as the new community name and leave the community rights as read-only. If the Master Console is running on a Windows 2003 system, select the **Accept SNMP packets from any host** radio button.

Note: On Windows 2000, **Accept SNMP packets from any host** is the default. On Windows 2003, the default is **Accept SNMP packets from these hosts**, with an empty field underneath. This default results in the NetView[®] part of the installation failing.

Using the installation wizard

This topic describes the installation process and lists the programs that you can install using the installation wizard.

The master console installation wizard provides the framework for installing all of the software that is required for the master console. It ensures that the master console meets all prerequisites and launches the installation program for each of the software products being installed.

Important: During the installation process, some products require a system reboot after they are installed. Any time you are prompted to reboot the system, you should do so. After each system reboot, the Master Console installation wizard will continue the installation process from the point it was interrupted by the required reboot.

The installation wizard helps you to install the following products:

- Adobe Acrobat Reader
- PuTTY
- DB2
- SAN Volume Controller console
- DS4000 Storage Manager Client (FAStT Storage Manager Client)
- Tivoli Storage Area Network Manager (TSanM)
- IBM Director

You must use the master console CD-ROMs to install the master console software.

Logging in and reviewing user rights

This topic describes the steps required to begin using the installation wizard.

To install software on the master console, you must be logged on as a local administrator (for example, as the administrator user) on the system where the master console software will be installed. However, the user ID must also have system privileges, called user rights, that provide the ability to:

- Act as part of the operating system
- Create a token object
- Increase quotas
- Replace a process level token
- Debug programs

These user rights are governed by the local security policy and are not initially set as the default for administrators. They might not be in effect when you log on as the local administrator.

If these user rights are not set, you can choose to have the master console installation wizard set them automatically, or you can manually set them.

After these user rights are set (either by the installation program or manually), log off the system, and then log on again for the user rights to take effect. You can then restart the installation wizard to continue with the master console installation.

Setting User Rights manually

This topic describes how to manually set the user rights for each policy.

Alternatively, you can manually set user rights before performing the installation. Perform the following steps to manually set user rights:

1. Click **Start** —> **Settings** —> **Control Panel**.
2. Double-click **Administrative Tools**.
3. Double-click **Local Security Policy** to open the Local Security Settings window.
4. Click **Local Policies** to expand it.
5. Double-click **User Rights Assignment** to see the policies in effect on your user ID. For each of the following policies,
 - Act as part of the operating system
 - Create a token object

- Increase quotas
- Replace a process level token
- Debug programs

perform the following steps:

- Highlight the policy to be checked.
 - Double-click the policy and look for the user ID in the "Assigned To" column of the Local Security Policy Setting window to verify the policy setting. Ensure that the **Local Policy Setting** and the **Effective Policy Setting** are checked.
- If the user ID does not appear in the list for the policy, you must associate the policy with the user ID. Perform the following steps to add the user ID to the accepted names on the policy list:
 - Click **Add** on the Local Security Policy Setting window. The Select Users or Groups window opens.
 - Highlight the user or group under the Name column.
 - Click **Add** to put the name in the lower window.
 - Click **OK** to add the policy to the user or group.

Starting the installation wizard

This topic describes the steps for starting the installation wizard.

Before you begin: Ensure that you have logged in using a user ID with administrative privileges and the modified user rights.

- Insert the Master Console CD-ROM 1 in the CD-ROM drive.
- Click **Start**—>**Run** to open the Run dialog.
- Enter `cd-rom_drive:\setup.exe`, where `cd-rom_drive` is the letter of the drive in which you inserted the CD. Click **OK**.

The following message is displayed in the DOS-prompt window.

```
+-----+
| Initializing InstallShield Wizard...
| Preparing Java (tm) Virtual Machine .....
| .....
+-----+
```

- When prompted, select the language to be used for the installation wizard and click **OK**.
- The installation wizard Welcome panel is displayed. Click **Next**.
- The installation wizard License Agreement panel is displayed. Click **I accept the terms in the license agreement**, and then click **Next** to begin installing the Adobe Acrobat Reader.

Note: Before installing the Adobe Acrobat Reader, the installation wizard verifies that all prerequisites are installed on the system. If not, a pop-up opens describing the prerequisites that are not currently installed. When you click **OK**, the installation wizard exits.

After installing the prerequisite software, start the installation wizard again.

Installing the Adobe Acrobat Reader

This topic describes how to install the Adobe Acrobat Reader using the master console installation wizard.

Adobe Acrobat Reader 6.0 is silently installed by the installation program. It provides access to documentation, such as this document, through a popup window.

When the installation is complete, an information window appears. From this window, you can access this document or IBM Support Web sites by right-clicking on the left side of the window.

Click **Next** to select the destination directory where the master console will be installed.

Choosing the Master Console destination directory

This topic describes how to choose the directory where the master console software will be installed.

Perform the following steps to choose the destination directory:

1. By default, the master console is installed in c:\Program Files\IBM\MasterConsole. To choose a different directory, click **Browse** and select a different directory from the Select a directory dialog.
2. After selecting the destination directory, click **Next** to display the list of optional products that you can select to be installed for the master console.

Selecting the optional features

This topic describes how to select the optional features to be installed by the master console wizard.

Select those optional features you want to install and deselect those optional features you do not want to install:

1. **Install DS4000 Storage Manager Client (FAStT Storage Manager Client)**
If DS4000 Storage Manager Client (FAStT Storage Manager Client) is deselected, a message is displayed when you click the **Next** button to warn you that this feature should only be deselected if DS4000 disk drives are not part of the current configuration.
2. **Install Connection Manager**
If Connection Manager is deselected, a message is displayed when you click the **Next** button to warn you that IBM's ability to swiftly resolve unusual or complex problems will be compromised if this feature is disabled.

After selecting or deselecting the optional features, click **Next** to display the list of products that will be installed for the master console.

Viewing the products to be installed

This topic describes the panel that displays the list of products to be installed for the master console, and it explains the steps needed to proceed with the master console installation process.

Using the list of products to be installed for the master console, the installation wizard determines if any of these products are already installed and, if so, whether the installed version is later than the version to be installed. The Product List panel lists the results:

- Products of the master console stack
- Versions of the already installed products

- Required versions for the products
- Actions to be done by the installation wizard or by the user

Depending on the installed version of each product, the installation wizard will determine whether to install the product:

- If the product is not installed or its installed version is lower than the desired version, the product is installed or upgraded by launching the specific installer of the product.
- If the product is installed at a version equal to or higher than the desired version, the product is left as is. The corresponding panels that launch and verify the specific product installation are skipped.
- For DB2, the installation wizard also checks the installed edition. If the installed edition is not "Enterprise Edition," the installation wizard inserts "*Wrong edition" in the Installed Version column. You must manually uninstall the wrong installed edition.

To manually uninstall the wrong installed edition:

1. Click **Cancel** to exit the master console installation wizard.
2. Manually uninstall the wrong DB2 edition.
3. After uninstalling the wrong edition of DB2, start the master console installation wizard again.

From this panel, click **Next** to begin installing PuTTY.

Installing PuTTY

This topic describes how to install PuTTY using the master console installation wizard.

Perform the following steps to install PuTTY:

1. From the PuTTY installation panel, click **Next** to begin the installation of PuTTY.
2. When prompted to confirm that you want to install PuTTY, click **Yes** to launch the PuTTY setup wizard.
3. Using the PuTTY setup wizard, perform these steps to install PuTTY (you can take the defaults for all PuTTY installation options):
 - a. Select the destination directory where PuTTY will be installed, and then click **Next**.
 - b. Choose the Start Menu Folder, and then click **Next**.
 - c. On the Additional Tasks menu, click **Next**.
 - d. On the Ready to Install menu, click **Install**.
 - e. When the setup wizard completes, you are prompted to view the Readme.txt file. If you do not want to view that file, make sure the check box is not selected. Then, click **Finish** to complete the installation.
4. From the master console installation wizard, click **Next**. The installation wizard validates the installation of PuTTY. If the validation is not successful, an error panel is displayed. If errors were found, correct the errors and start the installation wizard again.

Before continuing with the installation wizard, you should create a public and private key using PuTTY. You will need these keys when you install the SAN Volume Controller Console.

Generating an SSH key pair using PuTTY

This task describes how to generate SSH keys using PuTTY on the master console.

Although not part of the master console installation wizard, you need to generate SSH keys to be used for the SAN Volume Controller. You will be prompted for these keys when you install the SAN Volume Controller console. You can leave the installation wizard in its current state while you generate the SSH keys.

Perform these steps to generate SSH keys on the master console:

1. Start the PuTTY Key Generator. Click **Start** —> **Programs** —> **PuTTY** —> **PuTTYgen**.
2. Click **SSH2 RSA** as the type of key to be generated.
3. Click **Generate**.
4. Move the cursor around the blank area of the Key section to generate a random number.
5. Click **Save public key** to save the public key.
6. Enter **icat** as the name of the key and click **OK**.
7. Click **Save private key** to save the private key.
8. When prompted to confirm that you want to create the key without a passphrase, click **Yes**.
9. Enter **icat.ppk** as the name of the key and click **OK**.
10. Close the PuTTY Key Generator.

Installing DB2

This topic describes how to install DB2 using the master console installation wizard.

Perform the following steps to install DB2:

1. From the Launch DB2 Installation panel, click **Next** to begin the installation of DB2.
2. If prompted to insert a different CD, insert it in the CD-ROM drive and enter the CD-ROM drive letter in the location field. Then click **OK**.
3. The DB2 setup wizard starts. Using the DB2 setup wizard, perform these steps to install DB2:
 - a. From the Welcome to the DB2 Setup Wizard panel, click **Next**.
 - b. From the License Agreement menu, accept the terms of the license agreement and then click **Next**.
 - c. From the Select the installation type menu, click **Next** to accept the default values.
 - d. From the Select the installation action menu, click **Next** to accept the default value.
 - e. From the Select installation folder menu, click **Next** to accept the default destination.
 - f. From the Set user information for the DB2 Administration Server menu, you can use the default user name (db2admin). However, you will need to specify a password.

Note: Ensure that **Use the same user name and password for the remaining DB2 services** is selected. This allows you to use this same

user name and password for the remainder of the DB2 installation. Otherwise, you will be prompted to enter a user name and password for several additional menus.

- g. Click **Next**. If you are prompted to create the user, click **Yes**.
- h. From the Set up the administration contact list menu, select **Local → Create a contact list on this system**, and then click **Next**.

Note: If you receive a warning stating that the SMTP server has not been specified, click **OK** to continue.

- i. From the Configure DB2 instances menu, select **DB2** from the **DB2 Instances** list, and then click **Next**.
 - j. From the Prepare the DB2 tools catalog menu, click **Do not prepare the DB2 tools catalog on this computer** and then click **Next**.
 - k. From the Specify a contact for health monitor notification menu, click **New contact**, and enter the appropriate information in the **Name** and **Email address** fields.
 - l. Click **Next**.
 - m. From the Start copying files menu, click **Install** to begin installing DB2.
 - n. Click **Finish** to complete the installation.
 - o. When the IBM DB2 Universal Database™ Welcome menu starts, click **Exit First Steps**.
4. From the master console installation wizard, click **Next** to verify DB2 installation. The installation wizard validates the installation of DB2. If the validation is not successful, an error panel is displayed. If errors were found, correct the errors and start the installation wizard again.

