IBM System Storage Master Console for
SAN Volume Controller

Installation and User's Guide

Version 4.1.0

GC27-2065-00

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

First Edition (September 2006)

This edition replaces GC30-4090-03 and all previous versions of GC30-4090.

Contents

About this guide

This guide contains information about installing and using the master console.

- 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 11 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 23 explains how to configure the master console.
- Chapter 6, "Managing the master console," on page 31 provides an overview of the tasks that you might perform occasionally to maintain the master console so that it effectively manages the SAN Volume Controller.
- Chapter 7, "Uninstalling master console software," on page 35 provides a high-level overview of the procedures for uninstalling the master console software.
- Chapter 8, "Upgrading the master console software," on page 39 explains how to upgrade the master console software.
- Chapter 9, "Troubleshooting the master console," on page 45 provides information about resolving problems with the master console.

Who should use this guide

This topic describes the audience for this guide.

The *IBM® System Storage™ Master Console for SAN Volume Controller: Installation and User's Guide* should be used by the person or persons assigned to manage 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)
- Networking and network management
- SAN management
- Command-line interface scripting
- Critical business issues (such as backup, disaster recovery, and security)

Conventions and notices

This topic describes the notice conventions used in this publication.

The following notices are used in this publication 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.

Emphasis

Different typefaces are used in this guide to show emphasis.

The following typefaces are used to show emphasis:

Boldface	Text in **boldface** represents menu items and command names.
Italics	Text in *italics* is used to emphasize a word. In command syntax, it is used for variables for which you supply actual values, such as a default directory or the name of a cluster.
`Monospace`	Text in `monospace` identifies the data or commands that you type, samples of command output, examples of program code or messages from the system, or names of command flags, parameters, arguments, and name-value pairs.

Web sites

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

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

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

Master console library and related publications

A list of publications that are related to this product are provided to you for your reference.

The information in this section lists and describes the following publications:

- The publication that is available for the IBM System Storage master console for SAN Volume Controller
- Other IBM publications that relate to the master console

Master console library

The following publication is available in the master console library. It is provided in softcopy on the CD set for the IBM System Storage Master Console and at http://www.ibm.com/storage/support/2145.

Note: The softcopy version of this publication is accessibility-enabled for the IBM Home Page Reader.

- *IBM System Storage Master Console for SAN Volume Controller: 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.

Other IBM publications

The following tables list and describe other IBM publications that contain additional information related to the master console.

SAN Volume Controller publications

The following publications are related to the SAN Volume Controller. Unless otherwise noted, these publications are available in Adobe portable document format (PDF) from the following Web site:

http://www.ibm.com/storage/support/2145

Title	Description	Order number
IBM System Storage SAN Volume Controller: Command-Line Interface User's Guide	This guide describes the commands that you can use from the SAN Volume Controller command-line interface (CLI).	SC26-7903
IBM System Storage SAN Volume Controller: Configuration Guide	This guide provides guidelines for configuring your SAN Volume Controller.	SC26-7902
IBM System Storage SAN Volume Controller: Host Attachment Guide	This guide provides guidelines for attaching the SAN Volume Controller to your host system.	SC26-7905
IBM System Storage SAN Volume Controller: Installation Guide	This guide includes the instructions the service representative uses to install the SAN Volume Controller.	GC26-7900
IBM System Storage SAN Volume Controller: Planning Guide	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.	GA32-0551

Title	Description	Order number
IBM System Storage SAN Volume Controller: Service Guide	This guide includes the instructions the service representative uses to service the SAN Volume Controller.	GC26-7901

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- Mail

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  RCF Processing Department
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  Tucson, Arizona 85775-4401
  U.S.A.

Summary of changes

This document contains terminology, maintenance, and editorial changes.

Changes made in release 4.1

Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change.

The following list describes the changes made to the *IBM System Storage Master Console for SAN Volume Controller: Installation and User's Guide* in release 4.1.

New information

New information in release 4.1 of this guide includes:

- Remote service is now managed by the IBM Virtually On-site (VOS) tool, which is not a part of the master console but, instead, a remote desktop-sharing Web-based tool that is available on the IBM Web site. IBM Connection Manager is no longer needed for remote service.
- New instructions are included for upgrading the master console to version 4.1.
- The master console can support up to four SAN Volume Controller clusters.
- Configuration planning information has been added.
- Instructions for changing the master console host name and updating the name in other master console applications has been added to the Chapter 6, "Managing the master console," on page 31 chapter.
- A glossary has been added.

Changed information

Changed information in release 4.1 of this guide includes:

- The introductory information about the master console has been enhanced.
- The prerequisite information for the software master console has been updated.
- The edition for the Microsoft Windows Server 2003 preinstalled on the hardware version of the master console has been clarified.
- Only one Ethernet connection is now required because the VPN connection to the external internet is no longer required for remote service.
- The configuration steps note whether they apply to both the hardware and software master console, or to only the hardware master console.
- The process for reviewing a softcopy version of this documentation and browsing IBM Support Web sites during the installation has been updated.
- The instructions for setting up the call home feature now include information for the 8F4 model.
- The command for replacing a client SSH private key known to the SAN Volume Controller software was corrected.
- Some of the instructions for installing the IBM Director have been updated.

- The method that you use to open the Event Log for IBM Director has changed. To open it, you click **Tasks → Event Log → Event Log: Open**.

Deleted information

Information that was deleted from release 4.1 of this guide includes:

- Conceptual and task-oriented information about the following components was removed because the master console no longer needs these components:
  - DB2®
  - DS4000 Storage Manager Client (FAStT Storage Manager Client)
  - IBM Tivoli® Storage Area Network Manager (Tivoli SAN Manager)
  - IBM Connection Manager
- Information about establishing a VPN connection for remote service was removed. This function has been replaced with the IBM Virtually On-site (VOS) tool.
- Information about using the master console with the SAN File System was removed.

Changes made in release 3.2

The following list describes the changes made to the *IBM System Storage Master Console for SAN Volume Controller: Installation and User's Guide* in release 3.2.

Note: The brand ″IBM TotalStorage®″ has been replaced with ″IBM System Storage″ when referring to the master console and the SAN Volume Controller.

New information

New information in release 3.2 of this guide includes:

- Information clarifying the version of Tivoli Storage Area Network Manger (Tivoli SAN Manager) has been added.
- A Windows 2003 example has been added to the instructions for mirroring the boot drive.
- A new section for upgrading the master console to version 3.2 was added.
- Several topics about setting up error notifications for the SAN Volume Controller were added.

Changed information

Changed information in release 3.2 of this guide includes:

- The information about remote access and the role of the IBM Connection Manager in that access has been enhanced.
- The conceptual information about service alerts and e-mail notifications was updated.
- The planning information for the master console has been enhanced and updated.
- Fibre Channel cables are no longer available with the master console.
- The system memory requirements for the hardware where the master console is installed is now 4 GB.
- The installation overview and several of the installation topics have been enhanced and updated.
- The configuration overview and most of the existing configuration topics were enhanced.

- Some of the troubleshooting information was enhanced or clarified.

Deleted information

Information that was deleted from release 3.2 of this guide includes:

- The hardware master console configuration steps have been removed from the planning section and incorporated into the configuring section.
- Topics and information related to Fibre Channel connections were removed since Fibre Channel connections are no longer available with the master console.
- The information about setting up service alert for the SAN Volume Controller was removed and replaced by several topics about setting up error notifications for the SAN Volume Controller
- The section for upgrading the master console to version 3.1 was removed and replaced with information about upgrading to version 3.2.

Chapter 1. Overview

The master console provides a single point from which to manage the IBM System Storage SAN Volume Controller. You can purchase the master console as a hardware product option (which includes the master console software pre-installed) or as a software-only option.

The master console provides you with the following functions:

- A platform on which the subsystem configuration tools can be run
- A platform on which all subsystem service activity can be initiated
- E-mail notifications about errors or events to your personnel, such as a systems administrator
- The call home feature, which is an automatic notification to IBM support staff in the event of a severe error
- A platform for remote service, which allows the desktop to be shared with remote IBM service personnel if assistance is required to resolve complex problems
- Access to the SAN Volume Controller. You can access the following components:
  - SAN Volume Controller Console through a Web browser.
  - Administrative command-line interface, through a Secure Shell (SSH) session.

The master console can support up to four SAN Volume Controller clusters.

When using the master console with the SAN Volume Controller, you must install and configure the master console before you configure the SAN Volume Controller. The installation and configuration steps are different between the hardware master console and the software-only master console. For the hardware master console (in which the software is preinstalled), you must customize the default factory settings. The general steps for this are given in Chapter 5, "Configuring the master console," on page 23.

A note on the two master console product options

Although you have two options in purchasing the master console product, the only difference between these two options are the installation and configuration processes.

For the master console software option, you perform both the installation and configuration processes.

For the master console hardware option, the manufacturing plant installs the software on the hardware using the default settings, and you must configure and customize the settings.

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.

Service alerts and error notifications

This topic provides an overview of the service alerts and error notifications.

You can configure the IBM Director on the master console to send messages to the system administrator through e-mail when errors or events are logged. You can also initiate a call home message to IBM when failures that require service actions are logged by the SAN Volume Controller.

