IBM Storwize V5000

Quick Installation Guide

IBM

This edition replaces GI13-2861-04.

Contents

Figures

Tables

Safety and environmental notices

Review the safety notices, environmental notices, and electronic emission notices for IBM® Storwize® V5000 before you install and use the product.

Suitability for telecommunication environment: This product is not intended to connect directly or indirectly by any means whatsoever to interfaces of public telecommunications networks.

To find the translated text for a caution or danger notice, complete the following steps.

1. Look for the identification number at the end of each caution notice or each danger notice. In the following examples, the numbers (C001) and (D002) are the identification numbers.
   CAUTION:
   A caution notice indicates the presence of a hazard that has the potential of causing moderate or minor personal injury. (C001)
   DANGER

   > **A danger notice indicates the presence of a hazard that has the potential of causing death or serious personal injury. (D002)**

2. Locate the *IBM Systems Safety Notices* with the user publications that were provided with the Storwize V5000 hardware.

3. Find the matching identification number in the *IBM Systems Safety Notices*. Then, review the topics about the safety notices to ensure that you are in compliance.

4. (Optional) Read the multilingual safety instructions on the Storwize V5000 website.
   a. Go to www.ibm.com/support
   b. Search for "Storwize V5000"
   c. Click the documentation link

Safety notices and labels

Review the safety notices and safety information labels before using this product.

To view a PDF file, you need Adobe Acrobat Reader. You can download it at no charge from the Adobe website:

www.adobe.com/support/downloads/main.html

IBM Systems Safety Notices

This publication contains the safety notices for the IBM Systems products in English and other languages. Anyone who plans, installs, operates, or services the system must be familiar with and understand the safety notices. Read the related safety notices before you begin work.

Note: The *IBM System Safety Notices* document is organized into two sections. The danger and caution notices without labels are organized alphabetically by language

in the "Danger and caution notices by language" section. The danger and caution notices that are accompanied with a label are organized by label reference number in the "Labels" section.

Note: You can find and download the current *IBM System Safety Notices* by searching for Publication number **G229-9054** in the IBM Publications Center.

The following notices and statements are used in IBM documents. They are listed in order of decreasing severity of potential hazards.

Danger notice definition
    A special note that emphasizes a situation that is potentially lethal or extremely hazardous to people.

Caution notice definition
    A special note that emphasizes a situation that is potentially hazardous to people because of some existing condition, or to a potentially dangerous situation that might develop because of some unsafe practice.

Note: In addition to these notices, labels might be attached to the product to warn of potential hazards.

Finding translated notices

Each safety notice contains an identification number. You can use this identification number to check the safety notice in each language.

To find the translated text for a caution or danger notice:

1. In the product documentation, look for the identification number at the end of each caution notice or each danger notice. In the following examples, the numbers (D002) and (C001) are the identification numbers.

   DANGER

   > **A danger notice indicates the presence of a hazard that has the potential of causing death or serious personal injury. (D002)**

   CAUTION:
   A caution notice indicates the presence of a hazard that has the potential of causing moderate or minor personal injury. (C001)

2. After you download the *IBM System Safety Notices* document, open it.
3. Under the language, find the matching identification number. Review the topics about the safety notices to ensure that you are in compliance.

Note: This product was designed, tested, and manufactured to comply with IEC 60950-1, and where required, to relevant national standards that are based on IEC 60950-1.

Caution notices for the Storwize V5000

Ensure that you understand the caution notices for Storwize V5000.

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM Systems Safety Notices*.

CAUTION:
The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.

Do not: Throw or immerse into water, heat to more than 100°C (212°F), repair or disassemble. (C003)

CAUTION:

33.6-46.3 kg (74-102 lbs)	46.3-61.7 kg (102-136 lbs)	≥61.7-100 kg (136-220 lbs)

The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit. (C011)

CAUTION:
To avoid personal injury, before lifting this unit, remove all appropriate subassemblies per instructions to reduce the system weight. (C012)

CAUTION:

CAUTION regarding IBM provided VENDOR LIFT TOOL:

- Operation of LIFT TOOL by authorized personnel only

- LIFT TOOL intended for use to assist, lift, install, remove units (load) up into rack elevations. It is not to be used loaded transporting over major ramps nor as a replacement for such designated tools like pallet jacks, walkies, fork trucks and such related relocation practices. When this is not practicable, specially trained persons or services must be used (for instance, riggers or movers). Read and completely understand the contents of LIFT TOOL operator's manual before using.

- Read and completely understand the contents of LIFT TOOL operator's manual before using. Failure to read, understand, obey safety rules, and follow instructions may result in property damage and/or personal injury. If there are questions, contact the vendor's service and support. Local paper manual must remain with machine in provided storage sleeve area. Latest revision manual available on vendor's website.

- Test verify stabilizer brake function before each use. Do not over-force moving or rolling the LIFT TOOL with stabilizer brake engaged.

- Do not raise, lower or slide platform load shelf unless stabilizer (brake pedal jack) is fully engaged. Keep stabilizer brake engaged when not in use or motion.

- Do not move LIFT TOOL while platform is raised, except for minor positioning.

- Do not exceed rated load capacity. See LOAD CAPACITY CHART regarding maximum loads at center versus edge of extended platform.

- Only raise load if properly centered on platform. Do not place more than 200 lb (91 kg) on edge of sliding platform shelf also considering the load's center of mass/gravity (CoG).

- Do not corner load the platform tilt riser accessory option. Secure platform riser tilt option to main shelf in all four (4x) locations with provided hardware only, prior to use. Load objects are designed to slide on/off smooth platforms without appreciable force, so take care not to push or lean. Keep riser tilt option flat at all times except for final minor adjustment when needed.

- Do not stand under overhanging load.

- Do not use on uneven surface, incline or decline (major ramps).

- Do not stack loads. (C048, part 1 of 2)

- Do not operate while under the influence of drugs or alcohol.
- Do not support ladder against LIFT TOOL.
- Tipping hazard. Do not push or lean against load with raised platform.
- Do not use as a personnel lifting platform or step. No riders.
- Do not stand on any part of lift. Not a step.
- Do not climb on mast.
- Do not operate a damaged or malfunctioning LIFT TOOL machine.
- Crush and pinch point hazard below platform. Only lower load in areas clear of personnel and obstructions. Keep hands and feet clear during operation.
- No Forks. Never lift or move bare LIFT TOOL MACHINE with pallet truck, jack or fork lift.
- Mast extends higher than platform. Be aware of ceiling height, cable trays, sprinklers, lights, and other overhead objects.
- Do not leave LIFT TOOL machine unattended with an elevated load.
- Watch and keep hands, fingers, and clothing clear when equipment is in motion.
- Turn Winch with hand power only. If winch handle cannot be cranked easily with one hand, it is probably over-loaded. Do not continue to turn winch past top or bottom of platform travel. Excessive unwinding will detach handle and damage cable. Always hold handle when lowering, unwinding. Always assure self that winch is holding load before releasing winch handle.
- A winch accident could cause serious injury. Not for moving humans. Make certain clicking sound is heard as the equipment is being raised. Be sure winch is locked in position before releasing handle. Read instruction page before operating this winch. Never allow winch to unwind freely. Freewheeling will cause uneven cable wrapping around winch drum, damage cable, and may cause serious injury. (C048, part 2 of 2)

CAUTION:

Removing components from the upper positions in the rack cabinet improves rack stability during a relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building.