Installing SAN Volume Controller console

This topic describes how to install the SAN Volume Controller console using the master console installation wizard.

Perform the following steps to install the SAN Volume Controller console:

- 1. From the master console installation wizard, click **Next** to launch the SAN Volume Controller Installer wizard.
- 2. From the SAN Volume Controller Installer wizard, perform these steps to install the SAN Volume Controller Console:
 - a. From the Welcome panel, click **Next**.
 - b. From the License Agreement panel, click **I accept the terms of the license agreement**, and then click **Next**.
 - c. From the Destination Directory panel, click **Next** to accept the default directory.
 - d. From the PuTTY configuration panel, enter the private key (default is `icat.ppk`) that you created after installing PuTTY. Then, click **Next**.
 - e. From the CIMOM ports menu, click **Next** to accept the default ports.
 - f. From the embedded WebSphere® Application Server ports menu, click **Next** to accept the default ports.
 - g. From the installation confirmation menu, click **Install** to install the SAN Volume Controller console.
 - h. Click **Finish** to complete the installation.

Note: If **View post installation tasks** is clicked, you can view the steps needed to access the SAN Volume Controller console.

3. From the master console installation wizard, click **Next**. The master console installation wizard validates the installation of the SAN Volume Controller Console. If the validation is not successful, an error panel is displayed. If errors were found, correct the errors and start the installation wizard again.

Installing the DS4000 Storage Manager Client (FAStT Storage Manager Client)

This topic describes how to install the DS4000 Storage Manager Client (FAStT Storage Manager Client) using the master console installation wizard.

Perform the following steps to install the DS4000 Storage Manager Client (FAStT Storage Manager Client):

1. From the master console installation wizard, click **Next** to start the installation of the DS4000 Storage Manager Client (FAStT Storage Manager Client).
2. From the DS4000 Storage Manager Client (FAStT Storage Manager Client) installation wizard, perform these steps to install the client:
 - a. From the Welcome panel, click **Next**.
 - b. At the copyright prompt, click **OK**.
 - c. From the License Agreement panel, click **Yes**.
 - d. From the Destination Directory panel, click **Next** to accept the default directory.
 - e. When prompted to start the Event Monitor service, click **Yes**.
 - f. From the Operation Complete panel, click **Finish**.
3. From the master console installation wizard, click **Next**. The master console installation wizard validates the installation of the DS4000 Storage Manager Client (FAStT Storage Manager Client). If the validation is not successful, an error panel is displayed. If errors were found, correct the errors and start the installation wizard again.

Installing Tivoli SAN Manager

This topic describes how to install the Tivoli SAN Manager using the master console installation wizard.

Before you begin installing Tivoli SAN Manager, you must ensure that the SNMP service is started and that a public community string is defined. In addition, you must ensure that SNMP Trap service is set to manual and stopped. To view the services:

1. Right-click **My Computer** from the desktop, and then click **Manage**.
2. Expand **Services and Applications**.
3. Click **Services**.
4. Select **SNMP Service** and verify that the status is set to started.
5. Right-click SNMP Service and click **Properties**.
6. Click the **Security** tab and verify that there is a public community name with a minimum of Read rights.
7. Click **OK** to close the SNMP Service properties dialog.
8. From the list of services, select **SNMP Trap Service**. Verify that the status is not set to started and that the startup type is set to manual.

Perform the following steps to install the TSanM manager:

1. From the master console installation wizard, click **Next** to start the installation of IBM Tivoli Storage Area Network Manager.
2. If prompted to insert a different CD, insert it in the CD-ROM drive and enter the CD-ROM drive letter in the location field. Then click **OK**.
3. From the Tivoli Storage Area Network Manager setup wizard, perform these steps to install Tivoli Storage Area Network Manager:
 - a. Select the language to be used for the installation, and click **OK**.
 - b. At the copyright prompt, click **OK**.
 - c. From the Welcome menu, click **Next**.
 - d. From the License Agreement panel, click **I accept the terms in the license agreement**, and then click **Next**.
 - e. From the Destination Directory panel, click **Next** to accept the default directory.
 - f. From the base port number panel, click **Next** to accept the default.
 - g. From the data repository panel, click **DB2**, and then click **Next**.
 - h. From the Single/Multiple User ID/Password Choice panel, you can decide to use the DB2 Administrator username and password you specified during the DB2 installation for all IDs and passwords on this panel. You can also choose to use different IDs and passwords for each of the IDs and passwords on this panel. After choosing, click **Next**.
 - i. Enter the DB2 Administrator username and password. Confirm the password and click **Next**.

Note: If you chose not to use the DB2 Administrator username and password, you will be prompted for enter IDs and passwords for DB2, Websphere, host authentication, and NetView.

 - j. From the database name panel, click **Next** to accept the default.
 - k. From the Tivoli Network installation drive menu, click **Next** to accept the default.
 - l. From the installation confirmation menu, click **Next**.
 - m. When prompted, click **Finish** to complete the installation of the TSanM manager. Note that the machine will reboot and the master console installation wizard will continue.
4. From the master console installation wizard, click **Next**. The master console installation wizard validates the installation of TSanM manager. If the validation is not successful, the Verify TSanM Manager Installation panel displays an error. Correct all errors and restart the master console installation wizard.

Before you continue with the master console software installation, you need to disable the NetView component of Tivoli SAN Manager from receiving traps from the Windows SNMP Trap Service. Both NetView and IBM Director receive traps on the same port by default, which will cause a conflict when SNMP traps are sent from SAN File System or SAN Volume Controller. Therefore, you need to configure IBM Director to forward traps to NetView (you will configure IBM Director to forward traps after installing it).

To disable the NetView component from receiving SNMP traps:

1. Edit the Windows registry by opening a DOS prompt and entering regedit from the command line.

2. Locate the key
HKEY_LOCAL_MACHINE\SOFTWARE\Tivoli\NetView\CurrentVersion.
3. Double-click the **trapdSharePort162** value name and change its value data to **0**.
4. Right-click the key
HKEY_LOCAL_MACHINE\SOFTWARE\Tivoli\NetView\CurrentVersion and click **New → DWORD Value**.
5. Change the value name to **trapdTrapReceptionPort**.
6. Double-click the **trapdTrapReceptionPort** value name, change its value data to an available port number, such as 9950 and click the **Decimal** radio button.

Tip: Remember the port number that you set here. You will refer to that number when you modify the IBM Director configuration.

7. Close the Registry Editor window.
8. Open a Command Prompt window.
9. Remove the NetView service.
`C:\usr\ov\bin\nvservice -remove`
10. Reinstall the NetView service (which will remove the dependency on the SNMP Trap Service).
`C:\usr\ov\bin\nvservice -install -username .\NetView -password password`

where *password* is the password of the local NetView account.

Installing Tivoli SAN Manager Agent

This topic describes how to install the TSanM agent using the master console installation wizard.

Perform the following steps to install the TSanM agent:

1. From the master console installation wizard, click **Next** to begin the installation of the TSanM agent.
2. If prompted to insert a different CD, insert it in the CD-ROM drive and enter the CD-ROM drive letter in the location field. Then click **OK**.
3. Select the language to be used by the TSanM Agent Setup Wizard, and click **OK**.
4. The TSanM Agent Setup Wizard is launched. From the Setup Wizard perform these steps to install the TSanM Agent:
 - a. From the Software License Agreement panel, click **I accept the terms in the license agreement**, and click **Next**.
 - b. From the Installation Directory panel, click **Next** to accept the default directory.
 - c. From the Manager name and port number panel, enter **localhost** for the Tivoli Manager name (because both the Manager and the Agent are on the master console). Leave the default for the Port Number, and click **Next**.
 - d. From the Base Port Number panel, click **Next** to accept the default.
 - e. From the Host Authentication Password panel, enter the password of the Host Authentication ID you specified when you installed Tivoli SAN Manager - Manager.

Note: If you chose to use the DB2 Administrator username and password for all IDs when you installed the Tivoli SAN Manager, enter it on

this panel as well. Otherwise, enter the ID that you specified for the host authentication ID when you installed the Tivoli SAN Manager.

- f. From the Installation Confirmation menu, click **Next**.
 - g. Click **Finish** to complete the installation of the Tivoli SAN Manager Agent.
5. From the master console installation wizard, click **Next**. The master console installation wizard validates the installation of TSanM agent. If the validation is not successful, the Verify TSanM Agent Installation panel displays an error. If errors were found, correct the errors and restart the master console installation wizard.

Installing IBM Director

This topic describes how to install IBM Director using the master console installation wizard.

Perform the following steps to install IBM Director:

1. From the master console installation wizard, click **Next** to begin the installation of IBM Director.
2. If prompted to insert a different CD, insert it in the CD-ROM drive and enter the CD-ROM drive letter in the location field. Then click **OK**.
3. The IBM Director Setup Wizard is launched. From the Setup Wizard perform these steps to install IBM Director:
 - a. From the License Agreement panel, click **I accept the terms in the License Agreement**, and click **Next**.
 - b. From the Server Plus Pack panel, click **Next**.
 - c. From the Feature and Installation Directory panel, click the Red x for SNMP Access and Trap Forwarding. Click **This Feature will be installed on the local hard drive**, and click **Next**.
 - d. From the IBM Director service account information panel, fill in the following fields:
 - Domain. Enter the host name for the master console.
 - User name. Enter a Windows user account that has administrative privileges.
 - Password. Enter the password for the Windows user account (and confirm it).Then click **Next**.
 - e. From the Encryption Settings panel, click **Next** to accept the defaults.
 - f. From the Software distribution settings panel, click **Next** to accept the defaults.
 - g. Click **Install** to begin the installation.
 - h. From the Network Drivers configuration pop-up, select the first port and click **Enable driver**.
 - i. From the IBM Director database configuration, make sure that Microsoft Jet 4.0 is selected (it is the default). Do not select DB2 here. Then click **Next**.
 - j. Click **Finish** to complete the installation.
 - k. When prompted to reboot the system, click **No**.
 - l. From the master console installation wizard, click **Next**. The master console installation wizard validates the installation of IBM Director. If the validation is not successful, the Verify IBM Director Installation panel displays an error. Correct all errors and restart the master console installation wizard.

After completing the installation and before continuing with the master console installation wizard, you need to configure IBM Director to forward traps to the NetView component of Tivoli SAN Manager.

1. Open a Command Prompt window.
2. Change to the IBM Director snmp directory.

```
cd Director_installation_directory\data\snmp
```

where *Director_installation_directory* is C:\Program Files\IBM\Director by default.