In response to a severe error condition, the 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, and another optional e-mail (a call home e-mail) to the IBM support system. The optional call home 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.

Figure 1 shows the call home architecture for the SAN Volume Controller.

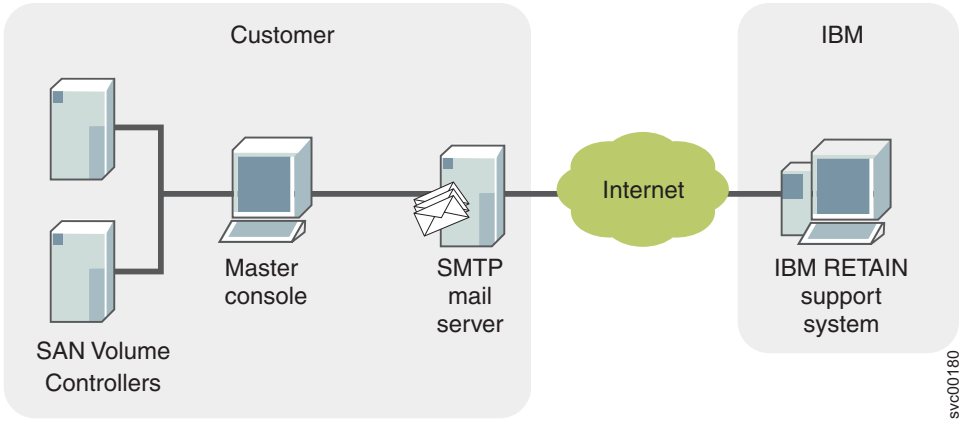

Figure 1. Call home architecture for SAN Volume Controller

Related tasks

"Installing the SNMP service" on page 13
This topic describes how to install the SNMP services.

Virtually On-site and remote service

When you contact IBM to help you resolve a problem with your SAN Volume Controller system, the IBM service representative might suggest using IBM Virtually On-site (VOS) tool to remotely access the master console. This type of remote service can help you reduce service costs and shorten repair times.

VOS is a remote desktop-sharing solution that is offered through the IBM Web site. With it, the IBM service representative can remotely view your system to troubleshoot a problem. You can maintain a chat session with the representative, so that you can monitor the activity and either understand how to fix the problem yourself or allow the IBM service representative to fix it for you.

To use it, the master console must be able to access the Internet.

When you access the Web site, you sign in and enter a code that the IBM service representative provides to you. This code is unique to each VOS session. A plug-in is downloaded onto your master console to connect you and your IBM service representative to the remote service session. VOS contains several layers of security to protect your applications and your computers. You can also use security features to restrict access by the service representative.

To use VOS, follow the instructions that are given to you by your IBM service representative.

Secure Shell

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

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

- The SAN Volume Controller command-line interface (CLI)
- 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 the SAN Volume Controller.

The SSH key pair must be generated prior to installing the SAN Volume Controller Console because you need to enter the key pair during the SAN Volume Controller Console installation process. 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). 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 Reader
- IBM Director
- PuTTY (SSH client software)

- SAN Volume Controller Console

Chapter 3. Planning for the master console

This topic provides an overview of the planning tasks that you must complete before you install and configure the master console.

Note: The hardware-related prerequisites in this section are relevant only when you are installing and configuring the master console software on hardware of your choice (that is, when you have purchased only the master console software).

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

- Verify that you have met the hardware and software prerequisites if you have the software-only master console.
- Verify that your planned master console configuration is supported.
- Determine how the ports on the master console are to be configured.
- Determine the IP addresses to be used for the master console.

The master console must be in the same room as the devices that it supports. In addition, place the master console within 50 feet of the SAN Volume Controller nodes.

Prerequisites for the software master console

Before you install the software master console, ensure that you have the prerequisite hardware and software.

Hardware prerequisites

The master console software can be installed on a rack-mounted, high-performance, highly-reliable Intel® server (such as the IBM eServer™ xSeries® 306m or equivalent) with the following options:

- One Pentium® 4 processor, minimum 2.6 GHz
- Minimum of 4 GB of system memory
- Two IDE hard disk drives, minimum 40 GB each. During installation, you will mirror these drives.
- CD drive
- One 1 Gb port for an Ethernet connection (fiber or copper)
- 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 306m server (1U)
- Intel Pentium 4 3.0 GHz processor
- 4 GB memory DIMM (256 MB comes with base unit)
- Two 70 GB IDE hard disk drives (one comes with base unit)
- One 10/100/1000 Copper Ethernet port on planar

- NetBay 1U Flat Panel Monitor Console Kit with US keyboard

Software prerequisites

The software version of the master console requires that you obtain the following software:

- Operating system
  - The software version of the master console requires that one of the following operating systems is provided on your hardware platform:
    - Microsoft Windows Server 2003 Enterprise Edition
    - Microsoft Windows Server 2003 Standard Edition
    - Microsoft Windows 2000 Server 5.00.2195.

  Note: The hardware master console is shipped with Microsoft Windows Server 2003, Standard Edition preinstalled.
- Microsoft Windows Internet Explorer version 6.0 with Service Pack 1, or later
- Antivirus software (not required but necessary to ensure protection of your computer).

Operating System configuration prerequisites

Ensure that your operating system is configured as follows:

- SNMP Service must be installed and set to **Automatic**.
- SNMP Trap Service must be set to **Manual**.

Supported configurations

Ensure that your planned master console configuration is one that is supported.

Use the following rules when planning your master console configuration:

- One master console can concurrently support up to four SAN Volume Controller clusters.
- Multiple master consoles can access a single cluster, but only one master console can be configured to support the call home feature for a specific cluster. Also, when multiple master consoles access one cluster, you cannot concurrently perform configuration and service tasks.

Specifying port assignments

This topic applies to planning for the hardware master console product.

If you have completed the planning tasks in the *IBM System Storage SAN Volume Controller: Planning Guide*, you might have assigned two master console Ethernet ports: one that connects to the SAN Volume Controller and one to use for a virtual private network (VPN) connection. In version 3.1 and earlier version of the master console included the IBM Connection Manager, which supported the VPN connection as the remote service method. In version 4.1 and later versions, remote service is managed by the IBM Virtually On-site (VOS) tool, which is a cross-product Internet tool used by IBM and not a component of the master console. To use VOS, you must use an Ethernet port that has Internet access. However, you can determine how you want to provide the port. For example, you can provide the set up and configure the port by using any of the following methods:

- Provide Internet access through the same port that is used to access the SAN Volume Controller nodes. This method does not provide as much security as the other example methods.
- Use the alternate Ethernet port that you previously allocated for the VPN connection.
- Choose not to provide the master console with any access to the public Internet and allow VOS to access another console that can access the master console Web server over an intranet.

Use Table 1 to record the port assignments.

Table 1. Port assignment table

Master console	Ethernet	
	Ethernet connecting to SAN Volume Controller	**(Optional) Ethernet connecting to Internet for VOS**

Table 2 provides an example of a completed port assignment table.

Table 2. Example completed port assignment table

Master console	Ethernet	
	Ethernet connecting to SAN Volume Controller	**(Optional) Ethernet connecting to Internet for VOS**
Master console	Ethernet hub 1, port 5	Ethernet hub 1, port 6

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 address**: The address that will be used to access 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

Master console IP configuration worksheet	
Machine name:	Ethernet port
Master console IP address	
Gateway IP address	
Subnet mask	

Related tasks

"Entering the IP address for the Ethernet port" on page 12
This topic describes how to configure the IP address for the internal IP network connection. You perform this step as part of the installation process for the software master console or as part of the configuration process for the hardware master console.

Chapter 4. Installing master console software

This section guides you through the process for installing the master console software on your own hardware.

Note: If you purchased the hardware master console and do not need to reinstall the master console software, you can skip the software installation tasks and proceed with the steps in the Chapter 5, "Configuring the master console," on page 23 section.

Before you install the master console software, you must have completed the following tasks:

- Installed all hardware prerequisites for the master console.
- Installed all prerequisite software.
- 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. Select the **Simple Network Management Protocol** check box and click **OK**.

In addition, view the release notes for the master console software on the following IBM support Web site for the latest information:

http://www.ibm.com/storage/support/2145

You can use the installation wizard to help you install all of the master console software components instead of installing each component individually.

The following tasks are involved in the master console software installation process:

- **Task 1:** Prepare the master console environment.
- **Task 2:** Install the master console software by using the installation wizard.
- **Task 3:** Mirror the boot drive.

Important: Other than antivirus software, ensure that the master console software is the only type of software that is installed on the hardware that you are using for the master console.

Preparing the master console environment

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

To prepare the master console environment, you must perform the following steps. These steps are explained in more detail in other topics in this book.

1. Configure the IP address for the Ethernet port, which is to be connected to the internal IP network. "Entering the IP address for the Ethernet port" on page 12 provides more details for this step.
2. Configure the host name for the master console. "Configuring the master console host name" on page 12 provides more details for this step.

3. Set up the internet browser. “Configuring the browser” provides more details for this step.
4. Install the SNMP service (if you did not install it when you installed the operating system). “Installing the SNMP service” on page 13 provides more details for this step.