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must observe the following precautions.
  - Remove all devices in the 32U position and above.
  - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.
  - Ensure that there are no empty U-levels between devices installed in the rack cabinet below the 32U level.
- If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- If the rack cabinet you are relocating was supplied with removable outriggers they must be reinstalled before the cabinet is relocated.
- Inspect the route that you plan to take to eliminate potential hazards.
- Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that comes with your rack cabinet for the weight of a loaded rack cabinet.
- Verify that all door openings are at least 760 x 230 mm (30 x 80 in.).
- Ensure that all devices, shelves, drawers, doors, and cables are secure.
- Ensure that the four leveling pads are raised to their highest position.
- Ensure that there is no stabilizer bracket installed on the rack cabinet during movement.
- Do not use a ramp inclined at more than 10 degrees.
- When the rack cabinet is in the new location, complete the following steps:
  - Lower the four leveling pads.
  - Install stabilizer brackets on the rack cabinet.
  - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.
- If a long-distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also lower the leveling pads to raise the casters off the pallet and bolt the rack cabinet to the pallet. **(R002)**

Danger notices for Storwize V5000

Ensure that you are familiar with the danger notices for Storwize V5000.

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM Systems Safety Notices*.

DANGER

> When working on or around the system, observe the following precautions:
>
> Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:
>
> - If IBM supplied a power cord(s), connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
> - Do not open or service any power supply assembly.
> - Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
> - The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
> - Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
> - Connect any equipment that will be attached to this product to properly wired outlets.
> - When possible, use one hand only to connect or disconnect signal cables.
> - Never turn on any equipment when there is evidence of fire, water, or structural damage.
> - Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
> - Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.
>
>   To disconnect:
>   1. Turn off everything (unless instructed otherwise).
>   2. Remove the power cords from the outlets.
>   3. Remove the signal cables from the connectors.
>   4. Remove all cables from the devices.
>
>   To connect:
>   1. Turn off everything (unless instructed otherwise).
>   2. Attach all cables to the devices.
>   3. Attach the signal cables to the connectors.
>   4. Attach the power cords to the outlets.
>   5. Turn on the devices.
> - Sharp edges, corners and joints might be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching. (D005)

DANGER

> Heavy equipment–personal injury or equipment damage might result if mishandled. (D006)

DANGER

> **DANGER: Serious injury or death can occur if loaded lift tool falls over or if a heavy load falls off the lift tool. Always completely lower the lift tool load plate and properly secure the load on the lift tool before moving or using the lift tool to lift or move an object. (D010)**

DANGER

> **Racks with a total weight of > 227 kg (500 lb.), Use Only Professional Movers! (R003)**

DANGER

> **Do not transport the rack via fork truck unless it is properly packaged, secured on top of the supplied pallet. (R004)**

> **DANGER:**
>
> ⏚
>
> **Main Protective Earth (Ground):**
>
> **This symbol is marked on the frame of the rack.**
> **The PROTECTIVE EARTHING CONDUCTORS should be terminated at that point. A recognized or certified closed loop connector (ring terminal) should be used and secured to the frame with a lock washer using a bolt or stud. The connector should be properly sized to be suitable for the bolt or stud, the locking washer, the rating for the conducting wire used, and the considered rating of the breaker. The intent is to ensure the frame is electrically bonded to the PROTECTIVE EARTHING CONDUCTORS. The hole that the bolt or stud goes into where the terminal conductor and the lock washer contact should be free of any non-conductive material to allow for metal to metal contact. All PROTECTIVE EARTHING CONDUCTORS should terminate at this main protective earthing terminal or at points marked with ⏚ . (R010)**

Special caution and safety notices

This information describes special safety notices that apply to the Storwize V5000. These notices are in addition to the standard safety notices supplied and address specific issues relevant to the equipment provided.

General safety

When you service the Storwize V5000, follow general safety guidelines.

Use the following general rules to ensure safety to yourself and others.
- Observe good housekeeping in the area where the devices are kept during and after maintenance.
- Follow the guidelines when lifting any heavy object:
  1. Ensure that you can stand safely without slipping.
  2. Distribute the weight of the object equally between your feet.
  3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
  4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 18 kg (40 lb) or objects that you think are too heavy for you.*

- Do not perform any action that causes a hazard or makes the equipment unsafe.
- Before you start the device, ensure that other personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the unit.
- Keep your tool case away from walk areas so that other people cannot trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a device. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconducting clip, approximately 8 cm (3 in.) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

  Remember: Metal objects are good electrical conductors.
- Wear safety glasses when you are hammering, drilling, soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly after you have finished servicing the unit.

Handling static-sensitive devices

Ensure that you understand how to handle devices that are sensitive to static electricity.

Attention: Static electricity can damage electronic devices and your system. To avoid damage, keep static-sensitive devices in their static-protective bags until you are ready to install them.

To reduce the possibility of electrostatic discharge, observe the following precautions:
- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and possibly damage the device.
- While the device is still in its antistatic bag, touch it to an unpainted metal part of the system unit for at least two seconds. (This action removes static electricity from the package and from your body.)
- Remove the device from its package and install it directly into your Storwize V5000, without putting it down. If it is necessary to put the device down, place it onto its static-protective bag. (If your device is an adapter, place it component-side up.) Do not place the device onto the cover of the Storwize V5000 or onto a metal table.
- Take additional care when you handle devices during cold weather. Indoor humidity tends to decrease in cold weather, causing an increase in static electricity.

Environmental notices

The *IBM Systems Environmental Notices* contains all of the required environmental notices for IBM Systems products in English and other languages.

The *IBM Systems Environmental Notices* (`http://ibm.co/1fBgWFI`) includes statements on limitations, product information, product recycling and disposal, battery information, flat panel display, refrigeration and water-cooling systems, external power supplies, and safety data sheets.

About this guide

This publication provides information that helps you install and initialize IBM Storwize V5000 systems.

Who should use this guide

This guide is intended for installers of Storwize V5000 systems.

Before configuring your system, ensure that you follow the procedures as listed. Be sure to gather IP addresses that you will need before you begin the installation.

Storwize V5000 library and related publications

Product manuals, other publications, and websites contain information that relates to Storwize V5000.

IBM Knowledge Center for Storwize V5000

The information collection in the IBM Knowledge Center contains all of the information that is required to install, configure, and manage the system. The information collection in the IBM Knowledge Center is updated between product releases to provide the most current documentation. The information collection is available at the following website:

http://www.ibm.com/support/knowledgecenter/STPVGU

Storwize V5000 library

Unless otherwise noted, the publications in the library are available in Adobe portable document format (PDF) from a website.

ibm.com/shop/publications/order

Click **Search for publications** to find the online publications you are interested in, and then view or download the publication by clicking the appropriate item.

Table 1 lists websites where you can find help, services, and more information.

Table 1. IBM websites for help, services, and information

Website	Address
Directory of worldwide contacts	http://www.ibm.com/planetwide
Support for Storwize V5000 (2077 or 2078)	www.ibm.com/support
Support for IBM System Storage® and IBM TotalStorage products	www.ibm.com/support/

Each PDF publication in the Table 2 on page xx library is also available in the IBM Knowledge Center by clicking the number in the "Order number" column:

Table 2. Storwize V5000 library

Title	Description	Order number
IBM Storwize V5000 Quick Installation Guide	The guide provides instructions for unpacking your order and installing your system. The first chapter describes verifying your order, becoming familiar with the hardware components, and meeting environmental requirements. The second chapter describes installing the hardware and attaching data cables and power cords. The last chapter describes accessing the management GUI to initially configure your system.	