3. Edit **SNMPServer.properties**.
4. Find the line **snmp.trap.v1.forward.address.1=**.
5. Uncomment the line (delete the # sign), and add the name of the master console machine. For example:

```
snmp.trap.v1.forward.address.1=master1
```
6. Find the line **snmp.trap.v1.forward.port.1=**.
7. Uncomment the line (delete the # sign), and add the port that you specified for the trapdTrapReceptionPort value in the Windows registry key KEY_LOCAL_MACHINE\SOFTWARE\Tivoli\NetView\CurrentVersion\. For example:

```
snmp.trap.v1.forward.port.1=9950
```
8. Save and close the file.
9. Reboot the master console.

Launching the IBM Director console

This topic describes how to launch and set up the IBM Director console using the master console installation wizard.

Perform the following steps to launch and set up the IBM Director console:

1. From the master console installation wizard, click **Next** to launch the IBM Director console.
2. The instructions to set up the IBM Director Console panel are displayed. Follow the instructions to set up filters as well as default error and event actions. You can choose to configure IBM Director now or you can wait until after the master console is installed. For more information about configuring IBM Director for SAN Volume Controller, see “Configuring service alert for SAN Volume Controller” on page 33. For more information about configuring IBM Director for SAN File System, see “Configuring service alert for SAN File System” on page 38.
3. The IBM Director Login menu is displayed. Enter the password of the Windows User Account with administrative privileges and click OK.
4. After setting up the IBM Director Console, make sure that the local system account can log on to IBM Director:
 - a. Close IBM Director.
 - b. Right-click **My Computer** from the desktop, and then click **Manage**.
 - c. Expand **Services and Applications**.
 - d. Click **Services**.
 - e. Right-click **IBM Director Server** and click **Properties**.
 - f. Select the **Log On** tab.
 - g. Click **Local System** account and select **Allow service to interact with desktop**.

- h. You are prompted that the new properties will not take effect until you stop and restart the service. Click **OK** at the prompt.
- i. Click **OK** to close the Properties dialog.
- j. Stop the IBM Director service, and then restart it.

Installing documentation and utilities files

This topic describes how to copy documentation and utilities files using the master console installation wizard.

Perform the following steps to copy the files:

1. From the master console installation wizard, click **Next** to begin copying documentation and support utilities.
2. If prompted to insert a different CD, insert it in the CD-ROM drive and enter the CD-ROM drive letter in the location field. Then click **OK**.
3. The documentation and support utilities are copied. After all documentation is installed, the **Finish** panel is displayed.
4. Review the master console installation log (mclog.txt) to ensure that all products are properly installed. The log file is located in `installation_directory\logs\`, where `installation_directory` is the directory where the master console was installed. The default installation directory is `C:\Program Files\IBM\MasterConsole`.
5. Click **Finish** to complete the installation.
6. If a system reboot is required, accept the prompt to complete the master console installation process.

Mirroring the boot drive

This topic describes how to mirror the boot drive on the master console using the Windows software mirroring capability.

The target disk must be unformatted before you can set it up as a mirrored disk.

Perform the following steps to mirror the boot drive:

1. From the desktop, right-click **My Computer**.
2. Click **Manage**.
3. Click **Storage** → **Disk Management**.
4. Right-click the disk icon for the system disk.
5. Click **Upgrade to dynamic disk** and then click **OK**.
6. Right-click the disk icon for the disk that you want to become the mirror of the system disk.
7. Click **Upgrade to dynamic disk** and then click **OK**.

Note:

- If you receive a warning, click **Yes**.
 - If your system reboots, restart the Disk Management.
8. Right-click the disk icon for the system disk.
 9. Click **Add Mirror**.
 10. Select the disk that you want to become the mirror of the system disk, and then click **Add Mirror**.
 11. A warning dialogue box appears stating that you must update the boot.ini file. Click **OK** to continue.

12. Update the boot.ini file:
 - a. From the desktop, double-click **My Computer**.
 - b. Click **Tools** → **Folder options**.
 - c. Click the **View** tab.
 - d. In the **Advanced settings** list, select the **Show hidden files and folders** radio button.
 - e. In the My Computer window, click **Local disk (C:)**.
 - f. Double-click the c:\boot.ini file to open the file in Notepad.

Attention: Be cautious when editing this file to make only the requested changes. Do not modify any other lines in this file.
 - g. In the operating system section, add **Primary** to the end of the operating description for the system disk.
 - h. Copy the line for the system disk, and change **Primary** to **Secondary**, and change the system disk (for example, **disk(0)**) to mirrored disk (for example, **disk(1)**).

The file should look similar to the following example:

```
[boot loader] timeout=30 default=multi(0)disk(0)partition(1)\WINNT [operating
system] multi(0)disk(0)partition(1)\WINNT="Microsoft Windows 2000 Advanced
Server Primary" /fastdetect
multi(0)disk(1)partition(1)\WINNT="Microsoft Windows 2000 Advanced
Server Secondary" /fastdetect
```
 - i. Save and close the file.
 - j. Reboot the machine.
 - k. After the machine completes the POST test, the system prompts you to select the Microsoft Windows operating system to boot from. Select **Microsoft Windows 2000 Advanced Server Secondary** and press Enter to verify that the machine boots successfully from the mirrored drive.
 - l. Reboot the machine again.
 - m. After the machine completes the POST test, the system prompts you to select the Microsoft Windows operating system to boot from. Select **Microsoft Windows 2000 Advanced Server Primary** and press Enter to verify that the machine boots successfully from the system drive.

Chapter 5. Configuring the master console

This topic provides an overview of the steps for configuring the master console.

Perform the following steps to configure the master console. Details for these steps are given in the sections that follow this list.

Note: *For San Volume Controller users:* As mentioned in Chapter 1, “Overview,” on page 1, you need to install and configure the master console before configuring the SAN Volume Controller. Similarly, you need to configure a cluster using the SAN Volume Controller Console before completing steps 5, 6, 7, 8, and 9. In addition to those steps, you will need to set up Virtual Network Computing (VNC) to enable the full remote support service, as described in the SAN Volume Controller Configuration Guide.

1. Log onto the master console.
2. Generate an SSH key pair using PuTTY.
3. Configure the PuTTY session (for command-line access).
4. If you are using the master console with the SAN File System, you can choose to use secure SSH. If you do, you need to:
 - a. Make sure each of the metadata servers in the SAN File System cluster are running.
 - b. Copy the master console SSH public key file onto each of the metadata server engines.
5. If you are using the master console with the SAN Volume Controller:
 - a. Start the SAN Volume Controller Console for the SAN Volume Controller.
 - b. Store the master console SSH public key file on each SAN Volume Controller cluster.
 - c. Set up a new zone on the Fibre Channel Switches that includes the master console and all of the 2145 nodes.
6. Configure and start Tivoli SAN Manager (TSanM).
7. Configure service alert.
8. Start IBM Director.
9. Modify your IBM Director settings.

Configuring a default PuTTY session

This topic explains how to configure a default PuTTY session so that you can run SSH from a command-line interface.

You only need to perform these steps if you are planning to run the PuTTY from a command prompt window and you are using private and public keys.

Remember: Keys are required for SAN Volume Controller, but they are not required for SAN File System.

Perform these steps to configure the PuTTY session on the master console:

1. Click **Start** —> **Programs** —> **PuTTY** —> **PuTTY** to open the PuTTY Configuration GUI window.
2. In the categories pane, make sure that **Session** is selected.

3. Select **SSH** as the protocol under the PuTTY basic options.
4. In the categories pane, click **Connection** —> **SSH**.
5. Select **2** as the preferred SSH protocol version.
6. In the categories pane, click **Auth**.
7. Type the fully-qualified file name of the SSH client private key file you specified when you used the PuTTY Key Generator in the **Private key file for authentication** field in the Authentication Parameters. For example, C:\Support Utils\PuTTY\icat.ppk.
If you do not know the file name, you can click **Browse** to select the file name from the system directory.
8. In the categories pane, click **Session**.
9. In the Saved Sessions window, click **Default Settings**.
10. Click **Save** to save your settings.

Storing keys in the SAN Volume Controller console software

This topic describes how to store your SSH keys in the SAN Volume Controller Console software. When the keys that are used to communicate with the SAN Volume Controller are changed, you must store a copy of the new private key in the SAN Volume Controller Console software.

Perform the following steps to store a copy of the new private key in the SAN Volume Controller Console software:

1. Open a command prompt window by clicking **Start** —> **Run**.
2. Type **cmd.exe** in the Open box. Click **OK**.
3. Type the following command:

copy path\filename C:"Program Files"\IBM\svconconsole\cimom\icat.ppk

where *path\filename* is the path and file name where you stored the SSH private key when it was generated in the previous procedure.

Note: Directory names with embedded spaces must be surrounded by quotation marks.

4. Stop and start the IBM CIM Object Manager to make the change take effect. Perform the following:
 - a. Click **Start** —> **Settings** —> **Control Panel**.
 - b. Double-click **Administrative Tools**.
 - c. Double-click **Services**.
 - d. From the list of services, right-click **IBM CIM Object Manager**. Select **Stop** and wait for Windows to stop the service.
 - e. From the list of services, right-click **IBM CIM Object Manager**. Select **Start**.

Setting up service alert for SAN Volume Controller

This topic provides an overview of configuring service alerts for SAN Volume Controller.

Before performing these procedures:

- SAN Volume Controller must be installed and configured.
- You need to know the serial number of the SAN Volume Controller.

This section describes how to configure service alerts to IBM Support Center and event notification to your system administrator for SAN Volume Controller.

Configuring service alert for SAN Volume Controller

This task provides step-by-step instructions for configuring IBM Director for the SAN Volume Controller error notification and service alert.

Perform the following steps to configure the master console to support the call home feature:

1. Cause a temporary error on the SAN Volume Controller to force an SNMP trap to be sent to the master console IP address. (For example, temporarily remove one of the SAN Volume Controller fibre channel cables, which will cause error code 1060 to be displayed on the front panel of the SAN Volume Controller node. After this error is displayed, replace the fibre channel cable, and delete the entry in the SAN Volume Controller error log).
2. Log on to the master console.
3. From the desktop, double-click the **IBM Director console** icon to open the IBM Director console.
4. Log on to the IBM Director console.
5. Validate that IBM Director received the traps sent by SAN Volume Controller.
 - a. Double click on the **Event Log** in the right column of IBM Director console.
 - b. Verify that the SNMP traps were received. SAN Volume Controller traps can be identified by displaying the **Event Type** field of the log. For SAN Volume Controller traps it will contain text starting **SNMP.iso.org.dod.internet.private.enterprises.ibm.ibmProd.190**.
If the traps were not received:
 - Contact your network administrator to ensure that there was not a networking problem.
 - Verify that the error notification setting on the SAN Volume Controller is not set to "none."
 - Verify that the master console IP address has been configured.
 - c. Close the Event Log.
6. From the IBM Director main panel, click **Task → Event Action Plan Builder**. The Event Action Plan Builder window opens.
7. From the Event Action Plan Builder window, right-click **Simple Event Filter** and click **New**.
8. A new simple event filter builder window open. Perform the following steps:
 - a. In the Event Type tab, make sure the **Any** option is *not* checked.
 - b. Expand the tree in the Event Type tab to select the following:
SNMP.iso.org.dod.internet.private.enterprises.ibm.ibmProd.190.1
 - c. Click **File** and then click **Save as**.
 - d. Enter **2145Error** as the name of the event filter and click **OK**.
9. Right click **Send an Internet (SMTP) E-mail** in the right column of the Event Action Plan Builder window and select **Customize**.
10. Enter the following information in the displayed form:
 - **Internet E-mail Address**. If the SAN Volume Controller is located in North America, Latin America, South America or the Caribbean Islands, enter

callhome1@de.ibm.com. If the SAN Volume Controller is located anywhere else in the world, enter **callhome0@de.ibm.com**.