Entering the IP address for the Ethernet port

This topic describes how to configure the IP address for the internal IP network connection. You perform this step as part of the installation process for the software master console or as part of the configuration process for the hardware master console.

Perform the following steps to configure the IP address for the internal network connection:

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

Related reference

“Specifying IP information” on page 9
This topic describes the IP configuration information that you specify for the master console.

Configuring the master console host name

You must set up the master console host name using the IP configuration information that you have specified during planning.

Perform the following steps to configure the host name:

1. From the desktop, right-click the **My Computer** icon and select **Properties**.
2. Click the **Network Identification** tab.
3. Click **Properties**.
4. Enter the master console name in the **Computer name** field.
5. Click **More**.
6. Enter the full path information in the **Primary DNS suffix for this computer** field.
7. Click **OK** until you return to the desktop.

Configuring the browser

After you install the SAN Volume Controller components, you can connect to the SAN Volume Controller Console using any supported Web browser on your system that is correctly configured.

Perform the following steps to configure the browser:

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

Your browser is now configured to use the SAN Volume Controller Console.

Installing the SNMP service

This topic describes how to install the SNMP services.

You must 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. Click the **General** tab and select **Automatic** as the startup type.
13. Click the **Security** tab and perform the following actions:
    a. Click **Add** under the **Accepted Community Names** field, enter `public` as the new community name, and leave the community rights as read-only.
    b. Ensure that the **Accept SNMP packets from any host** option is selected.

    Note: On some operating systems, the default is **Accept SNMP packets from these hosts**, with an empty field underneath for you to specify certain hosts. This option causes the NetView® part of the installation to fail.

Related concepts

"Service alerts and error notifications" on page 3
This topic provides an overview of the service alerts and error notifications.

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 the required software for the master console. It ensures that the master console meets all prerequisites and launches the installation program for each software component that is being installed.

Important: During the installation process, some products require a system reboot after they are installed. Reboot the system any time that you are prompted to do so. After each system reboot, the master console

installation wizard continues the installation process from the point where it was interrupted by the required reboot.

The installation wizard helps you to install the following products:
- Adobe Reader
- PuTTY
- SAN Volume Controller Console (optional)
- IBM Director

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

Logging in

This topic describes the permissions that are required to perform the master console installation.

To begin installing software on the master console, you must be logged in as a local administrator (for example, as the Administrator user) on the system where the master console software is to be installed.

Starting the installation wizard

This topic describes the steps for starting the installation wizard.

Before you begin the installation wizard, ensure that you have logged in with a user ID that has administrative privileges.

Perform the following steps to start the installation wizard:

1. Insert the master console CD-ROM 1 in the CD-ROM drive.
2. Click **Start—>Run** to open the Run dialog.
3. 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 a window:

   ```
   +------------------------------------------------------------+
   | InstallShield(R) is preparing the InstallShield Wizard, which |
   | will guide you through the rest of the process.            |
   | Please wait .........                                      |
   |                                                            |
   | Preparing Java (tm) Virtual Machine                        |
   +------------------------------------------------------------+
   ```

4. When you are prompted, select the language to be used for the installation wizard and click **OK**.
5. The installation wizard Welcome panel is displayed. Read the information from the panel and then 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 Reader.

   Note: Before Adobe Reader is installed, the program performs the following checks:
   a. The installation wizard verifies that all software prerequisites are installed on the system. If not, a window opens that describes the prerequisite software that is not currently installed. When you click **OK**, the installation wizard ends.

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

b. If any hardware requirements are not met on your system, a panel is displayed that states that the hardware requirements are not met and warns about a decrease in the performance level if these requirements are not met.

Installing the Adobe Reader

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

Adobe Reader is silently installed by the installation wizard. It allows you to open online versions of documentation, such as this document, through a pop-up window.

From the Install Acrobat Reader panel of the wizard, click **Next** to start the installation of Adobe Reader.

When the installation is complete, the Useful Information panel is displayed. From this panel, you can access this document or IBM Support Web sites by following the instructions on the panel.

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

Choosing the master console destination directory

This topic describes how to specify the installation directory for the master console software when you use the installation wizard.

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 box.
2. After you specify the destination directory, click **Next**.

Selecting the port for the information center

This topic describes how to select the port value that accesses the master console information center.

Perform the following steps to select a port value:

1. Enter a port value between 1 and 65535. To ensure that the port value is not in use by another application on your system, open a command prompt and enter the command **netstat –a** to see which port values are in use.
2. After entering the information center port value, 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 installation wizard.

Perform the following steps to specify whether you want to install the SAN Volume Controller Console:

1. Select **SAN Volume Controller Console** if you want to install that feature. Otherwise clear the check box.

If you clear the **SAN Volume Controller Console** check box, a message is displayed when you click **Next** that warns you that you must install this feature if the SAN Volume Controller Console is part of the current configuration.

2. Click **Next** to display the list of products that are to 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 next steps in 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 a later version than the version to be installed. The Product List panel lists the following results:

- Products of the master console stack
- Versions of already-installed products
- Required versions for the products
- Actions to be done by the installation wizard or by you

The table containing the list of the products to be installed or upgraded is saved as *MasterConsoleProducts.htm* in the location where the master console is installed.

Depending on the installed version of each product, the installation wizard determines whether to install the product based on the following conditions:

- 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 it is. The corresponding panels that launch and verify the specific product installation are skipped. For the products with higher versions than the required ones, the installation wizard displays a warning that tells you that these products are not tested with the master console.
- If a product in the list of products to be installed or upgraded is not properly installed on the system, you are asked to continue with the installation by reinstalling the product with the product-specific installer. If this action does not succeed, you must exit the master console installation wizard, manually remove the product from your system, and restart the master console installation wizard.

After you have reviewed the information presented in the table on this panel, click **Next**.

Installing PuTTY

This topic describes how to install PuTTY using the master console installation wizard. PuTTY is the SSH client software used by the master console.

Perform the following steps to install PuTTY:

1. From the PuTTY installation panel, click **Next** to begin the installation of PuTTY.
2. The installation wizard installs PuTTY silently. Wait for the wizard to complete the installation.

3. 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 you continue with the installation wizard, create an SSH key pair using PuTTYgen. You need these keys when you install the SAN Volume Controller Console.

Generating an SSH key pair using PuTTYgen

Although not part of the master console installation wizard, you must generate SSH keys for the SAN Volume Controller. You are 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 the following steps to generate SSH keys on the master console using the PuTTY Key Generator (PuTTYgen):

1. Start PuTTYgen by clicking **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. Type `icat` as the name of the public key and click **OK**.
7. Click **Save private key** to save the private key.
8. When you are prompted to confirm that you want to create the key without a passphrase, click **Yes**.
9. Type `icat.ppk` as the name of the private key and click **OK**.
10. Close PuTTYgen.

Installing SAN Volume Controller Console

This topic describes how to install the SAN Volume Controller Console by 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 panel, click **Next** to accept the default ports.
   f. From the embedded WebSphere® Application Server ports panel, click **Next** to accept the default ports.
   g. From the installation confirmation panel, click **Install** to install the SAN Volume Controller Console.

h. Click **Finish** to complete the installation.

Note: If you click **View post installation tasks**, 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 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 you are 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**.

   The IBM Director Setup Wizard is launched.
3. From the Setup Wizard, perform the following steps to install IBM Director:
   a. From the Welcome panel, click **Next**.
   b. From the License Agreement panel, click **I accept the terms in the License Agreement**, and 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).

      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 window, select the first port and click **Enable driver**.
   i. From the IBM Director database configuration, make sure that **Apache Derby**, which is the default, is selected. Then click **Next**.
   j. From the IBM Director Apache Derby database configuration, click **Next** because you cannot change any of the Apache Derby database configuration values.
   k. Click **Finish** to complete the installation.
   l. When you are prompted to restart the system, click **Yes**.
4. 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.

Preconfiguring IBM Director

This topic describes how the master console installation wizard performs some preconfiguration tasks for IBM Director.

IBM Director preconfiguration tasks consist of creating a set of event action plans designated for managing specific events generated by the master console system. These action plans are imported from configuration archive files that should exist on the master console installation package.

Perform the following steps to launch the IBM Director preconfiguration tasks:

1. If at least one of the event action plans is in the installation package, you are asked to provide, in the Superuser account panel, a Director superuser (member of DirSuper group) name and password needed in the IBM Director preconfiguration process.

   Provide the name and password, and click **Next** to continue.
2. Wait for the master console wizard to restart IBM Director and to discover IBM Director-managed systems.
3. The installation wizard finishes the preconfiguration tasks. If one or more configuration files are not found in the installation package, or if an error occurs during the creation of event action plans, a message is displayed in a panel warning the user that these action plans must be manually created later, after the installation is completed.

   Click **Next** to continue.