IBM documentation and related websites

Table 3 lists websites that provide publications and other information about the Storwize V5000 or related products or technologies. The IBM Redbooks® publications provide positioning and value guidance, installation and implementation experiences, solution scenarios, and step-by-step procedures for various products.

Table 3. IBM documentation and related websites

Website	Address
IBM Publications Center	ibm.com/shop/publications/order
IBM Redbooks publications	www.redbooks.ibm.com/

Related accessibility information

To view a PDF file, you need Adobe Reader, which can be downloaded from the Adobe website:

www.adobe.com/support/downloads/main.html

IBM Publications Center

The IBM Publications Center is a worldwide central repository for IBM product publications and marketing material.

The IBM Publications Center website offers customized search functions to help you find the publications that you need. You can view or download publications at no charge. Access the IBM Publications Center through the following website:

ibm.com/shop/publications/order

Related websites

The following websites provide information about Storwize V5000 or related products or technologies:

Type of information	Website

Storwize V5000 support	www.ibm.com/support
Technical support for IBM storage products	www.ibm.com/support/
IBM Electronic Support registration	www-01.ibm.com/support/electronicsupport/

Sending your comments

Your feedback is important in helping to provide the most accurate and highest quality information.

To submit any comments about this book or any other Storwize V5000 documentation, send your comments by email to starpubs@us.ibm.com. Include the following information in your email:

- Publication title
- Publication form number
- Page, table, or illustration numbers that you are commenting on
- A detailed description of any information that should be changed

How to get information, help, and technical assistance

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

Information

IBM maintains pages on the web where you can get information about IBM products and fee services, product implementation and usage assistance, break and fix service support, and the latest technical information. For more information, refer to Table 4.

Table 4. IBM websites for help, services, and information

Website	Address
Directory of worldwide contacts	http://www.ibm.com/planetwide
Support for Storwize V5000 (2077 or 2078)	www.ibm.com/support
Support for IBM System Storage and IBM TotalStorage products	www.ibm.com/support/

Note: Available services, telephone numbers, and web links are subject to change without notice.

Help and service

Before calling for support, be sure to have your IBM Customer Number available. If you are in the US or Canada, you can call 1 (800) IBM SERV for help and service. From other parts of the world, see http://www.ibm.com/planetwide for the number that you can call.

When calling from the US or Canada, choose the **storage** option. The agent decides where to route your call, to either storage software or storage hardware, depending on the nature of your problem.

If you call from somewhere other than the US or Canada, you must choose the **software** or**hardware** option when calling for assistance. Choose the **software** option if you are uncertain if the problem involves the Storwize V5000 software or hardware. Choose the **hardware** option only if you are certain the problem solely involves the Storwize V5000 hardware.When calling IBM for service regarding the product, follow these guidelines for the **software** and **hardware** options:

Software option

> Identify the Storwize V5000 product as your product and supply your customer number as proof of purchase. The customer number is a 7-digit number (0000000 - 9999999) assigned by IBM when the product is purchased. Your customer number should be on the customer information worksheet or on the invoice from your storage purchase. If asked for an operating system, use **Storage**.

Hardware option

> Provide the serial number and appropriate 4-digit machine type. For Storwize V5000, the machine type is 2077 or 2078.

In the US and Canada, hardware service and support can be extended to 24x7 on the same day. The base warranty is 9x5 on the next business day.

Getting help online

You can find information about products, solutions, partners, and support on the IBM website.

To find up-to-date information about products, services, and partners, visit the IBM website at www.ibm.com/support.

Before you call

Make sure that you have taken steps to try to solve the problem yourself before you call.

Some suggestions for resolving the problem before calling IBM Support include:
- Check all cables to make sure that they are connected.
- Check all power switches to make sure that the system and optional devices are turned on.
- Use the troubleshooting information in your system documentation. The troubleshooting section of the knowledge center contains procedures to help you diagnose problems.
- Go to the IBM Support website at www.ibm.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Using the documentation

Information about your IBM storage system is available in the documentation that comes with the product.

That documentation includes printed documents, online documents, readme files, and help files in addition to the knowledge center. See the troubleshooting information for diagnostic instructions. The troubleshooting procedure might require you to download updated device drivers or software. IBM maintains pages on the web where you can get the latest technical information and download device drivers and updates. To access these pages, go to www.ibm.com/support and follow the instructions. Also, some documents are available through the IBM Publications Center.

Sign up for the Support Line Offering

If you have questions about how to use and configure the machine, sign up for the IBM Support Line offering to get a professional answer.

The maintenance that is supplied with the system provides support when there is a problem with a hardware component or a fault in the system machine code. At times, you might need expert advice about using a function that is provided by the system or about how to configure the system. Purchasing the IBM Support Line offering gives you access to this professional advice while deploying your system, and in the future.

Contact your local IBM sales representative or your support group for availability and purchase information.

Chapter 1. Before you begin the installation

Before you can begin installing your system, you must unpack and verify your order and make other preparations.

The *Quick Installation Guide* contains a set of instructions to help you unpack and install your system. The guide is divided into three chapters.

1. The steps in Chapter 1, "Before you begin the installation" (the chapter you are now reading) involve verifying your order, becoming familiar with the hardware component terminology, and ensuring that you have met the environmental requirements.
2. The steps in Chapter 2, "Installing the hardware," on page 13 involve installing the hardware and attaching the data cables and power cords.
3. Chapter 3, "Configuring the system," on page 29 helps you create your configuration file and access the management GUI. The management GUI guides you through the initial configuration process.

Important information:

- This guide presumes that you have read the planning information regarding your physical environment that is available from the IBM Knowledge Center for Storwize V5000.
- Ensure that any cables that you are supplying are available for installation.

Installation scenarios

Depending on your order, this documentation steps you through setting up your system for the following scenarios:

- **Setting up a new system that consists of a control enclosure only.** In this case, you are not installing any expansion enclosures.
- **Setting up a new system that consists of a control enclosure and one or more expansion enclosures.**
- **Adding an expansion enclosure to an existing system.** In this case, you initially installed a control enclosure (and, optionally, one or more expansion enclosures). You want to add an expansion enclosure to your existing system. You do not need to power off the system. You can add an expansion enclosure while the system is operational.
- **Adding a control enclosure (either by itself or with one or more expansion enclosures) to an existing system.** You do not need to power off the system. You can add a control enclosure while the system is operational.
- **Setting up a new system that consists of more than one control enclosure.** Install the first control enclosure and then the required expansion enclosures. For each additional control enclosure, complete the setup as if you were adding it to an existing system.

Table 5 on page 2 lists the steps for each scenario.