- **Reply to.** Enter the E-mail address of an administrative contact at the site.
- **SMTP E-mail server.** Enter the name or IP address of the SMTP mail server.
- **SMTP port.** Enter the port number through which e-mail is sent to your e-mail server. The default is 25.
- **Subject of Email Message.** Enter the following text: 2145 Error Notification
- **Body of E-mail Message.** Enter the following text as shown:

```
# Contact name = contact_name (maximum 72 characters)
# Contact phone number = telephone_number (maximum 72 characters)
# Offshift phone number = telephone_number (maximum 72 characters)
# Machine location = machine_location (maximum 72 characters)
# Record Type = 1
&iso.org.dod.internet.private.enterprises.ibm.ibmProd.190.4.1
&iso.org.dod.internet.private.enterprises.ibm.ibmProd.190.4.2
&iso.org.dod.internet.private.enterprises.ibm.ibmProd.190.4.3
&iso.org.dod.internet.private.enterprises.ibm.ibmProd.190.4.4
&iso.org.dod.internet.private.enterprises.ibm.ibmProd.190.4.5
&iso.org.dod.internet.private.enterprises.ibm.ibmProd.190.4.6
&iso.org.dod.internet.private.enterprises.ibm.ibmProd.190.4.7
&iso.org.dod.internet.private.enterprises.ibm.ibmProd.190.4.8
&iso.org.dod.internet.private.enterprises.ibm.ibmProd.190.4.9
&iso.org.dod.internet.private.enterprises.ibm.ibmProd.190.4.10
&iso.org.dod.internet.private.enterprises.ibm.ibmProd.190.4.11
&iso.org.dod.internet.private.enterprises.ibm.ibmProd.190.4.12
```

Note: E-mails will include the text of the service alert message.

11. Click **File** → **Save As**.
12. Enter **2145CallHome** as the name of the email action, and then click **OK**.
13. Expand the **Event Action** → **PlanLog All Events** hierarchy in the left column of the Event Action Plan window.
14. Drag the **2145Error** event filter from the middle column of the window to **Log All Events** in the left column.
15. Click **Yes** in response to any warning pop-up windows that open.
16. Expand the **Send an Internet (SMTP) E-mail** hierarchy in the right column of the Event Action Plan Builder window.
17. Drag the **2145CallHome** item from the **Send an Internet (SMTP) E-mail** hierarchy to the **2145Error** item in the leftmost column.
18. Click **Yes** in response to any warning pop-up windows that open.
19. Optionally, enable the action history, which will show a history of all events.
 - a. Right click the action plan that you created.
 - b. Click **Action History**.
 - c. Click **Enable**.
20. Close the Event Action Plan Builder window.
21. Close the main IBM Director Window.

Configuring service alert test for SAN Volume Controller

This task provides instructions for configuring IBM Director for the SAN Volume Controller Service Alert test.

Perform the following steps to configure the service alert test:

1. Log on to the master console.

2. From the desktop, double-click the **IBM Director console** icon to open the IBM Director console.
3. Log on to the IBM Director console.
4. From the IBM Director main panel, click **Tasks** → **Event Action Plan Builder**. The Event Action Plan Builder window opens.
5. From the Event Action Plan Builder window, right-click **Send an Internet (SMTP) E-mail** and then click **Customize**.
6. Enter the following information in the displayed form:
 - **Internet E-mail Address.** If the SAN Volume Controller is located in North America, Latin America, South America or the Caribbean Islands, enter **callhome1@de.ibm.com**. If the SAN Volume Controller is located anywhere else in the world, enter **callhome0@de.ibm.com**.
 - **Reply to.** Enter the E-mail address of an administrative contact at the site.
 - **SMTP E-mail server.** Enter the name or IP address of the SMTP mail server.
 - **SMTP port.** Enter the port number through which e-mail is sent to your e-mail server. The default is 25
 - **Subject of Email Message.** Enter the following text: 2145 Call Home Test
Body of E-mail Message


```
# Contact name = contact_name (maximum 72 characters)
# Contact phone number = telephone_number (maximum 72 characters)
# Offshift phone number = telephone_number (maximum 72 characters)
# Machine location = machine_location (maximum 72 characters)
# Record Type = 4
# Machine Type/Model = 21454F2
# Serial Number = serial number of any installed SAN Volume Controller
```
7. Click **File** → **Save As**.
8. Enter **2145Test** as the name of the e-mail action, and click **OK**.
9. Close the Event Action Plan Builder window.
10. Close the main IBM Director Window.

Setting up e-mail notification

This task provides step-by-step instructions for configuring IBM Director to send you e-mail notifications of SAN Volume Controller errors and events.

If you are not configuring service alert for SAN Volume Controller, you will need to perform steps 1-7 from the "Configuring service alert for SAN Volume Controller" procedure before starting this procedure.

Perform the following steps to set up your e-mail notification:

1. Log on to the master console.
2. From the desktop, double-click the **IBM Director Console** icon to open the IBM Director console.
3. Log on to the IBM Director console.
4. From the IBM Director main panel, click **Tasks** → **Event Action Plan Builder**. The Event Action Plan Builder window opens.
5. From the Event Action Plan Builder window, right-click **Simple Event Filter** and click **New**.
6. A new simple event filter builder window open. Perform the following steps:
 - a. In the Event Type tab, ensure that the **Any** option is *not* checked.
 - b. Expand the tree in the Event Type tab to select the following:

SNMPiso.org.dod.internet.private.enterprises.ibm.ibmProd.190

- c. Click **File** → **Save as**.
- d. Enter **2145Event** as the name of the event filter and click **OK**.
7. Click **File** → **Save as**.
8. Enter **2145Event** as the name of the event filter and click **OK**.
9. Right-click **Send an Internet (SMTP) E-mail** in the right column of the Event Action Plan Builder window and select **Customize**.
10. Enter the following information in the displayed form:
 - **Internet E-mail Address**. Enter an e-mail address (for example, the e-mail address of the system administrator).
 - **Reply to**. Enter the e-mail address to which you want replies to be directed.
 - **SMTP E-mail server**. Enter the name or IP address of the SMTP mail server.
 - **SMTP port**. Enter the port number through which e-mail is sent to your e-mail server. The default is 25.
 - **Subject of Email Message**. Enter the following text: 2145 Event Notification.
 - **Body of E-mail Message**. Enter any information that you want to be sent to the recipient of the e-mail (for example machine location information). The body of the e-mail will also contain all the SNMP trap data containing the details of the event.
11. Click **File** → **Save As**.
12. Enter **2145EventNot** as the name of the e-mail action, and then click **OK**.
13. Expand the **Event Action Plan** → **Log All Events** hierarchy in the left column of the Event Action Plan window.
14. Expand the Simple Event Filter hierarchy in the middle column of the Event Action Plan Builder window.
15. Click **Yes** in response to any warning pop-up windows that open.
16. Expand the **Send an Internet (SMTP) E-mail** hierarchy in the right column of the Event Action Plan Builder window.
17. Drag the **2145EventNot** item from the **Send an Internet (SMTP) E-mail** hierarchy to the **2145Event** item in the leftmost column.
18. Click **Yes** in response to any warning pop-up windows that open.
19. Optionally, enable the action history, which will show a history of all events.
 - a. Right click the action plan that you created.
 - b. Click **Action History**.
 - c. Click **Enable**.
20. Close the Event Action Plan Builder window.
21. Close the main IBM Director Window.

Setting up service alert for SAN File System

This topic provides an overview of configuring service alerts for SAN File System.

The Service Alert feature works as follows:

1. The SAN File System raises an SNMP trap as the result of a detected error.
2. IBM Director on the master console receives notification of the trap.
3. IBM Director collects the trap and sends a specifically formatted e-mail to the specified system administrator.

Note: When an alert is sent by SAN File System, the system administrator may contact IBM Support Center if assistance is needed.

To configure service alerts, you need to compile the MIBs for the SAN File System and the RSA II adapter, and you also need to configure Service Alerts. You can also setup up e-mail notification.

Compiling MIBs for the SAN File System

This topic describes how to compile MIBs for the SAN File System on the master console.

The SAN File System cluster must be installed and operational and the metadata server must have been configured to send traps to the master console.

You need to compile MIBs for the SAN File System Service Alert feature and for the RSA II adapter.

Perform the following steps to compile the Service Alert MIB.

1. Use secure copy to copy the MIB from the metadata server to the master console:
 - a. Open a DOS command prompt on the master console.
 - b. Change to the putty directory (cd /program files/putty) and run **pscp** to copy a file from a metadata server engine. Note that you enter the command on one line and that *target_file* needs to end in the extension .mib.

```
pscp -I private_key_file -2 userID@engine_IP_address:  
/usr/share/snmp/mibs/IBM-SANFS-MIB.txt target_file.mib
```

If private keys have not been exchanged with the metadata servers, use the following syntax:

```
pscp.exe -2 userID@engine_IP_address:  
/usr/share/snmp/mibs/IBM-SANFS-MIB.txt target_file.mib
```

2. Open the IBM Director console.

Note: When you log in to IBM Director, the password for the IBM Director Login window must match the password for the IBM Director Server services.

3. In the Tasks menu, click **Discover Systems** and then **SNMP Devices**.
4. In the Groups pane on the left side of the panel, expand the All Groups group and right-click the SNMP Devices group, then click **Compile a new MIB**.
5. When the window opens, asking you to select the location of the new MIB, click the IBM-SANFS-MIB.txt file that you have saved.
6. The Status Messages window presents the following:
MIB file submitted to the server.
Starting MIB compile...
MIB Parsing complete
Resolving MIB imports
Saving MIB objects...
MIB Compile Finished.
7. Close the Status Messages window.
8. Compile the MIB for the RSA II adapter to configure it to send traps as well.
 - a. Download the RSA MIB. The MIB is obtained from the IBM Support Web site at <http://www.ibm.com/pc/support> as part of the firmware package for the RSA II adapter. You download the firmware update from IBM as a single executable file.

- b. Run the executable file, which will request that you insert a diskette. The diskette is formatted and the updated software is copied to the diskette (including the MIB).
- c. Use the same process for compiling the RSA MIB as for the SAN File System MIB. For more information, refer to the RSA II firmware documentation.

Configuring service alert for SAN File System

This task provides instructions for configuring IBM Director for the SAN File System error notification and service alert.

The SAN File System management information base (MIB) must have been compiled on the master console. In addition, the SAN File System cluster must be installed and operational, and the metadata servers must have been configured to send traps to the master console. See the *SAN File System Installation and Configuration Guide* for information about configuring SNMP traps on metadata server engines.