After the master console installation wizard has completed the preconfiguration tasks for IBM Director, you need to complete the following steps to ensure that the local system account can log on to IBM Director:

1. Close IBM Director.
2. Right-click **My Computer** from the desktop, and then click **Manage**.
3. Expand **Services and Applications**.
4. Click **Services**.
5. Right-click **IBM Director Server** and click **Properties**.
6. Select the **Log On** tab.
7. Click **Local System account** and select **Allow service to interact with desktop**. Click **Apply**.
8. You are prompted that the new properties will not take effect until you stop and restart the service. Click **OK** at the prompt.
9. Click **OK** to close the Properties dialog.
10. Stop the IBM Director service, and then restart it.

Installing documentation and support utilities

This topic describes how to use the master console installation wizard to install the master console documentation, Document Launcher, configuration files, IBM WebSphere Help System, and create the directories structure and icons.

Perform the following steps to copy the documentation files and to install the utilities:

1. From the master console installation wizard, click **Next** to begin installing the 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.
4. The installation wizard copies Eclipse files of IBM WebSphere Help System and installs the master console information center (copies master console-specific documentation into the IBM WebSphere Help System).
5. The program installs the master console information center as a service.
6. After all documentation and utilities are installed, the Finish panel is displayed.
7. 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.
8. Click **Finish** to complete the installation.
9. If a system reboot is required, accept the prompt to complete the master console installation process.

Mirroring the boot drive

You can use the Microsoft Windows software mirroring capability to mirror the boot drive on the master console.

Before you mirror the boot drive, ensure that you meet the following prerequisites:

- You must have a second drive that is as large or larger than your original boot drive.
- If the target disk has a partition that is assigned to it (that is, it already has a drive letter), perform the following steps to remove the partition:
  1. Back up any necessary data on the existing partition. When you remove an existing partition, you lose any data that is on it.
  2. Remove the partitioning by right-clicking **My Computer**, selecting **Manage** → **Storage** → **Disk Management**, right-clicking the target disk drive, and then selecting **Delete Partition**.

Perform the following steps to mirror the boot drive:

1. Right-click **My Computer** on the desktop.
2. Click **Manage**.
3. Click **Storage** → **Disk Management**.
4. Right-click the disk icon for the system disk.
5. Convert the disk to a dynamic disk by performing the following actions:

   For Windows 2000 systems:

   a. Click **Upgrade to dynamic disk** and then click **OK**.
   b. Right-click the disk icon for the disk that you want to become the mirror of the system disk.
   c. Click **Upgrade to dynamic disk** and then click **OK**.
   d. If you receive a warning, click **Yes**.
   e. If your system restarts, restart the Disk Management utility.

   For Windows 2003 systems:

   a. Click **Convert to dynamic disk**.

b. Select both drives and click **OK**.
c. Click **Convert**.
d. Click **Yes** to continue when you receive an operating system boot warning.
e. Click **Yes** to unmount file systems and to continue.
f. Allow the system to reboot.
g. Restart the Disk Management utility

6. For Windows 2000 systems, right-click the disk icon for the system disk or, for Windows 2003 systems, right-click the system disk partition.
7. Click **Add Mirror**.
8. Select the disk that you want to become the mirror of the system disk, and then click **Add Mirror**.
9. Click **OK** to continue when you receive a warning indicating that you must update the boot.ini file.
10. Perform the following steps to update the boot.ini file:
    a. Double-click **My Computer** on the desktop.
    b. Click **Tools → Folder options**.
    c. Click the **View** tab.
    d. In the **Advanced settings** list, perform one of the following actions, depending on your operating system:
       - For Windows 2000 systems, select **Show hidden files and folders**.
       - For Windows 2003 systems, select **Show hidden files and folders** and clear the **Hide protected operating system files** option. Click **Yes** when you receive a warning.
    e. In the My Computer window, click **Local disk (C:)**.
    f. Open the C:\boot.ini file in a text editor.

       Attention: Be cautious when you edit this file and make only the specified 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, change **Primary** to **Secondary**, and change the system disk (for example, **rdisk(0)**) to mirrored disk (for example, **rdisk(1)**). The file looks similar to one of following examples.

       Windows 2000 example:

```
[boot loader]
timeout=30 default=multi(0)disk(0)rdisk(0)partition(1)\WINNT
[operating systems]
multi(0)disk(0)rdisk(0)partition(1)\WINNT="Microsoft Windows 2000 Advanced
  Server Primary" /fastdetect
multi(0)disk(0)rdisk(1)partition(1)\WINNT="Microsoft Windows 2000 Advanced
  Server Secondary" /fastdetect
```

       Windows 2003 example:

```
[boot loader]
timeout=30
default=multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
[operating systems]
multi(0)disk(0)rdisk(0)partition(1)\WINDOWS="Windows Server 2003,
  Standard Primary" /fastdetect
multi(0)disk(0)rdisk(1)partition(1)\WINDOWS="Windows Server 2003,
  Standard Secondary" /fastdetect
```

    i. Save and close the file.

j. Restart the machine.

   After the machine completes the Power On Self Test (POST), the system prompts you to select the Windows operating system to use for the boot process

k. Select the secondary operating system and press Enter to verify that the machine successfully restarts from the mirrored drive.

l. Restart the machine again.

   After the machine completes the POST, the system again prompts you to select the Microsoft Windows operating system to use for the boot process.

m. Select your operating system and press Enter to verify that the machine successfully restarts from the system drive.

Chapter 5. Configuring the master console

This section provides steps for configuring the master console. If you installed the master console on your own hardware, you have already performed some of these steps during the installation process.

Perform the following process to configure your master console:

1. Log on as a local administrator (for example, as the Administrator user) to the system where the master console software is installed.

   Note: If you purchased the software-only master console, skip to step 3 because you completed steps 2a through 2d when you installed the master console software.

2. If you purchased a hardware master console, perform the following configuration steps:
   a. Optionally, reconfigure the master console host name. When you receive the hardware master console, the host name is preconfigured as `mannode`. If you choose to change this name see "Reconfiguring the master console host name" for more information.
   b. Configure the network. "Configuring the network" on page 24 provides more details for this step.
   c. Configure the browser. "Configuring the browser" on page 24 provides more details for this step.
   d. Generate an SSH key pair using the PuTTYgen. "Generating an SSH key pair using PuTTYgen" on page 17 provides more details for this step.
3. For both software and hardware master consoles, perform the following configuration steps:
   a. Configure a default PuTTY session only for command-line interface (CLI) access. "Configuring a default PuTTY session" on page 25 provides more details for this step.
   b. Store keys in the SAN Volume Controller Console software. "Storing keys in the SAN Volume Controller Console software" on page 26 provides more details for this step.
   c. Set up e-mail notification and the call home feature for the SAN Volume Controller. "Setting up e-mail notification for the SAN Volume Controller" on page 26 and "Setting up the call home feature for the SAN Volume Controller" on page 28 provide more details for this step.
   d. Install your chosen antivirus software on the master console system.

Reconfiguring the master console host name

When you receive the hardware master console, the host name is preconfigured as `mannode`. However, you can reconfigure the master console host name as part of the configuration process for the hardware master console.

Perform the following steps to reconfigure the host name:

1. From the desktop, click **Start**.
2. Right-click on **My Computer**.
3. Click **Properties**.

4. Click **Computer Name**.
5. Click **Change**.
6. Type the master console host name in the **Computer name** field.
7. Click **More**.
8. Type the full path information in the **Primary DNS suffix of this computer** field.
9. Click **OK** until you return to the desktop.
10. Run the *install_path*\MasterConsole\Support Utils\mcconfig.exe file, where *install_path* is the drive letter and the directory where the master console is installed.

Configuring the network

You must configure the network as part of the installation process for the software master console or as part of the configuration process for the hardware master console.

Entering the IP address for the Ethernet port

This topic describes how to configure the IP address for the internal IP network connection. You perform this step as part of the installation process for the software master console or as part of the configuration process for the hardware master console.

Perform the following steps to configure the IP address for the internal network connection:

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

Related reference

"Specifying IP information" on page 9
This topic describes the IP configuration information that you specify for the master console.

Configuring the browser

If you plan to access the SAN Volume Controller Console using a browser other than the one that is preinstalled on the hardware master console system, use the configuration instructions of your chosen browser to ensure that new windows (pop-ups) can automatically open when you visit a Web site. Also, uninstall or turn off any applications that block or suppress pop-up windows.

Generating an SSH key pair using PuTTYgen

You must generate SSH keys for the SAN Volume Controller as part of the installation process for the software master console or as part of the configuration process for the hardware master console.

Perform the following steps to generate SSH keys on the master console using the PuTTY Key Generator (PuTTYgen):

1. Start PuTTYgen by clicking **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. Type `icat` as the name of the key and click **OK**.
7. Click **Save private key** to save the private key.
8. When you are prompted to confirm that you want to create the key without a passphrase, click **Yes**.
9. Type `icat.ppk` as the name of the key and click **OK**.
10. Close the PuTTYgen.

Configuring a default PuTTY session

For both the software and hardware versions of the master console, you must configure a default PuTTY session so that you can run SSH from a command-line interface.

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

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 that 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

For both the software and hardware versions of the master console, when the keys that are used to communicate with the SAN Volume Controller are generated or 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***icat.ppk C:\"Program Files"\IBM\svcconsole\cimom**

   where *path* is the path where you stored the SSH private key when it was generated.