Table 5. Steps for different installation scenarios

New system (control enclosure only)	New system (control enclosure and one or more expansion enclosures)	Adding expansion enclosures to an existing system	Adding control enclosures and expansion enclosures to an existing system
"Reviewing your packing slip" on page 5	"Reviewing your packing slip" on page 5	"Reviewing your packing slip" on page 5	"Reviewing your packing slip" on page 5
"Identify the hardware components" on page 6	"Identify the hardware components" on page 6	"Identify the hardware components" on page 6	"Identify the hardware components" on page 6
"Verify environmental requirements" on page 11	"Verify environmental requirements" on page 11	"Verify environmental requirements" on page 11	"Verify environmental requirements" on page 11
"Review enclosure location guidelines" on page 11	"Review enclosure location guidelines" on page 11	"Review enclosure location guidelines" on page 11	"Review enclosure location guidelines" on page 11
"Installing the support rails" on page 13	"Installing the support rails" on page 13	"Installing the support rails" on page 13[1]	"Installing the support rails" on page 13[2]
"Installing the enclosures" on page 17	"Installing the enclosures" on page 17	"Installing the enclosures" on page 17[1]	"Installing the enclosures" on page 17[2]
"Connecting Ethernet cables to node canisters" on page 22	"Connecting SAS cables to expansion enclosures" on page 18	"Connecting SAS cables to expansion enclosures" on page 18[1]	"Connecting SAS cables to expansion enclosures" on page 18[1]
"Connecting Fibre Channel cables to a Fibre Channel host interface adapter" on page 24	"Connecting Ethernet cables to node canisters" on page 22	"Powering on the system" on page 27[1]	"Connecting Ethernet cables to node canisters" on page 22[2]
"Powering on the system" on page 27	"Connecting Ethernet cables to node canisters" on page 22	"Adding an expansion enclosure to an existing system" on page 38	Optional: "Connecting Fibre Channel cables to a Fibre Channel host interface adapter" on page 24
Chapter 3, "Configuring the system," on page 29	"Powering on the system" on page 27		"Powering on the system" on page 27
	Chapter 3, "Configuring the system," on page 29		"Adding a control enclosure to an existing system" on page 38
[1]Complete these steps for each expansion enclosure that you add.			
[2]Complete these steps for each control enclosure and expansion enclosure that you add.			

Be familiar with the following information

- See "Caution notices for the Storwize V5000" on page x and "Danger notices for Storwize V5000" on page xiv for a summary of the situations that can be potentially hazardous to you. Before installing, read and understand the following caution and danger statements.
- Use safe practices when lifting. The fully populated enclosure weighs about 26 kg (57 lbs). At least two people are required to lift and install the enclosure into the rack or to remove an enclosure from the rack.

  CAUTION:
  Use safe practices when lifting.

18-32 kg (39.7-70.5 lbs)	32-55 kg (70.5-121.2 lbs)	≥55 kg (≥121.2 lbs)

  (27)

  Also keep in mind that a rack full of equipment is extremely heavy.

  DANGER: Heavy equipment–personal injury or equipment damage might result if mishandled. (D006)

- The following general precautions should be observed, even though the power-on steps differ slightly from the directions that you will follow for this product:

DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

– If IBM supplied a power cord(s), connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.

– Do not open or service any power supply assembly.

– Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.

– The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.

– Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.

– Connect any equipment that will be attached to this product to properly wired outlets.

– When possible, use one hand only to connect or disconnect signal cables.

– Never turn on any equipment when there is evidence of fire, water, or structural damage.

– Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.

– Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

   To disconnect:

   1. Turn off everything (unless instructed otherwise).
   2. Remove the power cords from the outlets.
   3. Remove the signal cables from the connectors.
   4. Remove all cables from the devices.

   To connect:

   1. Turn off everything (unless instructed otherwise).
   2. Attach all cables to the devices.
   3. Attach the signal cables to the connectors.
   4. Attach the power cords to the outlets.
   5. Turn on the devices.

– Sharp edges, corners and joints might be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching. (D005)

Tools needed

A flat-blade screwdriver with a 7 mm (1/4 inch) head is the only tool needed for installation.

Reviewing your packing slip

After you open your shipment, you must verify the contents against the packing slip.

In each box, locate the packing slip. Verify that the items listed in the packing slip match what is in the box, and that any optional items that you ordered are included in the list. Your shipment might contain extra items, depending on the order.

Note: If you purchased your equipment through a reseller, some of the options might be preinstalled. Contact your supplier for details.

Use the following checklist to check off the items in your order as you verify that they are included in your shipment.

__ • Control enclosure or expansion enclosure (Table 6):

Table 6. Storwize V5000 enclosures.

Machine type / model	Warranty	Description
2077-12C	1 year	IBM Storwize V5000 12-slot Control Enclosure for 3.5-inch drives
2077-12E	1 year	IBM Storwize V5000 12-slot Expansion Enclosure for 3.5-inch drives
2077-24C	1 year	IBM Storwize V5000 24-slot Control Enclosure for 2.5-inch drives
2077-24E	1 year	IBM Storwize V5000 24-slot Expansion Enclosure for 2.5-inch drives
2078-12C	3 years	IBM Storwize V5000 12-slot Control Enclosure for 3.5-inch drives
2078-12E	3 years	IBM Storwize V5000 12-slot Expansion Enclosure for 3.5-inch drives
2078-24C	3 years	IBM Storwize V5000 24-slot Control Enclosure for 2.5-inch drives
2078-24E	3 years	IBM Storwize V5000 24-slot Expansion Enclosure for 2.5-inch drives

__ • Rack-mounting hardware kit:

    __ – Two rails (right and left assembly)

    __ – Two rail springs

    __ – Two sets of rail-mount screws and alternative rail-mount pins (large and small) for non-IBM racks

__ • Two power cords for connection to rack-mounted power distribution units

__ • Drive bay blanking plates (installed in the enclosure)

__ • Publications package (includes a USB flash drive that is used to initialize the system)

Options applicable to control enclosures

Note: All options other than cables are preinstalled.

__ • Fibre Channel cables

__ • SAS cables

__ • Drives

__ • Power cords for connection to wall sockets

Options applicable to expansion enclosures

Note: All options other than cables are preinstalled.

__ • Expansion enclosure attachment cables

__ • Drives

__ • Power cords for connection to wall sockets

Identify the hardware components

The following graphics identify the hardware components and port locations for the control enclosure and expansion enclosure on Storwize V5000 systems.

Control enclosure components

Figure 1 shows the rear view of a control enclosure and identifies the location of the power supply units and node canisters.
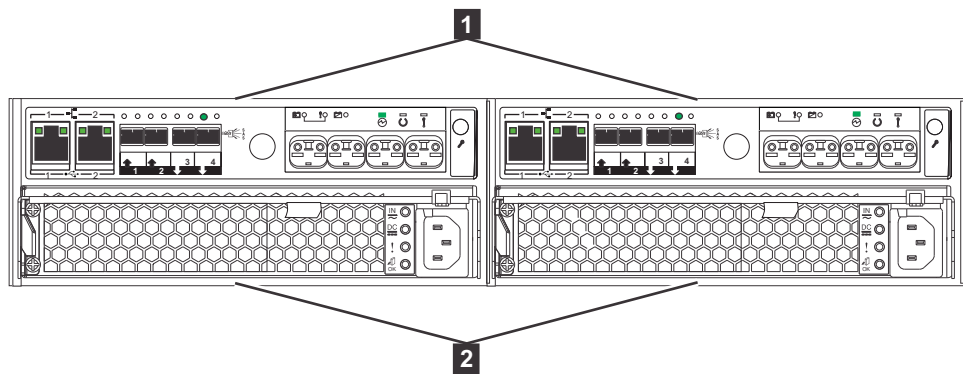
Figure 1. Rear view of a Storwize V5000 control enclosure

Data ports

Figure 2 shows the rear view of a Storwize V5000 control enclosure and identifies the location of the ports.
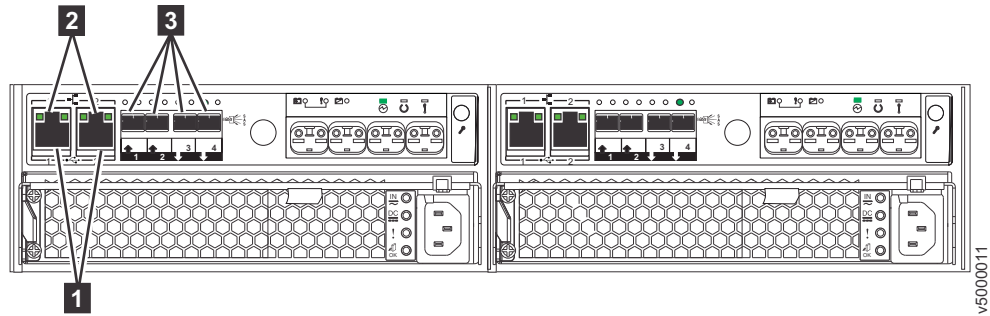
Figure 2. Data ports in the rear of the Storwize V5000 control enclosure

- **1** USB ports. Each canister has two USB ports. One port is used during installation.
- **2** Ethernet ports. Each canister has two 1 Gbps Ethernet ports.