Perform the following steps to configure the master console to support the Service Alert feature:

1. Verify that the metadata servers can send Simple Network Management Protocol (SNMP) traps to the master console. From the master metadata server, run the following **snmptrap** commands. Note that the quote marks are two single quotes:


```
snmptrap -v 2c -c public master_console_IP_address '' SNMPv2-MIB:coldStart
```

```
snmptrap -v 2c -c public master_console_IP_address '' IBM-SANFS-MIB:sanfsGenericTrap
```

where *master_console_IP_address* is the IP address or host name of the master console.
2. Log on to the master console.
3. From the desktop double-click the **IBM Director console** icon to open the IBM Director console.
4. Log on to the IBM Director console.
5. Validate that IBM Director received the traps sent by the SAN File System master metadata server.
 - a. Double-click **Event Log** in the right column of the IBM Director console.
 - b. Verify that the SNMP traps were received. Look for the metadata server hostname or IP address under the Sender Name column. If the traps were not received:
 - Contact your network administrator to ensure that there was not a networking problem.
 - Make sure that the SAN File System sent the traps.
 - c. Close the event log.
6. From the IBM Director main panel, click **Tasks**.
7. In the Tasks menu, click **Event Action Plan Builder**. The Event Action Plan Builder window opens.
8. From the Event Action Plan Builder window, right-click **Simple Event Filter** and click **New**.
9. A new simple event filter builder window opens. Perform the following steps:
 - a. In the Event Type tab, make sure that the **Any** option is *not* checked.

- b. Expand the tree in the Event Type tab to select the following:

**SNMP.iso.org.dod.internet.private.enterprises.ibm.ibmProd.
ibmSanfsModule.ibmSanfsTraps**

- c. Click **File**, and then click **Save as**.
- d. Enter **tankGenericTrap** and the name of the event filter and click **OK**.
10. Right-click **Send an Internet (SMTP) E-mail** in the right column of the Event Action Plan Builder menu and click **Customize**.
11. Enter the following information in the displayed form:
- **Internet E-mail address**. Fill in an e-mail address to which to send service notifications (for example, the e-mail address of the system administrator).
 - **Reply to**. Fill in an e-mail address to which to send service notifications (for example, the e-mail address of the system administrator).
 - **SMTP e-mail server**. Enter the name or IP address of the SMTP mail server.
 - **SMTP port**. Enter the port number through which e-mail is sent on your e-mail server. The default is 25.
 - **Subject of E-mail Message** — Enter the following text: IBM SAN FS Call-home Notification.
 - **Body of E-mail message** — Enter the following text as shown.

```
#Machine type=machine_type
#Device serial number=serial_number
#Record type=1
#Component id=software
#Contact name=contact_name
#Contact phone=telephone_number
#Mgmt node=&system
#Date recvd=&date
#Time recvd=&time
```
- where:
- *Machine_type* is a four-digit device type and three-digit model.
 - *Serial_number* is the serial number of the master engine in the cluster.
 - The *contact_name* and *telephone_number* can be any length and format.
 - The values &system, &date, and &time are entered exactly as shown. They are not variables.

Note: E-mails will include the text of the service alert message.

12. Click **File**, and then click **Save As**.
13. Enter **IBM SAN FS Call-home Notification** as the name of the e-mail action, and then click **OK**.
14. Expand the **Event Action Plan** → **Log All Events** hierarchy in the left column of the Event Action Plan window.
15. Expand the **Simple Event Filter** hierarchy in the middle column of the Event Action Plan Builder window.
16. Drag the **tankGenericTrap** event filter from the middle column to **Log All Events** in the left column.
17. Click **Yes** in response to any warning pop-up windows that open.
18. Expand the **Send an Internet (SMTP) E-mail** hierarchy in the right column of the Event Action Plan Builder menu.
19. Drag the **IBM SAN FS Call-home Notification** item from the **Send an Internet (SMTP) E-mail** hierarchy to the **tankGenerictrap** item in the left column.

20. Click **Yes** in response to any warning pop-up windows that open.
21. Optionally, enable the action history, which will show a history of all events.
 - a. Right-click the action plan that you just created.
 - b. Click **Action History**.
 - c. Click **Enable**.
22. Close the Event Action Builder window.
23. Close the IBM Director window.

Setting up e-mail notification

This task provides step-by-step instructions about setting up your e-mail notification for the SAN File System.

Perform the following steps to set up your e-mail notification:

1. Start IBM Director by clicking the **IBM Director Console** icon on the desktop.
2. From the IBM Director Console menu bar, select **Tasks —> Event Action Plan Builder**.
3. In the **Actions** column, expand the item **Send an Internet (SMTP) E-mail**.
4. Right-click **IBM SAN FS Call-home Notification** and select **Update**. The **Customize Action: IBM SAN FS Call-home Notification** panel displays.
5. Fill in the following items:
 - **Internet E-mail Address** — Fill in an e-mail address (for example, the e-mail address of the system administrator)
 - **Reply to** — Fill in the e-mail address to which you want any replies to be directed.
 - **SMTP E-mail Server** — Fill in the address of your e-mail server.
 - **SMTP Port** — Change this, if required, to your SMTP server port number.
 - **Subject of E-mail Message** — Fill in SAN File System Event Notification.
 - **Body of E-mail message** — Enter the following text as shown.
Machine location = Data Centre
6. Click **File —> Save** to save the information.
7. Close the Event Action Plan Builder window.
8. Close the IBM Director Console window.

Chapter 6. Managing the master console

This topic provides an overview of the tasks that you can perform from the master console.

Tasks that you can perform from the master console include:

- Starting Tivoli SAN Manager.
- Accessing SAN File System.
- Initiating remote support.
- Replacing the SSH key pair for SAN Volume Controller.
- Replacing the client SSH private key known to the SAN Volume Controller software.
- Setting passwords for Tivoli SAN Manager, DB2, and SAN Volume Controller.

Starting Tivoli SAN Manager

This task provides step-by-step instructions about how to start the TSanM. Ensure that you configure the Tivoli SAN Manager (TSanM) to meet your requirements.

Perform the following steps to start Tivoli SAN Manager:

1. Double-click **Tivoli NetView** icon on your desktop, or select **Start → Programs → Tivoli Console**.
2. On the menu bar, select **SAN → Configuration**.
3. Click **Configuration Manager**.
4. Select **Switches and Other SNMP Agents → SNMP Agents**.
5. Add the IP address for each Fibre Channel switch into the SNMP Agents list:
 - a. Click **Add**.
 - b. Type the IP address or name of the Fibre Channel switch and click **OK**.
 - c. In the SNMP Agents section of the Switches and Other SNMP Agents panel, select the entry for the Fibre Channel switch and click **Advanced**.
 - d. Type the user ID and password for that particular switch (the manufacturing defaults for user ID is admin and password is passw0rd). This enables TSanM to access the switch to collect zoning information.
 - e. To enable this access, configure the Fibre Channel switch to allow SNMP Command Access. Refer to your Fibre Channel switch documentation for procedures on setting up this access.
6. Verify the installation by running a SAN discovery. From the menu bar, click **SAN → Configure Manager**. This displays the Configure Manager panel
7. Select **Clear History → OK**.
8. Select **Cancel** on the Configure Manager panel.
9. Ensure that the TSanM discovers all expected Fibre Channel connections and devices. You can visually check that the TSanM discovers all expected connections and device by displaying the topology map for each fabric and seeing that all the expected devices are presented.

Accessing the SAN File System

This topic describes how to access the SAN File System metadata server engines through an SSH session.

From the master console, you can access the metadata server engines in the SAN File System cluster using PuTTY to establish an SSH session. For more information about PuTTY, refer to the PuTTY user's manual.

Accessing the SAN File System from the command line

This topic describes how to access the SAN File System metadata server engines through an SSH session from the command line.

Perform these steps to establish an SSH session to any of the engines in the SAN File System from the command line.

1. Open a DOS command prompt on the master console.
2. Change to the PuTTY directory.
`cd \Program Files\PuTTY`
3. Run **putty** to establish an SSH session with a master metadata server engine.
`putty.exe -ssh engine_IP_address -I private_key_file -2`

Note: If you are not using private/public keys with the SAN File System, omit the -I and -2 parameters.

4. Log in to the master metadata server engine using a Linux™ user ID and password.

After connecting to the engine, you can access the SAN File System administrative command-line interface (CLI) to run SAN File System commands. These commands provide the ability to manage engines, metadata servers, and administrative servers.

In addition, you can perform operating system commands from the SSH session as well.

Accessing the SAN File System from the desktop

This topic describes how to access the SAN File System metadata server engines through an SSH session from the master console desktop.

Perform these steps to establish an SSH session to any of the engines in the SAN File System from the master console desktop.

Note: If you are using secure keys, make sure that you have configured SSH to use those secure keys.

1. Double-click the **PuTTY** icon.
2. Fill in the IP address of the engine to be accessed.
3. Select **SSH** as the protocol.
4. Click **Open**.
5. After the session is established, log in using a Linux user ID and password.

After connecting to the engine, you can access the SAN File System administrative command-line interface (CLI) to run SAN File System commands. These commands provide the ability to manage engines, metadata servers, and administrative servers.

In addition, you can perform operating system commands from the SSH session as well.

Transferring files using pscp

This topic describes how to use the PuTTY secure copy function to copy files from a metadata server engine and the master console.

Perform these steps to transfer files from a metadata server engine in the SAN File System cluster to the master console using secure copy. For more information about **pscp**, refer to the PuTTY user's manual.

1. Open a DOS command prompt on the master console.
2. Run **pscp** to copy a file from a metadata server engine.

```
pscp.exe userID@engine_IP_address:source_file target_file -I private_key_file  
-2
```

Transferring files using psftp

This topic describes how to use the PuTTY ftp function to transfer files between a metadata server engine and the master console.

Perform these steps to transfer files between a metadata server engine in the SAN File System cluster and the master console using ftp. For more information about **psftp**, refer to the PuTTY user's manual.

1. Open a DOS command prompt on the master console.
2. Start the psftp session.

```
psftp
```
3. Open a connection to the metadata server engine.

```
open userID@engine_IP_address
```
4. Change to the appropriate directory on the metadata server (for example, `cd /path`).
5. Change directories to the appropriate directory on the master console (for example, `lcd /path`).
6. Use `put` to transfer files to the metadata server engine and `get` to retrieve files from the metadata server engine.

```
put file_name new_file_name  
or  
get file_name new_file_name
```

7. End the ftp session by entering **quit**.

Initiating remote support

This topic provides an overview about initiating remote support.

When IBM is trying to provide a solution to a particular problem, you might be requested to invoke an IP connection so that a remotely based service representative can interrogate the master console to collect additional information on the problem.

Perform the following steps to initiate remote support:

1. Invoke the remote support connection.
2. Add an additional subnet route.

Invoking a remote support connection

This topic describes how to invoke a remote support connection.