   Note: Directory names with embedded spaces must be surrounded by double 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**.

Configuring the error notification and call home features for the SAN Volume Controller

For both the software and hardware versions of the master console, you must configure the error notification and call home features for the SAN Volume Controller if you plan to use these options.

Before you perform these procedures, ensure that the following prerequisites are met:

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

The IBM Director provides error notification by alerting your system administrator through e-mail when errors or events are logged by the SAN Volume Controller. The call home feature initiates a message to IBM when failures that require service actions are logged by the SAN Volume Controller.

Setting up e-mail notification for the SAN Volume Controller

If you use the e-mail notification feature on either the software and hardware versions of the master console, you must perform this task to configure IBM Director to alert your system administrator by e-mail when errors or events are logged by the SAN Volume Controller.

Perform the following steps to configure the IBM Director to notify your system administrator of SAN Volume Controller errors and events:

1. Initiate a test SNMP trap to be sent to the master console IP address by causing a temporary error on the SAN Volume Controller. For example, temporarily remove one of the SAN Volume Controller fibre-channel cables to 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 the IBM Director received the test trap that was sent by the SAN Volume Controller by using the following steps:
   a. Open the **Event Log** by clicking **Tasks** → **Event Log** → **Event Log: Open**.
   b. Verify that the test SNMP trap was received. SAN Volume Controller traps can be identified by displaying the **Event Type** field of the log. For SAN Volume Controller traps, the field contains text starting with SNMP.iso.org.dod.internet.private.enterprises.ibm.ibmProd.190. If the test trap was not received, perform one or more of the following actions:
      - Contact your network administrator to ensure that there is 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 **Tasks→Event Action Plan Builder**. The Event Action Plan Builder panel opens.
7. Expand the **Send an Internet (SMTP) E-mail** hierarchy in the right column of the Event Action Plan Builder panel.
8. Double-click **2145EventNot**.
9. Type the following information in the form that is displayed:
   a. **Internet E-mail Address**: Type an e-mail address (for example, the e-mail address of the system administrator).
   b. **Reply to**: Type the e-mail address to which you want replies to be directed.
   c. **SMTP E-mail server**: Type the name or IP address of the SMTP mail server.
   d. **SMTP port**: Type the port number through which e-mail is sent to your e-mail server. The default is 25.
   e. **Subject of E-mail Message**: Type `2145 Event Notification`.
   f. **Body of E-mail Message**: Type any information that you want to be sent to the recipient of the e-mail (for example, the machine location information). The body of the e-mail also contains all the SNMP trap data that contains the details of the event.
10. Click **File->Save**.
11. Close the Event Action Plan Builder panel.
12. Close the main IBM Director panel.

Setting up the call home feature for the SAN Volume Controller

If you use the call home feature on either the software and hardware versions of the master console, you must configure the IBM Director to initiate a message to IBM when failures that require service actions are logged by the SAN Volume Controller.

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

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 panel opens.
5. Expand the **Send an Internet (SMTP) E-mail** hierarchy in the right column of the Event Action Plan Builder panel.
6. Double-click **2145CallHome**.
7. Type the following information in the form that is displayed:
   a. **Internet E-mail Address**: If the SAN Volume Controller is located in North America, Latin America, South America or the Caribbean Islands, type the following address into the field:

      ```
      callhome1@de.ibm.com
      ```

      If the SAN Volume Controller is located anywhere else in the world, type the following address into the field:

      ```
      callhome0@de.ibm.com
      ```

   b. **Reply to**: Type the e-mail address to which you want replies to be directed.
   c. **SMTP E-mail server**: Type the name or IP address of the SMTP mail server.
   d. **SMTP port**: Type the port number through which e-mail is sent to your e-mail server. The default is 25.
   e. **Subject of E-mail Message**: Type `2145 Error Notification`
   f. **Body of E-mail Message**: Complete the following text fields. Do not change any other fields in the body of the e-mail message.

      ```
      # Contact name = contact_name
      # Contact phone number = primary_telephone_number
      # Offshift phone number = offshift_telephone_number
      # Machine location = machine_location
      ```

      where *contact_name* is the name of the person who the IBM service representative can contact about this call home request, *primary_telephone_number* is the primary telephone number to use to reach the contact person, *offshift_telephone_number* is the telephone number where the contact person can be reached during nonbusiness hours, and *machine_location* is the location of the machine. You can enter a maximum of 72 characters for each field.
8. Click **File** → **Save**.
9. Double-click **2145Test**.

10. In the **Body of E-mail Message** section of the form that displays, type the same information that you entered in step 7f on page 28 along with the following information:

    ```
    # Machine Type/Model = type_model
    # Serial Number = serial_number
    ```

    where:

    - *type_model* is the machine type and model of the installed SAN Volume Controller that is involved in this call home request. Possible values for *type_model* are **21454F2** (default), **21458F2**, and **21458F4**. The default value is **21454F2**. Do not enter any hyphens when you type the machine type and model.
    - *serial_number* is the serial number of the SAN Volume Controller that is involved in this call home request. To find the value for *serial_number* on 4F2 models, find the serial number label, which is located on the right edge of the front panel. For the 8F2 and the 8F4 models, the label is located on the center of the front panel. Do not enter any hyphens when you type the serial number.

11. Click **File** → **Save**.
12. Right-click **2145Test** and select **Test**.

    A call home record is generated. An IBM service representative will call you within 24 hours to confirm that the call home test has been successful. If you do not receive a phone call, report this to IBM as a call home failure.
13. Close the Event Action Plan Builder panel.
14. Close the main IBM Director panel.

Note: The action plan is preconfigured. If this becomes corrupted, the call home function and event notifications will fail and, before you continue, you must recover the data.

Chapter 6. Managing the master console

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

Tasks that you can perform from the master console include:

- Recovering Action Plan preconfiguration data
- 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 the SAN Volume Controller.
- Changing the master console host name.

Recovering Action Plan preconfiguration data

IBM Director is preconfigured to help you set up error notification for the SAN Volume Controller. If this preconfiguration data becomes corrupted, the call home function and event notifications fail.

Use the following Web site to download the most recent SAN Volume Controller Management Information Base (MIB) and preconfiguration recovery files and procedures:

http://www.ibm.com/storage/support/2145

Note: Although preconfiguration recovery files exist on the master console, these files might not be compatible with the latest version of SAN Volume Controller software or with the latest SAN Volume Controller MIB.

Replacing the SSH key pair for the 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. The following syntax assumes that the existing private key in the cimom folder is named icat.ppk.

   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 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.

Changing the master console host name

You can change the master console host name anytime. When you change the host name, you must also be sure that other master console applications are updated to use the new name.

Perform the following steps to change the host name and to update the name in other master console applications

1. From the desktop, click **Start**.
2. Right-click on **My Computer**.
3. Click **Properties**.
4. Click **Computer Name**.
5. Click **Change**.
6. Type the master console host name in the **Computer name** field.
7. Click **More**.
8. Type the full path information in the **Primary DNS suffix of this computer** field.
9. Click **OK** until you return to the desktop.
10. Run the *install_path*\MasterConsole\Support Utils\mcconfig.exe file, where *install_path* is the drive letter and the directory where the master console is installed.

Chapter 7. Uninstalling master console software

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

To uninstall the master console software, you must remove the components separately using the Microsoft Windows Add or Remove Programs dialog box. Because of product dependencies, you must uninstall the software packages in the following order:

1. IBM Director
2. PuTTY
3. Adobe Acrobat Reader
4. Master console

Note: When you remove the master console, you remove documentation, support utilities, and icons. Therefore, you can continue to access all product documentation until you remove the master console. The documentation is located in <*destination_location*>\Documents, where <*destination_location*> is the location where the master console was installed on the system. The default location is *system_drive*\Program Files\IBM\MasterConsole.

Accessing the Add or Remove Programs dialog panel

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 the SAN Volume Controller Console

This topic describes how to uninstall the SAN Volume Controller Console from the master console.

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

1. Open the Add/Remove Programs window from the Windows Control Panel.
2. Find and select **IBM System Storage SAN Volume Controller Console**.
3. Click **Remove** or **Change**.
4. Navigate through the uninstallation wizard, selecting the **Next** button of each panel.
5. Wait for the program to be removed, and then click **Finish**
6. If you are prompted to reboot the system, answer **yes** to reboot the system and complete the removal of the product.

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 Reader

You can uninstall Adobe Reader from the system that is running the master console.

Perform the following steps to uninstall Adobe Reader:

1. Open the Add or Remove Programs window from the Windows Control Panel.
2. Find and select the line for Adobe Reader in the Add or Remove Programs window.
3. Click **Remove** or **Change**.
4. Navigate through the uninstallation wizard, selecting the **Next** button of each window.
5. Wait for the program to be removed, and then click **Finish**.

Uninstalling the master console

This topic describes how to uninstall the master console.

This procedure assumes that you have opened the Microsoft Windows Add or Remove Programs dialog box.

Perform the following steps to uninstall the master console:

1. Find and select **IBM System Storage Master Console for SAN Volume Controller** in the Add or Remove Programs window.
2. Click **Remove** or **Change**.
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 the master console was installed. The default is *system_drive*\Program Files\IBM\Master Console.