  Port 1 Must be connected for system management. Can optionally be used for iSCSI host connectivity.

  Port 2 Optional. Can be used for iSCSI host connectivity or to provide an alternative (redundant) management address.
- **3** Serial-attached SCSI (SAS) ports. Each canister has four SAS ports. Ports 3 and 4 are optionally used for connecting to expansion enclosures. The other ports are not used.

Control enclosure support rails

The left and right control enclosure support rails (Figure 3 on page 8) are designed specifically for installation of a control enclosure.

- The ledge on the inside of the rails supports the entire length of a control enclosure.
- At the rear end of the control enclosure support rail, the top edge curves over to capture the top edge of an inserted control enclosure. This prevents the installed control enclosure bouncing when the rack is subjected to quake or vibration.
- The control enclosure support rails adjust to fit racks from 685 mm to 765 mm deep, measured between the front and rear rack rails.
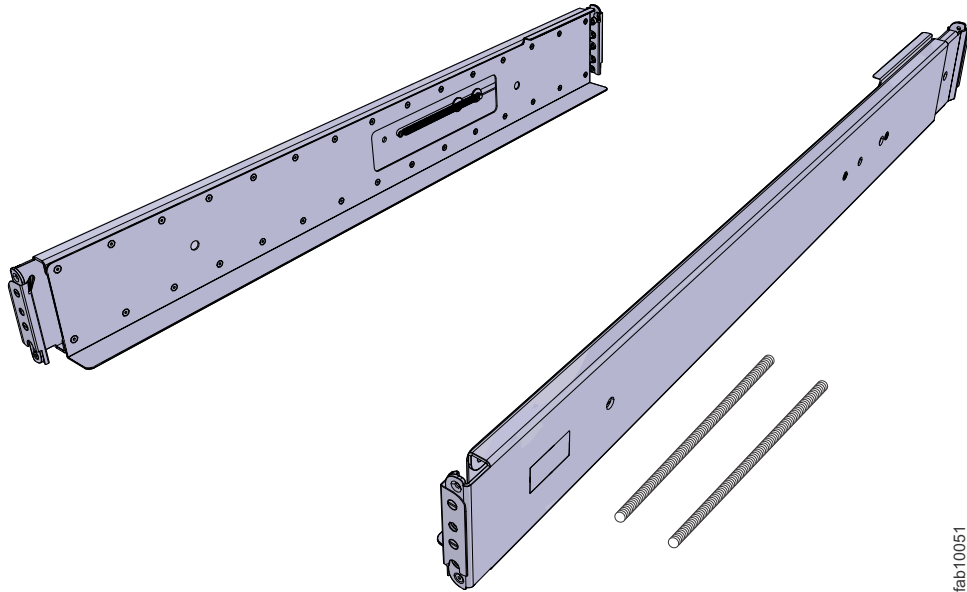
Figure 3. Control enclosure support rails of a Storwize V5000 system

Expansion enclosure components

Figure 4 shows the location of the power supply units and expansion canisters.

*   **1** Expansion canisters
*   **2** Power supply units
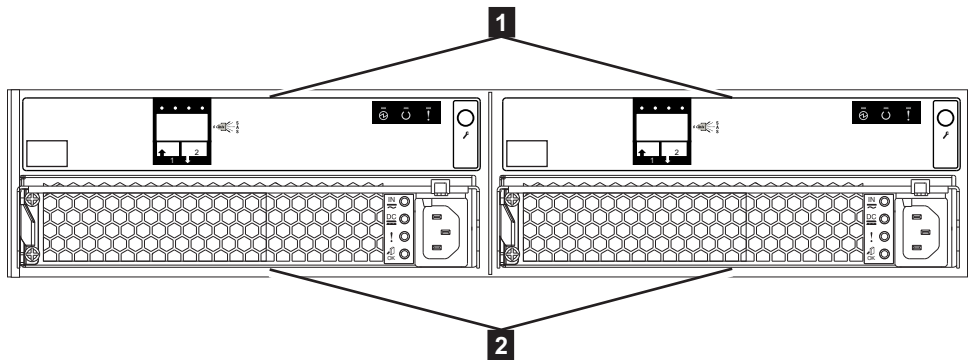
Figure 4. Rear view of a Storwize V5000 expansion enclosure

Figure 5 on page 9 shows the LEDs and SAS port locations from the rear view of an expansion canister.

*   **1** LEDs
*   **2** SAS ports
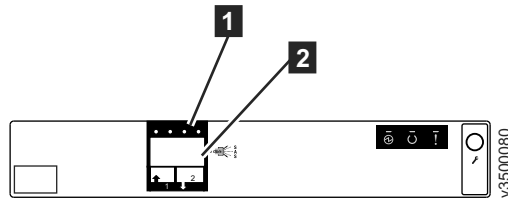
Figure 5. SAS ports and LEDs in rear view of a Storwize V5000 expansion canister

Each canister has two SAS ports that are numbered 1 on the left and 2 on the right. Port 1 is always used. Port 2 is used only if this is not the last enclosure in the chain.

Expansion enclosure support rails

The left and right expansion enclosure support rails (Figure 6) are designed specifically for installation of an expansion enclosure.

- The ledge on the inside of each rail supports the entire length of an expansion enclosure.
- The expansion enclosure support rails capture the left and right rear edges of an inserted expansion enclosure. This prevents the installed control enclosure bouncing when the rack is subjected to quake or vibration.
- The expansion enclosure support rails adjust to fit racks from 595 mm to 755 mm deep, measured between the front and rear rack rails.
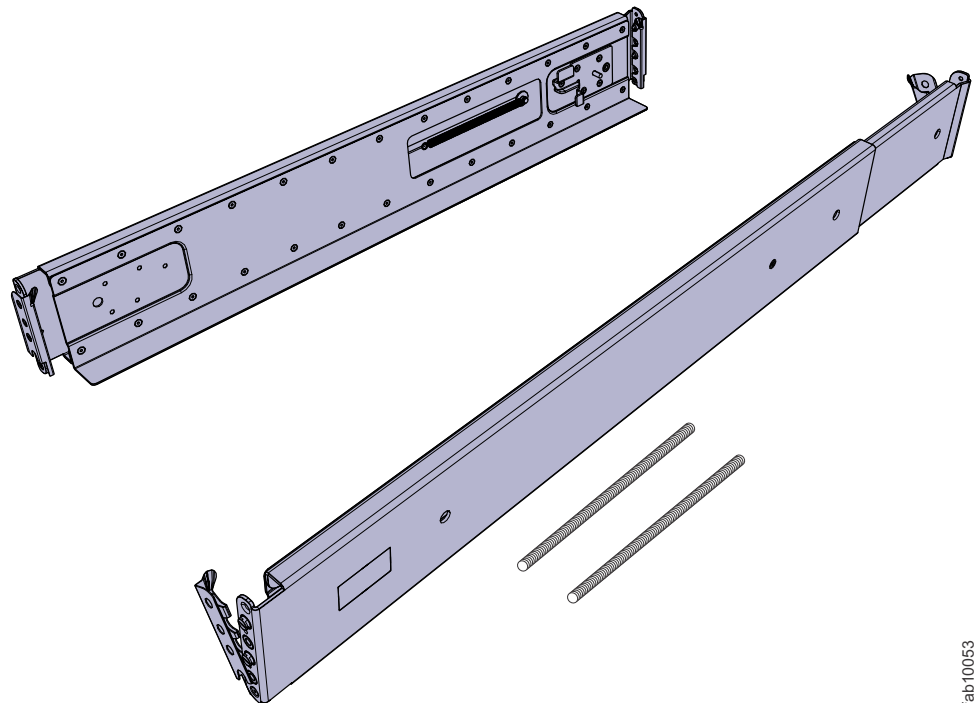
Figure 6. Expansion enclosure support rails on Storwize V5000