Note: To ensure that the IBM Support Center has the correct access to the master console and its various software packages, it might be necessary to provide passwords, including the Administrator password, or to be present to input the passwords when required.

Perform the following steps to set up a secure connection to IBM with Connection Manager:

1. Double-click the **IBM Connection Manager** icon in the Master Console folder on the desktop to display the Connection Manager window.
2. Choose **IBMVPN** from the destination drop-down menu.
3. Click **Make Connection** when you are ready for the IBM remote service representative to log in. The status “Disconnected” at the bottom of the window changes to “Connected.”
4. Click **Generate Connection ID**. An alphanumeric string displays in the box to the right of the Generate Connection ID button. This is your connection ID; it must be given to the IBM remote service representative.
5. After all remote support actions are complete, click **Disconnect** to terminate the connection.
6. When prompted to confirm the connection termination, click **OK**. The status “Connected” at the bottom of the window changes back to “Disconnected.”
7. To close down the application, click **Cancel**, and then click **OK**.

Adding an additional subnet route

This topic describes how to add a new route for the IBM support network after the VPN connection has been established using the IBM Connection Manager.

Perform the following steps to add an additional subnet route.

1. Determine the support network IP address of the master console:
 - a. Click **Start —> Programs —> Accessories —> Command Prompt**.
 - b. Enter **ipconfig /all**. The end of the listing will look similar to the following example:

PPP adapter IBMVPN:

```
Connection-specific DNS Suffix . : 
Description . . . . . : WAN (PPP/SLIP) Interface
Physical Address. . . . . : 00-53-45-00-00-00
DHCP Enabled. . . . . : No
IP Address. . . . . : 198.74.64.60
Subnet Mask . . . . . : 255.255.255.255
Default Gateway . . . . . : 
DNS Servers . . . . . :
```

2. Determine the support network interface number (IF) by entering **route print**. The beginning of the routing table will look similar to the following example:

```
=====
Interface List
0x1 ..... MS TCP Loopback interface
0x1000003 ...00 02 55 7b 0c 09 ..... Intel(R) 82546EB Based Dual Port
                                   Network Connection
0x1000004 ...00 02 55 7b 0c 08 ..... Intel(R) PRO/1000 MT Dual Port
                                   Network Connection
0x2000004 ...00 53 45 00 00 00 ..... WAN (PPP/SLIP) Interface
=====
```

The support network interface is identified as the WAN (PPP/SLIP) Interface. The number given is in hex and must be converted to decimal (for example, 0x2000004 (hex) = 33554436 (decimal)).

3. Add the new route for the support network by entering the following command:

```
route ADD 198.74.64.0 MASK 255.255.252.0 [remote_support_IP]
IF [IF_decimal_number] Metric 2
```

Where *remote_support_IP* is the master console IP address determined in step 1 on page 44 and *IF_decimal_number* is the interface number determined in step 2 on page 44 (for example, route ADD 198.74.64.0 MASK 255.255.252.0 168.74.64.60 IF 33554436 Metric 2).

4. Verify that the new route was added by entering **route print** and finding the 198.74.64.0 255.255.252.0 entry in the table. The output will look similar to the following:

```
=====
Interface List
0x1 ..... MS TCP Loopback interface
0x1000003 ...00 02 55 7b 0c 09 ..... Intel(R) 82546EB Based Dual Port
                                   Network Connection
0x1000004 ...00 02 55 7b 0c 08 ..... Intel(R) PRO/1000 MT Dual Port Network
                                   Connection
0x2000004 ...00 53 45 00 00 00 ..... .WAN (PPP/SLIP) Interface
=====

Active Routes:
Network Destination  Netmask          Gateway          Interface        Metric
0.0.0.0              0.0.0.0          9.47.101.1      9.47.101.159    1
0.0.0.0              0.0.0.0          9.47.101.1      192.168.70.105  1
9.47.101.0           255.255.255.0    9.47.101.159    9.47.101.159    1
9.47.101.159         255.255.255.255  127.0.0.1       127.0.0.1        1
9.255.255.255        255.255.255.255  9.47.101.159    9.47.101.159    1
127.0.0.0            255.0.0.0        127.0.0.1       127.0.0.1        1
192.168.0.0          255.255.0.0      192.168.70.105  192.168.70.105  1
192.168.70.105       255.255.255.255  127.0.0.1       127.0.0.1        1
192.168.70.255       255.255.255.255  192.168.70.105  192.168.70.105  1
198.74.64.0         255.255.252.0    168.74.64.60    198.74.64.60     2
198.74.64.0          255.255.255.0    198.74.64.60    198.74.64.60     1
224.0.0.0            224.0.0.0        9.47.101.159    9.47.101.159    1
224.0.0.0            224.0.0.0        192.168.70.105  192.168.70.105  1
255.255.255.255      255.255.255.255  9.47.101.159    9.47.101.159    1
Default Gateway      9.47.101.1
=====

Persistent Routes:
None
```

5. Verify routing to the support network by entering **ping 198.74.67.235**.

Replacing the SSH key pair for SAN Volume Controller

This topic provides step-by-step instructions for replacing the SSH key pair.

Note:

- If you change the SSH keys that will be used by the master console to communicate with the SAN Volume Controller Console you will have to store the client SSH private key in the SAN Volume Controller Console software as described previously and then store the client SSH public key on the SAN Volume Controller cluster.

- If you change the IP address of your SAN Volume Controller cluster after you have added the cluster to SAN Volume Controller Console, the SAN Volume Controller Console will not be aware of the existence of the cluster.

To correct this, remove the cluster from the SAN Volume Controller Console and add it back again. Perform the following steps:

1. Start the SAN Volume Controller Console by clicking on the desktop icon or by using your Web browser to go to `http://IP_address:9080/ica`, where *IP_address* is the IP address of the master console. The Signon window is displayed. This might take a few moments to open.
2. Enter the user ID `superuser` and the password `passw0rd`. The Welcome window is displayed.
3. Click **Clusters** from the portfolio.
4. Check the **Select** box for the cluster for which you wish to replace the key.
5. Click **Remove a cluster** in the selection box
6. Click **Go**.
7. Click **Clusters** from the portfolio.
8. Click **Add a cluster** in the selection box.
9. Input the IP address of the cluster.
10. Do *not* check the **Create (Initialize Cluster)** box.
11. Click **OK**.
12. Enter the user name and password. When you see the pop-up window, enter the network password and click **OK**.
13. Add the SSH client public key to the SAN Volume Controller cluster:
 - a. Click **Browse...** for the key file to upload and locate the public key or input the key in the **Key (direct input)** field
 - b. Type an identifier in the **ID** field, which uniquely identifies the key to the cluster.
 - c. Select the **Administrator** radio button.
 - d. Click **Add Key**.
 - e. Click **Clusters** from the portfolio to check the status of the cluster. If the cluster status remains **SSH Key Refused**, you do not have a good key pair. You can reset the SAN Volume Controller Console private SSH key. However, if you have successfully contacted other clusters, you will break that connectivity.

Replacing the client SSH private key known to the SAN Volume Controller software

This task provides step-by-step instructions to replace the client SSH private key known to the SAN Volume Controller software.

Attention: If you have successfully contacted other SAN Volume Controller clusters, you will break that connectivity if you replace the client SSH private key known to the SAN Volume Controller software.

Perform the following steps to replace the client SSH private key:

1. Sign off the SAN Volume Controller Console.
2. Using the Windows Services facility, stop the IBM CIM Object Manager:

- a. Click **Start** —> **Settings** —> **Control Panel**.
- b. Double-click **Administrative Tools**.
- c. Double-click **Services**.
- d. Select **IBM CIM Object Manager** in the list of services, right click, and select **Stop**.
- e. Leave the Services panel open.
3. Copy the client SSH private key into the appropriate SAN Volume Controller Console directory. Perform the following:
 - a. Open a command prompt window by clicking **Start** —> **Run**.
 - b. Type **cmd.exe** in the **Open** field.
 - c. Click **OK**.
4. Type the following command:


```
copy filename C:\program files\IBM\svcconsole\cimom\icat.ppk
```

 where *filename* is the path and file name of the client SSH private key
5. Restart the IBM CIM Object Manager. Select **IBM CIM Object Manager** in the list of services, right click and select **Start**.
6. Log on to the SAN Volume Controller Console.
7. Click **Clusters** in the portfolio.
8. Check the status of the cluster.

Setting passwords

This topic lists the passwords that you must set on the master console.

The following passwords must be set on the master console:

- Tivoli SAN Manager (changing the Host Authorization)
- DB2 user IDs and passwords
- SAN Volume Controller user ID and password

Changing the Host Authorization for Tivoli SAN Manager password

This topic describes how to set the Host Authorization for Tivoli SAN Manager password on the master console.

Note: Verify that the file C:\Support Utils\ChangeWASAdminPass.bat is present. If not, download it into the C:\Support Utils directory from the 2145 Support Web site, by selecting **Downloadable files** from the following URL: www.ibm.com/storage/support/2145

These IDs and passwords are used internally by the master console, and can be changed if required.

You can change this password by performing the following steps:

1. Open a command prompt window by selecting **Start** —> **Programs** —> **Accessories** —> **Command Prompt**.
2. Type **cd C:\Support Utils**.
3. Type **ChangeWASAdminPass new_user_ID new_password**.
4. Reboot the master console.

Setting the DB2 user IDs and passwords

This topic describes how to set the DB2 user IDs and passwords on the master console.

You can change the DB2 user IDs and passwords by performing the following steps:

1. Use the Computer Management Administrative tool to change the password for the Base User ID password (db2admin):
 - a. Select **Start** —> **Settings** —> **Control Panel**.
 - b. Double-click **Administrative Tools** —> **Computer Management** —> **Local Users and Groups** from the left-hand navigation.
2. Use the Computer Management Administrative tool to change the database password used by Tivoli SAN Manager. If it is changed, you must perform the following steps:
 - a. Open a command line window by selecting **Start** —> **Programs** —> **Accessories** —> **Command Prompt**.
 - b. Enter `cd c:\tivoli\itsanm\manager\bin\w32-ix86`.
 - c. Enter `srncp -u userID -p password ConfigService setAuthenticationPw newPassword` where *userID* is your user ID, *password* is your password, and *newPassword* is the new host authentication password.

Setting SAN Volume Controller user ID and password

This topic describes how to set the SAN Volume Controller user ID and password on the master console.

These are set using the SAN Volume Controller Web pages accessed using a Web browser or using the SAN Volume Controller Console function. See the SAN Volume Controller documentation for more information about changing the ID and password.

Chapter 7. Uninstalling master console software

This topic provides a high-level overview of the procedures for uninstalling the master console software.

To remove the master console software, you must explicitly remove each of the software packages using the Add or Remove Programs dialog panel. Because of product dependencies, you must remove the software packages in the following order:

1. IBM Director
2. Tivoli SAN Manager Agent
3. Tivoli SAN Manager
4. DS4000 Storage Manager Client (FAStT Storage Manager Client)
5. SAN Volume Controller Console
6. DB2
7. PuTTY
8. Adobe Acrobat Reader
9. Software Only Master Console

Note: When you remove the software only master console, you remove documentation, support utilities, and icons. Therefore, you can continue to access all product documentation until you remove the software only master console. The documentation is located in *system_drive*\Program Files\IBM\Master Console\Documents.