Chapter 8. Upgrading the master console software

The topics in this section guide you through the upgrade process for the master console software.

Prerequisites for upgrading the master console

This topic provides an overview of the prerequisites for upgrading the master console.

If you are upgrading the master console software from version 3.2 or an earlier version, you might be required to uninstall some components that were previously included with the master console. Table 3 provides a list of master console components that are not supported by version 4.1 and the prerequisite actions to take.

Table 3. Unsupported components and actions to take prior to upgrading

Component	Action
IBM Tivoli Storage Area Network Manager (Tivoli SAN Manager) Agent	You must manually uninstall the Tivoli SAN Manager Agent. The "Uninstalling Tivoli SAN Manager Agent" topic provides instructions for uninstalling this component.
IBM Tivoli SAN Manager	You must manually uninstall the Tivoli SAN Manager. The "Uninstalling Tivoli SAN Manager" on page 40 topic provides instructions for uninstalling this component.
DS4000 Storage Manager Client (FAStT Storage Manager Client)	Unless you currently use the DS4000 Storage Manager Client, you must uninstall it. "Uninstalling the DS4000 Storage Manager Client (FAStT Storage Manager Client)" on page 40 provides instructions for uninstalling this component.
IBM Connection Manager	The IBM Connection Manager is automatically uninstalled during the master console upgrade process. You do not need to take any action.

Uninstalling Tivoli SAN Manager Agent

This topic describes how to uninstall Tivoli SAN Manager 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 Tivoli SAN Manager 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 Tivoli SAN Manager

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

This procedure assumes that you have performed the following actions:

- Uninstalled the Tivoli SAN Manager Agent
- Accessed the Add/Remove Programs dialog panel

Perform the following steps to uninstall the Tivoli SAN 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.
6. Remove the directory where the Tivoli SAN Manager and the Tivoli SAN Manager Agent were installed. By default, this directory is C:\Tivoli.

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.

Upgrading the master console to version 4.1

This topic provides information about upgrading the master console to version 4.1.

Before you begin the upgrade process, ensure that you have performed the following actions:

- Logged in using a user ID with administrative privileges

- Uninstalled any components that are not supported by the new version. For more information, see "Prerequisites for upgrading the master console" on page 39.

Perform the following steps to upgrade the master console software:

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

   The following message is displayed in a window:

   ```
   +------------------------------------------------------------+
   | InstallShield(R) is preparing the InstallShield Wizard, which |
   | will guide you through the rest of the process.            |
   | Please wait .........                                      |
   |                                                            |
   | Preparing Java (tm) Virtual Machine                        |
   +------------------------------------------------------------+
   ```

4. When you are 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 continue the upgrading.

   The installation wizard verifies that all software prerequisites are installed on the system. If they are not, a window opens describing the prerequisites that are not currently installed. Click **OK** to stop the installation wizard, then install the prerequisite software. After you have installed the prerequisites, start the installation wizard again.

   The installation wizard displays the version of the currently installed master console.
7. Click **Next** to continue upgrading.

   If any hardware requirements are not met on your system, a panel is displayed that indicates the hardware requirements that are not met and warning about a decrease of the performance level if these requirements are not met.
8. If the existing Adobe Reader is an earlier version than the required version, or if Adobe Reader is not installed on your system, the installation wizard panel Upgrading/Installing the Adobe Reader is displayed. Click **Next** to begin the upgrading or installation of Adobe Reader.

   When the installation is complete, the Useful Information panel is displayed. From this panel, you can access this document or IBM Support Web sites by following the instructions on the panel.
9. Click **Next** after you read the Useful Information panel.

   The Destination panel is displayed.
10. Specify the destination directory for the master console software. You can keep the old destination location displayed on the panel or select a different location. If you select a different location, the installation program first uninstalls the product from the old location and then installs the master console software in the new location that you specified.
11. Wait for the installation program to stop the master console information center service.

    The installation wizard displays the Select the information center port panel.

12. Keep the existing information center port value or change it. To change the information center port value, specify an unused port value between 1 and 65535. To see the ports that are being used by other applications, open a Command Prompt window, and enter the **netstat -a** command.

    The Select the optional features panel is displayed.

13. Specify whether you want the IBM System Storage SAN Volume Controller Console to be installed or upgraded, and then click **Next**.

    Note: If you clear the SAN Volume Controller Console option, a warning message is displayed before the List of products panel is displayed. This message warns that you should clear the SAN Volume Controller Console check box only when the SAN Volume Controller Console is not part of the current configuration.

    The List of products panel is displayed.

14. Review the information on the List of products panel. The list of products compares the installed product versions with the required ones in a table with the following columns:
    - 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

    The table containing the list of the products to be installed or upgraded is saved as *MasterConsoleProducts.htm* in the location where the master console is installed.

    Depending on the installed version of each product, the installation wizard determines whether to install or upgrade the product using the following conditions:
    - If the product is installed and its installed version is an earlier version than the required version, the installation wizard upgrades the product by launching the product-specific installer.
    - If the product is installed at a version equal to or later than the required version, the installation wizard does not install that product. The corresponding panels that launch and verify the specific product installation are skipped. When the existing version is a later versions than the required version, the installation wizard displays a warning telling you that your existing version has not been tested with the master console.
    - If a product from the list of products to be installed or upgraded is found to be not properly installed on the system, you are asked to continue with the installation by trying to reinstall the product with the product-specific installer. If this action does not succeed, exit the master console installation wizard, manually remove the product from your system, and restart the master console installation wizard.

15. From the List of products panel, click **Next** to continue upgrading the products.

    The installation wizard launches the necessary product-specific installation programs. During the installation, change CDs if prompted. For details about individual product installations, you can see the Chapter 4, “Installing master console software,” on page 11 topic and its subtopics.

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

If you receive a message telling you to change the property value for the user name, manually change the Log On As property of the IBM Director Server service by performing the following steps:

a. Open the Services window by selecting **Start** → **Settings** → **Control Panel** → **Administrative Tools** → **Services**.
b. In the Services window, select the **IBM Director Server** service.
c. Right-click on the selected service, and select **Properties** to open IBM Director Server Properties.
d. Click on the **Log On** tab and deselect the **Local System account** radio button.
e. Select **This account** radio button and then enter the user ID and its password.
f. Save the changes by clicking the **Apply** button.
g. Click **OK**.

You must remember the IBM Director account and password because you are asked for it when you upgrade the IBM Director and preconfigure it (see step 16). This account value is read by the installer as the default value for the IBM Director account during the upgrade.

After the product-specific installations are complete, the installation wizard displays the IBM Director Superuser Account panel.

16. In the IBM Director Superuser Account panel, enter the IBM Director superuser name and password. The installation program starts the IBM Director Support Program service so that the installation can perform the preconfiguration tasks.
17. Wait for IBM Director to start and then discover the Director-managed systems.

    If IBM Director was never preconfigured since its installation (that is, there are no action plans for managing specific events defined in the Director), the installation program performs the IBM Director preconfiguration tasks. These tasks consist of creating a set of action plans designated for managing specific events that are generated by the master console system. These action plans are imported from configuration archive files that exist on the installation package. If one or more configuration files are not found on the installation package, or if an error occurs while action plans are being imported, a message is displayed warning that these action plans must be manually created after installation is completed.
18. Upgrade the master console documentation and support utilities by performing the following steps:
    a. Restart the system if prompted after the installation wizard uninstalls the old documentation and utility files, Document Launcher, and information center.
    b. From the Documents and Support Utilities installation panel, click **Next** to begin the installation of new documentation and utilities files.
    c. If prompted to insert a different CD, insert it in the CD drive and enter the CD drive letter in the location field. Then click **OK**.

       The installation wizard copies the Eclipse files of the IBM WebSphere Help System and installs the master console information center (copying master console-specific documentations into the IBM WebSphere Help System).

       The program installs the master console information center as a service.

       After all documentation and utilities are installed, the Finish panel is displayed.
19. Click **Finish**.

20. If a system reboot is required, accept the prompt to complete the master console upgrading process.
21. 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

These topics provide information that you need to troubleshoot and resolve problems with the master console.

In addition to troubleshooting by yourself, you can also request a Virtually On-site session with an IBM service representative.

Related concepts

"Virtually On-site and remote service" on page 4
When you contact IBM to help you resolve a problem with your SAN Volume Controller system, the IBM service representative might suggest using IBM Virtually On-site (VOS) tool to remotely access the master console. This type of remote service can help you reduce service costs and shorten repair times.

Recovering from a disk failure on the master console system

At some point, you might have to recover from a disk failure on the system that runs the master console.

When you set up mirroring, the hard disk drive on the system that runs the master console is actually a mirrored pair of hard disks. This strategy protects against loss of the master console due to a disk failure. If one of these mirrored pair of disk drives fails and must 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 are displayed in the right panel.
3. If the failing disk drive is displayed, right-click the main volume of the drive and select **Break Mirror**.
4. Shut down the computer that runs the master console and replace the failing disk drive using the procedures that are detailed in the documentation for your replacement hard drive. 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.