Miscellaneous hardware

The USB flash drive (Figure 7) is packaged with the publications and contains the initialization tool for completing the initial system configuration.

svc00646

Figure 7. USB flash drive

Verify environmental requirements

The environmental and electrical requirements for the physical site must be met to ensure that your system works reliably.

Before installing a Storwize V5000 system, you must verify that adequate space in a suitable rack is available. You must also ensure that the requirements for power and environmental conditions are met.

This guide assumes that you have completed the physical planning for the environment of your system. If you have not done the environmental planning for your system, see the "Storwize V5000 physical installation planning" topic in the IBM Knowledge Center for Storwize V5000.

Review enclosure location guidelines

Before you install the enclosures, you must be familiar with these enclosure location guidelines.

Installing a control enclosure only

If you are installing a control enclosure only, follow these guidelines.
- Position the enclosure in the rack so that you can easily view it and access it for servicing.
- Locate the enclosure low enough for the rack to remain stable.
- Ensure that you provide a way for two or more people to install and remove the enclosure.

Installing a control enclosure and one or more expansion enclosures

If you are installing a control enclosure plus one or more expansion enclosures, follow these guidelines.
- Each Storwize V5000 enclosure to be installed requires 2U of rack space.
- Each assembled enclosure weighs more than 18 kg. Provide sufficient space at the front of the rack for two persons to carry the enclosure safely.
- Install all enclosures that constitute one system in contiguous positions in a rack. Place the control enclosure in the middle of the rack.
- Each control enclosure supports connection to up to nine expansion enclosures (four above the control enclosure and five below the control enclosure). If this system installation has fewer than nine expansion enclosures, reserve space directly above and below the system to allow future expansion.
- If a rack is to be only partially filled, install the enclosures low enough for the rack to remain stable and enable easy access to the enclosures for servicing.

Adding an expansion enclosure chain to an existing system

If you are adding an expansion enclosure chain to an existing or Storwize V5030F system, follow these guidelines.
- You do not need to power off the system. You can add an expansion enclosure while the system is operational.
- Add the first expansion enclosure directly below the control enclosure.
- Add the second expansion enclosure directly above the control enclosure.

- Add the third expansion enclosure directly below the first.
- Add the fourth expansion directly above the second, and so on.

Chapter 2. Installing the hardware

After verification that you have all of the hardware components that you require, you can install them.

You completed the initial steps of verifying the shipping contents and becoming familiar with the hardware components. You verified that the power and environmental requirements are met and planned the location of the enclosures. You are now ready to begin installing the hardware components and connecting the data cables and power cords.

Installing the support rails

Before installing an enclosure, you must first install support rails.

Procedure

To install the support rails, complete the following steps.

1. Locate the rack mounting rails and screws (Figure 8). The rail assembly consists of two rails that must be installed in the rack cabinet.
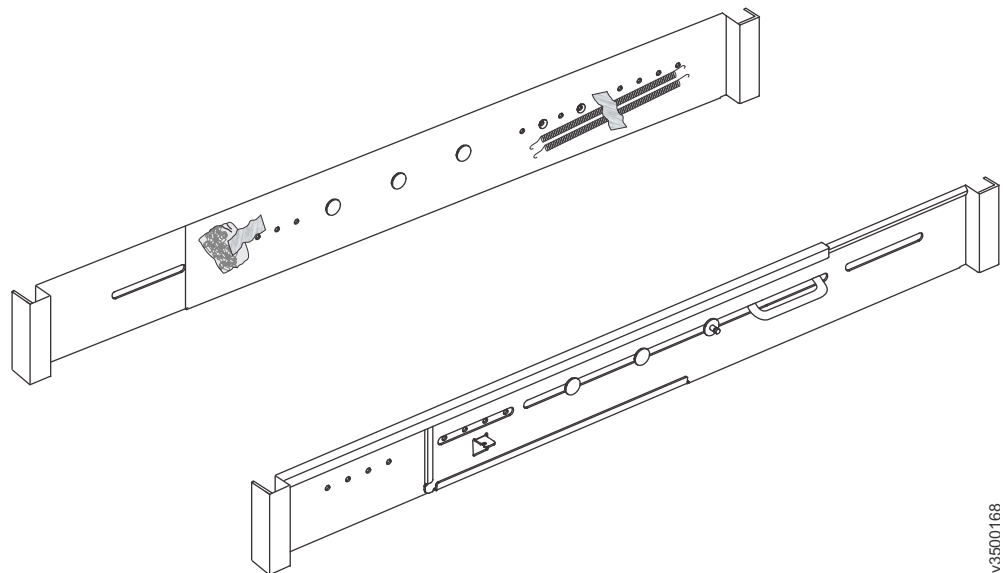
Figure 8. Rack mounting rails and screws

2. Remove the springs that are taped to one of the rails.
3. Attach a spring to the outside of each rail.
   a. Attach the circle end of the spring around the stud on the rail. (See Figure 9 on page 14.)
   b. Pulling on the spring, attach the hook end of the spring to the tab on the rail.
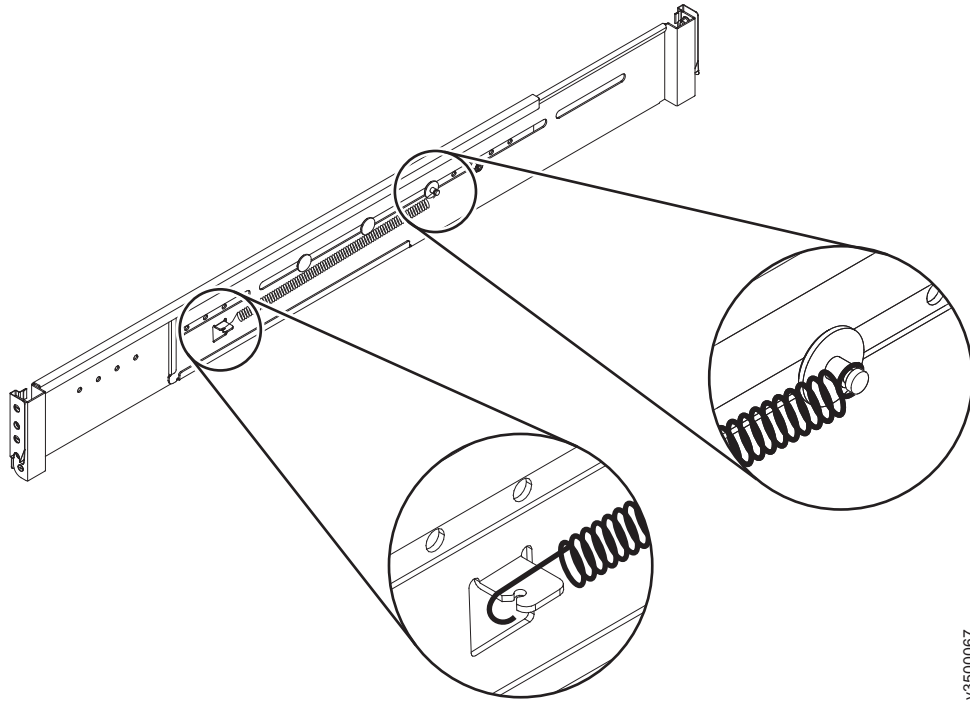
Figure 9. Installing the rail spring