Accessing the Add or Remove Programs dialog window

Perform the following steps to access the Add or Remove Programs dialog panel:

1. From the Windows menu bar, click **Start->Settings->Control Panel**.
2. From the Control Panel window, double-click the **Add/Remove Programs** icon.

Uninstalling IBM Director

This topic describes how to uninstall IBM Director from the master console using the Add/Remove Programs dialog panel.

This procedure assumes that you have accessed the Add/Remove Programs dialog panel.

Perform the following steps to uninstall IBM Director:

1. In the Add/Remove Programs panel, scroll to **IBM Director**, and click to select it.
2. Click **Change/Remove**.
3. Navigate through the uninstallation wizard, selecting the **Next** button of each window.
4. Wait for the program to be removed, and then click **Finish**.
5. If you are prompted to reboot the system, answer **yes** to reboot the system and complete the removal of the product.

Uninstalling TسانM Agent

This topic describes how to uninstall TسانM Agent from the master console using the Add/Remove Programs dialog panel.

This procedure assumes that you have accessed the Add/Remove Programs dialog panel.

Perform the following steps to uninstall the TسانM Agent:

1. In the Add/Remove Programs panel, scroll to **IBM Tivoli Storage Area Network Manager - Agent**, and click to select it.
2. Click **Change/Remove**.
3. Navigate through the uninstallation wizard, selecting the **Next** button of each window.
4. Wait for the program to be removed, and then click **Finish**.
5. If you are prompted to reboot the system, answer **yes** to reboot the system and complete the removal of the product.

Uninstalling TسانM Manager

This topic describes how to uninstall TسانM Manager from the master console using the Add/Remove Programs dialog panel.

This procedure assumes that you have accessed the Add/Remove Programs dialog panel.

Perform the following steps to uninstall the TسانM Manager:

1. In the Add/Remove Programs panel, scroll to **IBM Tivoli Storage Area Network Manager - Manager**, and click to select it.
2. Click **Change/Remove**.
3. Navigate through the uninstallation wizard, selecting the **Next** button of each window.
4. Wait for the program to be removed, and then click **Finish**.
5. If you are prompted to reboot the system, answer **yes** to reboot the system and complete the removal of the product.

Uninstalling the DS4000 Storage Manager Client (FAStT Storage Manager Client)

This topic describes how to uninstall the DS4000 Storage Manager Client (FAStT Storage Manager Client) from the master console using the Add/Remove Programs dialog panel.

This procedure assumes that you have accessed the Add/Remove Programs dialog panel.

Perform the following steps to uninstall the DS4000 Storage Manager Client (FAStT Storage Manager Client):

1. In the Add/Remove Programs panel, scroll to the product name, and click to select it.
2. Click **Change/Remove**.

3. Navigate through the uninstallation wizard, selecting the **Next** button of each window.
4. Wait for the program to be removed, and then click **Finish**
5. If you are prompted to reboot the system, answer **yes** to reboot the system and complete the removal of the product.

Uninstalling the SAN Volume Controller Console

This topic describes how to uninstall the SAN Volume Controller Console from the master console using the Add/Remove Programs dialog panel.

This procedure assumes that you have accessed the Add/Remove Programs dialog panel.

Perform the following steps to uninstall the SAN Volume Controller Console:

1. In the Add/Remove Programs panel, scroll to **IBM TotalStorage SAN Volume Controller Console**, and click to select it.
2. Click **Change/Remove**.
3. Navigate through the uninstallation wizard, selecting the **Next** button of each window.
4. Wait for the program to be removed, and then click **Finish**
5. If you are prompted to reboot the system, answer **yes** to reboot the system and complete the removal of the product.

Uninstalling DB2

This topic describes how to uninstall DB2 from the master console using the Add/Remove Programs dialog panel.

This procedure assumes that you have accessed the Add/Remove Programs dialog panel.

Perform the following steps to uninstall DB2:

1. In the Add/Remove Programs panel, scroll to **IBM DB2**, and click to select it.
2. Click **Change/Remove**.
3. Navigate through the uninstallation wizard, selecting the **Next** button of each window.
4. Wait for the program to be removed, and then click **Finish**
5. If you are prompted to reboot the system, answer **yes** to reboot the system and complete the removal of the product.

After removing DB2, you must also remove the following directories:

- The directory where DB2 was installed. The default directory is *system_drive\Program Files\SQLLIB*.
- The DB2 directory that contains database data. The default directory is *system_drive\DB2*.
- The DB2log directory containing the DB2 log files. The default directory is *system_drive\DB2*.

Uninstalling PuTTY

This topic describes how to uninstall PuTTY from the master console using the Add/Remove Programs dialog panel.

This procedure assumes that you have accessed the Add/Remove Programs dialog panel.

Perform the following steps to uninstall PuTTY:

1. In the Add/Remove Programs panel, scroll to **PuTTY**, and click to select it.
2. Click **Change/Remove**.
3. Navigate through the uninstallation wizard, selecting the **Next** button of each window.
4. Wait for the program to be removed, and then click **Finish**

Uninstalling Adobe Acrobat

This topic describes how to uninstall Adobe Acrobat from the master console using the Add/Remove Programs dialog panel.

This procedure assumes that you have accessed the Add/Remove Programs dialog panel.

Perform the following steps to uninstall PuTTY:

1. In the Add/Remove Programs panel, scroll to **PuTTY**, and click to select it.
2. Click **Change/Remove**.
3. Navigate through the uninstallation wizard, selecting the **Next** button of each window.
4. Wait for the program to be removed, and then click **Finish**

Uninstalling the software only master console

This topic describes how to uninstall the software only master console from the master console using the Add/Remove Programs dialog panel.

This procedure assumes that you have accessed the Add/Remove Programs dialog panel.

Perform the following steps to uninstall the software only master console:

1. In the Add/Remove Programs panel, scroll to **Software Only Master Console**, and click to select it.
2. Click **Change/Remove**.
3. Navigate through the uninstallation wizard, selecting the **Next** button of each window.
4. Wait for the program to be removed, and then click **Finish**
5. If you are prompted to reboot the system, answer **yes** to reboot the system and complete the removal of the product.

To complete the removal process, you can remove the directory where Software Only Master Console was installed. The default is *system_drive*\Program Files\IBM\Master Console.

Chapter 8. Upgrading the master console to the latest version

This topic provides information about upgrading the master console to the latest version.

Before you begin the following procedure to upgrade to the latest master console version, ensure that you have logged in with a user ID with administrative privileges and the modified user rights.

1. Insert the Master Console CD-ROM 1 in the CD-ROM drive.
2. Click **Start** → **Run** to open the Run dialog box.
3. Enter *cd-rom_drive:\setup.exe*, where *cd-rom_drive* is the letter of the drive in which you inserted the CD, and click **OK**.

The following message is displayed in the DOS-prompt window:

```
Initializing InstallShield Wizard...  
Preparing Java (tm) Virtual Machine
```

4. When prompted, select the language to be used for the installation wizard and click **OK**.
5. The installation wizard Welcome panel is displayed. Click **Next**.
6. The installation wizard License Agreement panel is displayed. Click **I accept the terms in the license agreement**, and then click **Next** to begin installing the Adobe Acrobat Reader.

Before installing the Adobe Acrobat Reader, the installation wizard verifies that all prerequisites are installed on the system. If they are not, a pop-up opens describing the prerequisites that are not currently installed. When you click **OK**, the installation wizard stops. After installing the prerequisite software, start the installation wizard again.

7. The installation wizard displays in a panel the version of the already installed master console. Click **Next** to continue upgrading.
8. The Select the optional features panel is displayed. Select or deselect the optional features:
 - Install DS4000 Storage Manager Client (FAS*St*T Storage Manager Client). If DS4000 Storage Manager Client (FAS*St*T Storage Manager Client) is deselected, a message is displayed when you click the **Next** button to warn you that this feature should only be deselected if DS4000 disk drives are not part of the current configuration.
 - Install Connection Manager. If Connection Manager is deselected a message is displayed when you click the **Next** button to warn you that IBM's ability to swiftly resolve unusual or complex problems will be compromised if this feature is disabled.

After selecting or deselecting the optional features, click **Next** to display the list of products that will be upgraded by the master console wizard.

9. The List of products panel is displayed. The installation wizard displays the list of the products of the master console comparing the already installed product versions with the required ones:
 - Products of the master console
 - Versions of the already installed products
 - Required versions for the products
 - Actions to be done by the master console installation wizard

Depending on the installed version of each product, the installation wizard will determine whether to upgrade the product using the following conditions:

- If the product is installed and its installed version is lower than the required version, the product will be upgraded by launching the specific installer of the product.
- If the product is installed at a version equal to or higher than the required version, the product is not installed. The corresponding panels that launch and verify the specific product installation will be skipped.
- For DB2, the installation wizard also checks the installed edition. If the installed edition is not Enterprise Edition, the installation wizard inserts **Wrong edition* in the Installed Version column. You must manually uninstall the wrong installed edition. To manually uninstall the wrong installed edition:
 - a. Click **Cancel** to exit the master console installation wizard.
 - b. Manually uninstall the wrong DB2 edition.
 - c. After uninstalling the wrong installed edition of DB2, start the master console installation wizard again.

From this panel, click **Next** to continue upgrading the products.

10. All the product upgrades will be done by launching the specific installer for each product. However, the upgrade is skipped for any product that is already installed with the same version or a higher version than the required one.

Note: All the individual software packages are provided on CDs with the master console. Installation instructions for the software packages are located in the individual software installation guides.

Upgrades to the master console software products will be available at the following Web site: www.ibm.com/storage/support/2145/. Instructions for downloading and installing upgraded software packages are also available at this site.

11. The upgrading of the documentation and utility files is performed in the following steps:
 - a. The installation wizard uninstalls the old documentation and utility files.
 - b. If a system reboot is required, accept the prompt to complete the old master console uninstallation.
 - c. From the Documents and Support Utilities installation panel, click **Next** to begin the installation of new documentation and utilities files.
 - d. If prompted to insert a different CD, insert it in the CD-ROM drive and enter the CD-ROM drive letter in the location field. Then click **OK**.
 - e. The documentation and support utilities files are copied.
12. After all documentation is installed, the Finish panel is displayed. Click **Finish**.
13. If a system reboot is required, accept the prompt to complete the master console upgrading process.
14. Review the master console installation log (mclog.txt) to ensure that all products are properly installed. The log file is located in *installation_directory\logs*, where *installation_directory* is the directory where the master console was installed. The default installation directory is C:\Program Files\IBM\MasterConsole.

Chapter 9. Troubleshooting the master console

This topic provides information you need to troubleshoot and resolve problems with the master console.

Recovering from a master console disk failure

This topic describes how to recover from a master console disk failure.