   Notes:

   a. It can be difficult to tell which of the two drives has failed. In this case, reboot with each drive one at a time to isolate the failed drive.
   b. If the replacement drive has a boot record that is present, erase the boot record prior to using the replacement drive. However, if the master console computer fails to boot because it cannot find the boot record, change the boot sequence in the BIOS to the other hard drive.
5. Restart the computer.
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 is marked **Missing**, remove that disk drive by right-clicking the drive and selecting **Remove Disk**.
9. If the new disk drive has a no entry sign that is displayed on it, right-click that disk drive 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**. The Add Mirror wizard is started.
12. Use the Add Mirror wizard to configure the second volume.
13. Ignore the window for making changes to the boot.ini file.

    The status of both volumes, the existing drive, and the new drive changes to **Regenerating**. After a short period of time, the status shows the percentage of regeneration that has completed. When the regeneration completes, the status displays as **Healthy**.

Troubleshooting SAN Volume Controller Console problems

If you have problems with the SAN Volume Controller Console, you can use the instructions in this topic to help you resolve them.

If the SAN Volume Controller Console closes unexpectedly

This problem has the following symptoms:

- The following dialog box is displayed:

  `You have signed off`
- The window closes.

To resolve this problem, perform the following actions:

1. 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).
2. If you cannot reconnect, try the following actions to resolve the problem:
   - Check the 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 memory. If there is a memory problem, you must 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 Windows boot problems

If you have problems with the Microsoft Windows booting, you can use the instructions in this topic to help you resolve them.

If Windows does not boot

During the Windows boot process, if Windows tries to start but fails with a 'blue screen' with a `Inaccessible Boot Device` message 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 computer where the master console resides.
2. Press F1 to display the **Configuration/Setup** menu.
3. Select **Start Options**.
4. Select **Start Sequence**.
5. Step down the sequence to the one that contains the hard disk.

6. Use the left and right cursor keys to select the other hard disk. For example, if the hard disk 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. Then select **Yes**.
8. If the master console boots, proceed with the steps for recovering from a master console disk failure. Otherwise, contact your IBM service 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 Controller nodes, fibre-channel switches, and storage generate SNMP traps as a result of events, such as errors and configuration changes. The errors are usually sent to the IBM Director and are listed in the Director Event Log. You can view all the events with their time stamps to help you determine which event is most likely to have caused the problem.

For example, the loss of a fibre-channel path or link because of a cable or GBIC fault can 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.

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

To resolve the problem, you might have to see the service documentation for the link end device involved (for example, the SAN Volume Controller, fibre-channel switch, or host)

If you identify a particular SAN component failure, see the service documentation for that component to resolve the problem. The master console C:\Documents directory contains documentation for some components.

Appendix. Accessibility features for the SAN Volume Controller

Accessibility features help users who have a physical disability, such as restricted mobility or limited vision, to use information technology products successfully.

Accessibility features for the SAN Volume Controller

The following list includes the major accessibility features in the SAN Volume Controller. These features support:

- Keyboard-only operation.
- Interfaces that are commonly used by screen readers.
- Keys that are tactilely discernible and do not activate just by touching them
- Industry-standard devices for ports and connectors.
- The attachment of alternative input and output devices.

Tip: The SAN Volume Controller 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.

Keyboard navigation

This product uses standard Microsoft Windows navigation keys.

IBM and accessibility

See the *IBM Accessibility Center* for more information about the commitment that IBM has to accessibility.

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Glossary

Glossary

This glossary includes terms for the IBM System Storage master console for SAN Volume Controller.

This glossary includes selected terms and definitions from A Dictionary of Storage Networking Terminology (http://www.snia.org/education/dictionary), copyrighted 2001 by the Storage Networking Industry Association, 2570 West El Camino Real, Suite 304, Mountain View, California 94040-1313. Definitions derived from this book have the symbol (S) after the definition.

The following cross-references are used in this glossary:

See Refers the reader to one of two kinds of related information:

- A term that is the expanded form of an abbreviation or acronym. This expanded form of the term contains the full definition.
- A synonym or more preferred term.

See also
Refers the reader to one or more related terms.

Contrast with
Refers the reader to a term that has an opposite or substantively different meaning.

A

access

- To obtain computing services or data.
- The ability to read, update, or otherwise use a resource. Access to protected resources is usually controlled by system software.

alert

- A message or other indication that identifies a problem or an impending problem.
- A message or log that a storage facility generates as the result of the collection and analysis of error events. An alert indicates that a service action is required.
- A message sent to a management services focal point in a network to identify a problem or an impending problem.

application server
A host that is attached to the storage area network (SAN) and that runs applications.

authentication

- In computer security, verification of the identity of a user or process and the construction of a data structure that contains the privileges that were granted to the user or process.
- In computer security, a process that ensures that the identities of both the sender and the receiver of a network transaction are true.

availability
The ability of a system to continue working, with perhaps a decrease in performance, after individual components fail.

B

boot drive
A disk drive that contains the operating system. When PCs came with a diskette drive, they were set to look for a bootable disk during startup in the diskette drive first, CD-ROM drive second and hard disk drive third. Today, many PCs come without a diskette drive, and the order is typically CD-ROM first and hard disk drive second, although this order can be changed in the BIOS setup.

C

call home
A communication service that links a machine to a service provider. The machine can use this link to place a call to IBM or to another service provider when service is required. With access to the machine, service personnel can

perform service tasks, such as viewing error and problem logs or initiating trace and dump retrievals.

CIM See *Common Information Model*.

CIM object manager (CIMOM)
The common conceptual framework for data management that receives, validates, and authenticates the CIM requests from the client application. It then directs the requests to the appropriate component or service provider.

CIMOM
See *CIM object manager*.

CLI See *command line interface*.

client A computer system or process that requests a service of another computer system or process that is typically referred to as a server. Multiple clients can share access to a common server.

cluster
In SAN Volume Controller, a pair of nodes that provides a single configuration and service interface.

command line-interface (CLI)
A type of computer interface in which the input command is a string of text characters.

Common Information Model (CIM)
A set of standards developed by the Distributed Management Task Force (DMTF). CIM provides a conceptual framework for storage management and an open approach to the design and implementation of storage systems, applications, databases, networks, and devices.

console

- A device for graphical or textual visual output from a computer system. (S)
- In systems, network and device management, an application that provides graphical and textual feedback regarding operation and status, and that may accept operator commands and input influencing operation and status. (S)
- See also *master console*.

D

data migration
The movement of data from one physical location to another without disrupting I/O operations.

degraded
Pertaining to a valid configuration that has suffered a failure but continues to be supported and legal. Typically, a repair action can be performed on a degraded configuration to restore it to a valid configuration.

device

- In the CIM Agent, the storage server that processes and hosts client application requests.
- IBM definition: A piece of equipment that is used with the computer and does not generally interact directly with the system, but is controlled by a controller.
- HP definition: In its physical form, a magnetic disk that can be attached to a SCSI bus. The term is also used to indicate a physical device that has been made part of a controller configuration; that is, a physical device that is known to the controller. Units (virtual disks) can be created from devices after the devices have been made known to the controller.

disk drive
A disk-based, nonvolatile, storage medium.

domain name server
In the Internet suite of protocols, a server program that supplies name-to-address conversion by mapping domain names to IP addresses.

E

error code
A value that identifies an error condition.

Ethernet
A packet-based networking technology for local area networks (LANs) that allows multiple access and handles contention by using Carrier Sense Multiple Access with Collision Detection (CSMA/CD) as the access method. Ethernet is standardized in the IEEE 802.3 specification.

F

fabric In fibre-channel technology, a routing structure, such as a switch, that receives addressed information and routes it to the appropriate destination. A fabric can consist of more than one switch. When multiple fibre-channel switches are interconnected, they are described as cascading. See also *cascading*.

fibre channel
A technology for transmitting data between computer devices at a data rate of up to 4 Gbps. It is especially suited for attaching computer servers to shared storage devices and for interconnecting storage controllers and drives.

file metadata
Information about the file, such as owner, permission, and physical location. This information is stored in the system storage pool.

firewall
A network configuration, usually both hardware and software, that prevents unauthorized traffic into and out of a secure network.

G

gateway
An entity that operates above the link layer and translates, when required, the interface and protocol used by one network into those used by another distinct network.

GB See *gigabyte*.

GBIC See *gigabit interface converter*.

gigabit interface converter (GBIC)
An interface module that converts the light stream from a fibre-channel cable into electronic signals for use by the network interface card.

gigabyte (GB)
In decimal notation, 1 073 741 824 bytes.

H

hardcoded
Pertaining to software instructions that are statically encoded and not intended to be altered.

host name

- The network name for a network adaptor on a physical machine in which the node is installed.
- In Internet communications, the name given to a computer. Sometimes, host name is used to mean the fully qualified domain name; other times, it is used to mean the most specific subname of a fully qualified domain name. For example, if mycomputer.city.company.com is the fully qualified domain name, either of the following may be considered the host name: mycomputer.city.company.com, mycomputer.