4. Working at the front of the rack cabinet, identify the two standard rack units (2U) of space in the rack into which you want to install the support rails. Figure 10 shows two rack units with the front mounting holes identified.
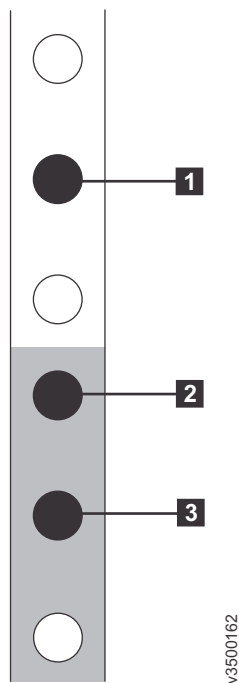
Figure 10. Hole locations in the front of the rack

- **1** Upper rail mounting bracket pin
- **2** Lower rail mounting bracket pin

- • **3** Rack mounting screw hole

5. Ensure that the appropriate bracket pins are installed in the front and rear bracket of each rail. Each rail comes with four medium pins preinstalled (two in the front bracket and two in the rear bracket). Large and small pins are provided separately. Use the pins that are appropriate for the mounting holes in your rack (see Table 7).

Table 7. Selecting bracket pins for your rack

Mounting holes	Bracket pins
Round, unthreaded	Use the preinstalled medium pins.
Round, threaded	Unscrew the medium pins and replace with the smaller pins supplied with the rails.
Square	Unscrew the medium pins and replace with the large pins supplied with the rails.

6. At each end of the rail, grasp the tab **1** and pull *firmly* to open the hinge bracket (see Figure 11).
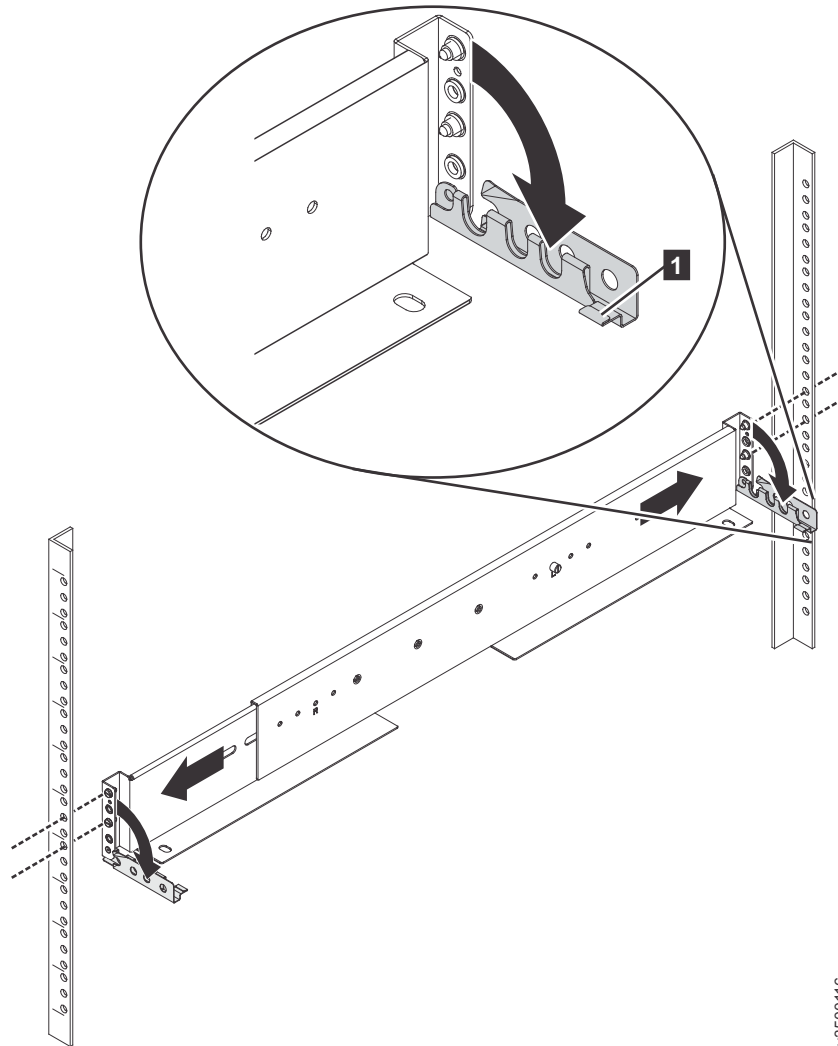
v3500116

Figure 11. Opening the hinge brackets

7. Align the holes in the rail bracket with the holes on the front and rear rack cabinet flanges. Ensure that the rails are aligned on the inside of the rack cabinet.

8. On the rear of the rail, press the two bracket pins into the holes in the rack flanges.

9. Close the rear hinge bracket to secure the rail to the rack cabinet flange. (See Figure 12.)
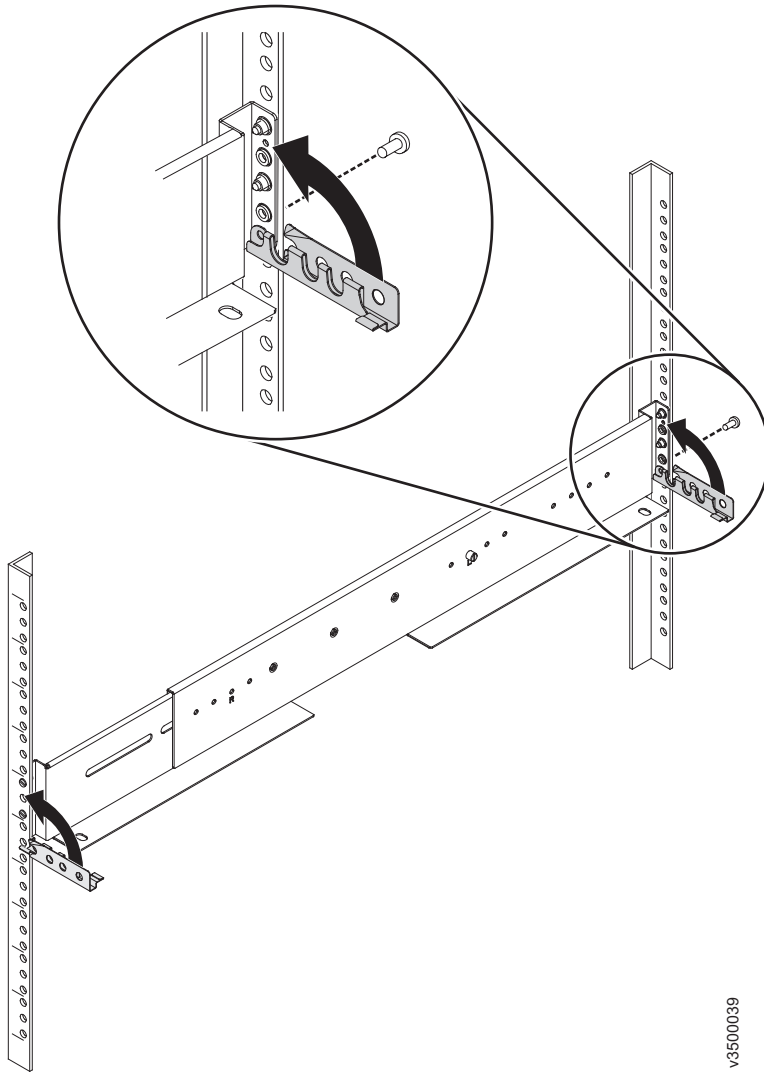
Figure 12. Closing hinge brackets and installing rear screw