The hard disk drive in the master console is a mirrored pair to protect against loss of the master console due to a disk failure. If one of these mirrored pair of disk drives fails and needs to be replaced, perform the following steps:

1. Right-click the **My Computer** icon on your desktop and select **Manage**.
2. Select **Disk Management**. The hard drives display in the right panel.
3. If the failing disk drive displays, right-click the main volume of the drive and select **Break Mirror**.
4. Shut down the master console and replace the failing disk drive using the procedures detailed in the documentation for your master console. Ensure that the new drive has its jumpers set the same as the drive that is being replaced. The new drive must be the same capacity or larger than the drive being replaced.

Note:

- It might not be obvious which of the two drives has failed. In this case, reboot with each drive connected in turn to isolate the failed drive.
 - If the replacement drive has a boot record present, erase it prior to use.
 - If the master console fails to boot, due to not being able to find the Boot Record, change the boot sequence in the BIOS to the other hard drive.
5. Restart the master console.
 6. Right-click the **My Computer** icon on your desktop and select **Manage**.
 7. Select **Disk Management**. The hard drives display in the right panel.
 8. If a disk drive displays in the list marked "Missing", remove it by right-clicking the drive and selecting **Remove Disk**.
 9. If the new disk drive has a "no entry sign" displayed on it, right-click it and select **Write Signature**. This removes the "no entry sign."
 10. Right-click the new disk drive and select **Upgrade to Dynamic Disk**.
 11. Right-click the volume that you want to mirror and select **Add Mirror**. This step starts the Add Mirror Wizard
 12. Use the dialogue boxes that display to configure the second volume.
 13. A dialogue box with reference to making changes to the boot.ini file displays. You can safely ignore this.
 14. The status of both volumes, the existing drive and the new drive, will change to "Regenerating" and will, after a short period of time, start to show the percentage of regeneration completed. When the regeneration completes, the status should show as "Healthy."

Troubleshooting SAN Volume Controller console problems

This topic describes how to troubleshoot problems with the SAN Volume Controller console on the master console.

Problem

Use this information to troubleshoot problems that you are having with SAN Volume Controller console on the master console.

Investigation

If the SAN Volume Controller console closes unexpectedly

A dialogue box is displayed containing the words: You have signed off. This window will be closed.

Before checking for hardware errors, open a new browser window and attempt to reconnect to the SAN Volume Controller Console. The logoff message is generally caused by the open session timing out (the browser window was left open from a previous session).

If you cannot reconnect, try the following actions to resolve the problem:

- Check current memory availability. This problem can be caused by a memory failure in the master console, causing it to run with less than the required one gigabyte of memory. If there is a memory problem, you need to correct it.
- Determine if the IP address of the master console has changed since the last reboot. If so, reboot the master console to correct the problem.

Troubleshooting Tivoli SAN Manager problems

This topic describes how to troubleshoot problems with Tivoli SAN Manager.

Problem

Use this information to troubleshoot problems that you are having with Tivoli SAN Manager.

Investigation

Tivoli SAN Manager loses information.

If Tivoli SAN Manager shows all resources as red (offline or out of contact) you should ensure that you have the Ethernet connections installed correctly.

- Port 1 should be connected to the (public) network (such as the rest of your LAN).
- Port 2 should be connected to the (private) device network—that is the devices connected to the SAN Volume Controller Engines or SAN File System cluster, the storage controllers and the SAN switches.

Tivoli SAN Manager shows a black (blank) topology.

If Tivoli SAN Manager shows a black (blank) topology:

1. Check that the file in use exists in the c:\Program Files\SQLIB\java12\ directory. If it does not, shut down Tivoli SAN Manager and run the jdbc2 batch file.

2. Edit c:\WINNT\system32\drivers\etc\hosts. If the local host is defined, verify that it is in the following format:
IP_address fully_qualified_domain_name short_name
If it is not, add another entry for the local host using this format.

Troubleshooting VPN problems

This topic describes how to troubleshoot problems with the virtual private network (VPN).

Problem

Use this information to troubleshoot problems that you are having with VPN.

Investigation

If you are having trouble establishing the VPN connection

Perform the following steps to resolve the problem:

1. Attempt to ping 198.74.67.235 from the master console. If you do not receive a response:
 - a. Ensure that you have added an additional subnet route.
 - b. Run **netstat -rn** and verify that you have lines similar to the following. Note the items in bold will differ depending on the Master Console.

Newly added:	198.74.64.0	255.255.252.0	198.74.64.21
	198.74.64.21	2	
Default:	198.74.64.0	255.255.255.0	198.74.64.21
	198.74.64.21	1	
2. View the IP Security Monitor:
 - a. From a command window on the MC, enter **ipsecmon**.
 - b. If there is no information in the Security Associations window, a VPN connection is not running.
 - c. Click **Options** to increase or decrease the refresh value.
3. Verify that an active tunnel is running. From the Master Console:
 - a. Make sure that the connection manager has been started and is properly connected
 - b. View the IP Security Monitor.
4. If the Connection Manager is attempting to connect repeatedly:
 - a. Ensure that the connection is configured properly and that you have added additional subnet routes.
 - b. Check the IP Security Monitor to ensure a connection has been established.
 - c. Stop and restart the IPSec Service from a command prompt:

```
net stop policyagent
net start policyagent
```

Troubleshooting Windows problems

This topic describes how to troubleshoot problems with Windows.

Problem

Use this information to troubleshoot problems that you are having with Windows.

Investigation

If Windows will not boot

If, during the Windows boot process, Windows tries to start but fails with a 'blue screen' with the message "Inaccessible Boot Device" and another reboot does not solve the problem. This could be due to the windows boot code being corrupted on the Startup Device.

Perform the following steps to resolve the problem.

1. Reboot the master console.
2. When Press F1 for Configuration/Setup is displayed, press **F1**.
3. Select **Start Options**.
4. Select **Start Sequence**.
5. Step down the sequence to the one that contains the Hard Disk.
6. Using the left/right cursor keys select the other hard disk. (If it is set to 1, select 0. If it is set to 0, select 1)
7. Press **Esc** to exit until you get the option to Save and exit. The select **Yes**.
8. If the master console boots up, proceed with the steps for recovering from a master console disk failure. Otherwise, contact your support representative.

Viewing error information on the master console

This topic describes how to view error information on the master console.

All of the SAN Volume Controllers, SAN File System metadata servers, fibre-channel switches, and storage, for example, DS4000, generate SNMP Traps as a result of events, such as errors and configuration changes. The errors are usually sent to IBM Director and are listed in the Director Event Log. You can view all the events with their time stamps that help you to determine which event is most likely to cause a problem

Example: The loss of a fibre-channel path/link due to a cable or GBIC fault could result in a number of different events being logged to the Director Event Log from the devices at each end of the failing cable, such as a SAN Volume Controller, fibre-channel switch, or storage.

Some SAN component communication, such as fibre-channel path errors, can also be seen in the Tivoli SAN Manager topology displays. The link and/or component are shown in red. If the problem is intermittent, you might see the component shown in yellow. For example, you might see the component shown in yellow if there is a loss of the link and now the link is restored.

Loss of just a component (shown in red) without the loss of the fibre-channel path (still showing in black) to it can indicate an IP connection problem between the master console and the component. Loss of the IP connection between the master console and a host can, if that host is the only Host with a Tivoli SAN Manager Agent installed, that has VDIs assigned from that SAN Volume Controller cluster, result in one or more SAN Volume Controllers also showing in red.

If you identify a fibre-channel path/link problem, the failure might be the fibre-channel cable, GBICs, SAN component, or host adapter at ends of the failing link.

To resolve the problem, you might need to refer to the service documentation for the link end device involved (SAN Volume Controller, fibre-channel switch, DS4000, host)

If you identify a particular SAN Component failure, refer to the service documentation for that component to resolve the problem. The master console C:\Documents directory contains copies of the various component documentation.

Appendix A. Accessibility

This topic provides information about the accessibility features of SAN File System and its accompanying documentation.

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully.

Features

These are the major accessibility features in SAN File System:

- You can use screen-reader software and a digital speech synthesizer to hear what is displayed on the screen.

Note: The SAN File System Information Center and its related publications are accessibility-enabled for the IBM Home Page Reader.

- You can operate all features using the keyboard instead of the mouse.

Navigating by keyboard

You can use keys or key combinations to perform operations and initiate many menu actions that can also be done with a mouse. You can navigate the SAN File System console and help system from the keyboard by using the following key combinations:

- To traverse to the next link, button or topic, press Tab inside a frame (page).
- To expand or collapse a tree node, press Right Arrow or Left Arrow, respectively.
- To move to the next topic node, press Down Arrow or Tab.
- To move to the previous topic node, press Up Arrow or Shift+Tab.
- To scroll all the way up or down, press Home or End, respectively.
- To go back, press Alt+Left Arrow
- To go forward, press Alt+Right Arrow.
- To go to the next frame, press Ctrl+Tab. There are quite a number of frames in the help system.
- To move to the previous frame, press Shift+Ctrl+Tab.
- To print the current page or active frame, press Ctrl+P.

Appendix B. Getting help, service, and information

If you need help, service, technical assistance, or just want more information about IBM products, you can find a wide variety of sources available from IBM to assist you.

Services available and telephone numbers listed are subject to change without notice.

Software Maintenance Agreement

All distributed software licenses include Software Maintenance Agreement (software subscription and technical support) for a period of 12 months from the date of acquisition providing a streamlined way to acquire IBM software and assure technical support coverage for all licenses. You can elect to extend coverage for a total of three years from date of acquisition. While your Software Maintenance is in effect, IBM provides you assistance for your 1) routine, short duration installation and usage (how-to) questions; and 2) code-related questions. IBM provides assistance by telephone and, if available, electronic access, only to your information systems (IS) technical support personnel during the normal business hours (published prime shift hours) of your IBM Support Center. (This assistance is not available to your end users.) IBM provides Severity 1 assistance 24 hours a day, every day of the year.

Before you call for service

This topic provides information you need to know before you call for service.

Some problems can be solved without outside assistance. You can use the online help by looking in the online or printed documentation that comes with the SAN File System, or by consulting the IBM Support Home Web site. Also, be sure to read the information in any README files and release notes that come with the SAN File System.

Getting help online

IBM maintains pages on the World Wide Web where you can get information about IBM products and services and find the latest technical information.

Table 3 lists some of these pages.

Table 3. IBM Web sites for help, services, and information

www.ibm.com/	Main IBM home page
www.ibm.com/storage/	IBM Storage home page
www.ibm.com/storage/support	IBM Support home page

Getting help by telephone

With the original purchase of the SAN File System, you have access to extensive support coverage. During the product warranty period, you can call the IBM Support Center (1 800 426-7378 in the U.S.) for product assistance covered under the terms of the software maintenance contract that comes with SAN File System purchase.

Have the following information ready when you call:

- SAN File System software identifier, which can be either the product name (SAN File System) or the Product Identification (PID) number
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information

If possible, have access to your master console when you call.

In the U.S. and Canada, these services are available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9:00 a.m. to 6:00 p.m. In all other countries, contact your IBM reseller or IBM marketing representative.¹

1. Response time varies depending on the number and complexity of incoming calls.

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