I

ID See *identifier*.

identifier (ID)
A sequence of bits or characters that identifies a user, program device, or system to another user, program device, or system.

illegal configuration
A configuration that will not operate and will generate an error code to indicate the cause of the problem.

input/output (I/O)
Pertaining to a functional unit or communication path involved in an input process, an output process, or both, concurrently or not, and to the data involved in such a process.

instance
An individual object that is a member of some class. In object-oriented programming, an object is created by instantiating a class.

integrity
The ability of a system to either return only correct data or respond that it cannot return correct data.

Internet Protocol (IP)
In the Internet suite of protocols, a connectionless protocol that routes data through a network or interconnected networks and acts as an intermediary between the higher protocol layers and the physical network.

interoperability
The capability to communicate, run

programs, or transfer data among various functional units in a way that requires the user to have little or no knowledge of the unique characteristics of those units.

I/O See *input/output*.

IP See *Internet Protocol*.

IP address
The unique 32-bit address that specifies the location of each device or workstation in the Internet. For example, 9.67.97.103 is an IP address.

J

JBOD (just a bunch of disks)

- IBM definition: See *non-RAID*.
- HP definition: A group of single-device logical units not configured into any other container type.

K

key In computer security, a sequence of symbols that is used with a cryptographic algorithm for encrypting or decrypting data. See also *private key*, *public key*.

L

local fabric
In SAN Volume Controller, those storage area network (SAN) components (such as switches and cables) that connect the components (nodes, hosts, switches) of the local cluster together.

M

Management Information Base (MIB)
Simple Network Management Protocol (SNMP) units of managed information that specifically describe an aspect of a system, such as the system name, hardware number, or communications configuration. A collection of related MIB objects is defined as a MIB.

master console
A single point from which to manage the IBM System Storage™ SAN Volume Controller. The master console product can be purchased as software that is installed and configured on a server or as a hardware platform with the operating system and master console software preinstalled.

MB See *megabyte*.

megabyte (MB)
In decimal notation, 1 048 576 bytes.

MIB See *Management Information Base*.

migration
See *data migration*.

mirroring

- The process of writing the same data to two disk units within the same auxiliary storage pool at the same time. The two disk units become a mirrored pair, allowing the system to continue when one of the mirrored units fails.
- The process of writing the same data to multiple disks at the same time. The mirroring of data protects it against data loss within the database or within the recovery log.
- A form of storage array in which two or more identical copies of data are maintained on separate media. Also known as RAID Level 1, disk shadowing, real-time copy, and t1 copy. (S)

N

node

- One SAN Volume Controller. Each node provides virtualization, cache, and Copy Services to the storage area network (SAN).
- An addressable entity connected to an I/O bus or network. Used primarily to refer to computers, storage devices, and storage subsystems. The component of a node that connects to the bus or network is a port. (S)

node name
A name identifier associated with a node. (S)

O

object In object-oriented design or programming, a concrete realization of a class that consists of data and the operations associated with that data.

offline
Pertaining to the operation of a functional unit or device that is not under the continual control of the system or of a host.

offshift
A person's non-working hours.

online Pertaining to the operation of a functional unit or device that is under the continual control of the system or of a host.

P

paused
In SAN Volume Controller, the process by which the cache component quiesces all ongoing I/O activity below the cache layer.

pend To cause to wait for an event.

petabyte (PB)
In decimal notation, 1 125 899 906 842 624 bytes.

port The physical entity within a host, SAN Volume Controller, or disk controller system that performs the data communication (transmitting and receiving) over the fibre channel.

power-on self-test
A diagnostic test that servers or computers run when they are turned on. Sometimes called POST.

private key

- In computer security, a key that is known only to its owner. See also *public key*.
- In secure communication, an algorithmic pattern used to encrypt messages that only the corresponding public key can decrypt. The private key is also used to decrypt messages that were encrypted by the corresponding public key. The private key is kept on the user's system and is protected by a password. See also *key*, *public key*.

property
In the Common Information Model (CIM), an attribute that is used to characterize instances of a class.

public key

- In computer security, a key that is made available to everyone. See also *private key*.
- In secure communication, an algorithmic pattern used to decrypt messages that were encrypted by the corresponding private key. A public key is also used to encrypt messages that can be decrypted only by the corresponding private key. Users broadcast their public keys to everyone with whom they must exchange encrypted messages. See also *key*, *private key*.

PuTTY
A client program that allows you to run remote sessions on your computer through specific network protocols, such as SSH, Telnet, and Rlogin.

Q

qualifier
A value that provides additional information about a class, association, indication, method, method parameter, instance, property, or reference.

R

rack A free-standing framework that holds the devices and card enclosure.

reference
A pointer to another instance that defines the role and scope of an object in an association.

reliability
The ability of a system to continue to return data even if a component fails.

remote fabric
In Global Mirror, the storage area network (SAN) components (switches and cables) that connect the components (nodes, hosts, and switches) of the remote cluster.

roles Authorization is based on roles that map to the administrator and service roles in an installation. The switch translates these roles into SAN Volume Controller administrator and service user IDs when a connection is made to the node for the SAN Volume Controller.

S

SAN See *storage area network*.

SCSI See *Small Computer Systems Interface*.

SCSI back-end layer
The layer in a Small Computer Systems Interface (SCSI) network that performs the following functions: controls access to individual disk controller systems that are

managed by the cluster; receives requests from the virtualization layer, processes them, and sends them to managed disks; addresses SCSI-3 commands to the disk controller systems on the storage area network (SAN).

SCSI front-end layer
The layer in a Small Computer Systems Interface (SCSI) network that receives I/O commands sent from hosts and provides the SCSI-3 interface to hosts. SCSI logical unit numbers (LUNs) are mapped to virtual disks (VDisks) in this layer as well. Thus, the layer converts SCSI read and write commands that are addressed to LUNs into commands that are addressed to specific VDisks.

SDD See *subsystem device driver*.

Secure Shell
A program to log in to another computer over a network, to execute commands in a remote machine, and to move files from one machine to another.

server In a network, the hardware or software that provides facilities to other stations; for example, a file server, a printer server, a mail server. The station making the request of the server is usually called the client.

Service Location Protocol (SLP)
In the Internet suite of protocols, a protocol that identifies and uses network hosts without having to designate a specific network host name.

Simple Mail Transfer Protocol (SMTP)
An Internet application protocol for transferring mail among users of the Internet. SMTP specifies the mail exchange sequences and message format. It assumes that the Transmission Control Protocol (TCP) is the underlying protocol.

Simple Network Management Protocol (SNMP)
In the Internet suite of protocols, a network management protocol that is used to monitor routers and attached networks. SNMP is an application-layer protocol. Information on devices managed is defined and stored in the application's Management Information Base (MIB).

SLP See *Service Location Protocol*.

Small Computer System Interface (SCSI)
A standard hardware interface that enables a variety of peripheral devices to communicate with one another.

SMI-S See *Storage Management Initiative Specification*.

SMTP See *Simple Mail Transfer Protocol*.

SNIA See *Storage Networking Industry Association*.

SNMP
See *Simple Network Management Protocol*.

SSH See *Secure Shell*.

storage area network (SAN)
A network whose primary purpose is the transfer of data between computer systems and storage elements and among storage elements. A SAN consists of a communication infrastructure, which provides physical connections, and a management layer, which organizes the connections, storage elements, and computer systems so that data transfer is secure and robust. (S)

Storage Management Initiative Specification (SMI-S)
A design specification developed by the Storage Networking Industry Association (SNIA) that specifies a secure and reliable interface that allows storage management systems to identify, classify, monitor, and control physical and logical resources in a storage area network. The interface is intended as a solution that integrates the various devices to be managed in a storage area network (SAN) and the tools used to manage them.

Storage Networking Industry Association (SNIA)
An association of producers and consumers of storage networking products whose goal is to further storage networking technology and applications. See www.snia.org.

subsystem device driver (SDD)
An IBM pseudo device driver designed to support the multipath configuration environments in IBM products.

subnet

- A network divided into smaller interconnected, but independent subgroups.

- To divide a network into smaller interconnected, but independent subgroups.

superuser authority
The level of access required to add users.

switch A network infrastructure component to which multiple nodes attach. Unlike hubs, switches typically have internal bandwidth that is a multiple of link bandwidth, and the ability to rapidly switch node connections from one to another. A typical switch can accommodate several simultaneous full link bandwidth transmissions between different pairs of nodes. (S) Contrast with *hub*.

system
A functional unit, consisting of one or more computers and associated software, that uses common storage for all or part of a program and also for all or part of the data necessary for the execution of the program. A computer system can be a stand-alone unit, or it can consist of multiple connected units.

T

terabyte
In decimal notation, 1 099 511 628 000 bytes.

V

valid configuration
A configuration that is supported.

virtualization
In the storage industry, a concept in which a pool of storage is created that contains several disk subsystems. The subsystems can be from various vendors. The pool can be split into virtual disks that are visible to the host systems that use them.

virtual private network (VPN)
An extension of a company's intranet over the existing framework of either a public or private network.

Virtually On-site (VOS)
A worldwide IBM Technical Support remote desktop sharing solution, used to allow an IBM service representative to remotely access your system and help you resolve hardware, software, or operational problems.

VOS See *Virtually On-site*.

VPN See *virtual private network*.

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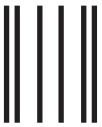

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