10. On the front of the rail, press the two bracket pins into the holes in the rack flanges.

11. Close the front hinge bracket to secure the rail to the rack cabinet flange. (See Figure 12.)

12. Secure the rear of the rail to the rear rack flange with an M5 screw. (See Figure 12.)

13. Repeat the steps to secure the opposite rail to the rack cabinet.

14. Repeat the procedure to install rails for each additional enclosure.

Installing the enclosures

Following your enclosure location plan, install the control enclosure (and optionally, one or more expansion enclosures).

About this task

CAUTION:
- **To lift and install the enclosure into the rack requires at least two people.**
- **Load the rack from the bottom up to ensure rack stability. Empty the rack from the top down.**

Procedure

To install an enclosure, complete the following steps.

1. On either side of the drive assemblies, remove the enclosure end caps by grasping the handle and pulling the bottom of the end cap free, then clearing the tab on the top of the enclosure.
2. Align the enclosure with the front of the rack cabinet.
3. Slide the enclosure into the rack along the rails until the enclosure is fully inserted (see Figure 13).

    Note: The rails are not designed to hold an enclosure that is partially inserted. The enclosure must always be in a fully inserted position.
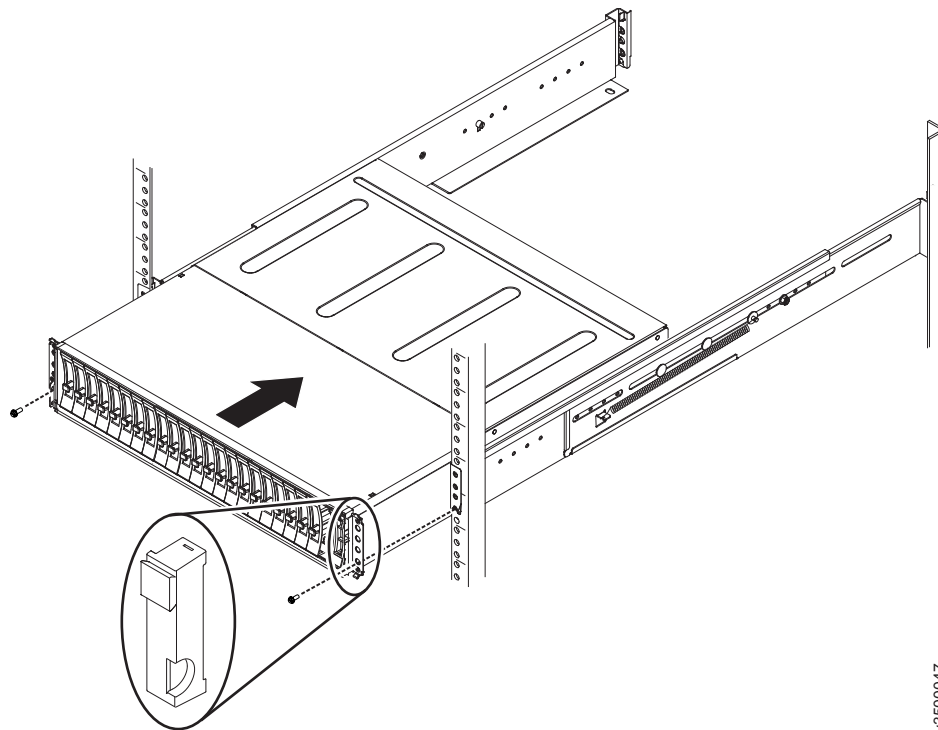
Figure 13. Inserting the enclosure

4. Secure the enclosure with a screw in the rack mounting screw hole.

5. Reinstall the left and right end caps. (See Figure 13 on page 17.) The left end cap has indicator windows that align with the status LEDs (light-emitting diodes) on the edge of the enclosure.

   a. Ensure that the serial number of the end cap matches the serial number on the rear of the enclosure.

   b. Fit the slot on the top of the end cap over the tab on the chassis flange.

   c. Rotate the end cap down until it snaps into place.

   d. Ensure that the inside surface of the end cap is flush with the chassis.

Connecting SAS cables to expansion enclosures

If you have installed expansion enclosures, you must connect them to a control enclosure.

About this task

This task applies if you are installing one or more expansion enclosures. Each control enclosure in the system can manage up to 19 expansion enclosures. A system that contains two control enclosures can have up to 38 expansion enclosures.

Note: When connecting SAS cables between enclosures, you must follow a list of guidelines to ensure that your configuration is valid. Do not begin connecting the cables until you have read "SAS cabling guidelines" on page 19.

Procedure

To install the cables, complete the following steps.

1. Using the supplied SAS cables, connect the control enclosure to the expansion enclosure at rack position 1, as shown in Figure 14 on page 19.

   a. Connect SAS port 4 of the left node canister in the control enclosure to SAS port 1 of the left expansion canister in the first expansion enclosure.

   b. Connect SAS port 4 of the right node canister in the control enclosure to SAS port 1 of the right expansion canister in the first expansion enclosure.
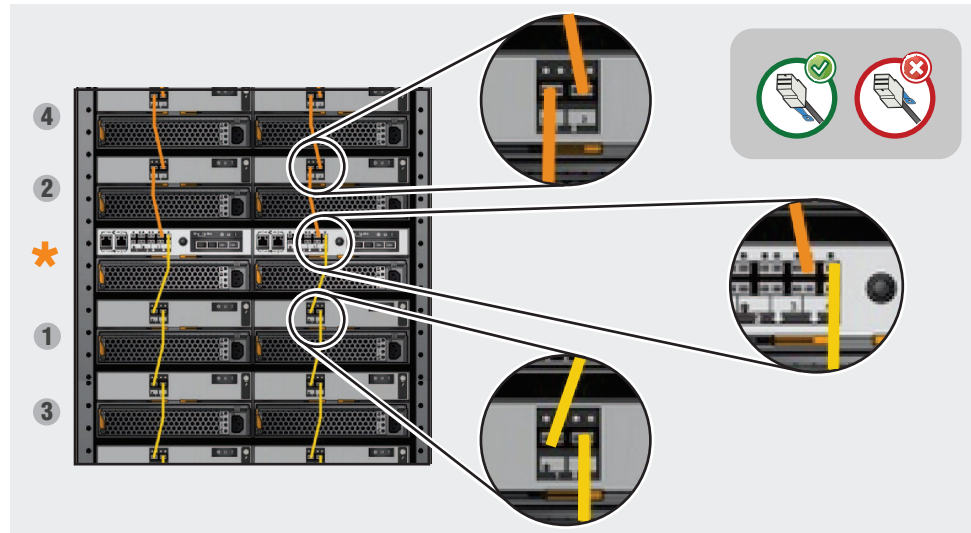
Figure 14. Connecting the SAS cables

2. To add a second expansion chain to the control enclosure, use the supplied SAS cables to connect the control enclosure to the expansion enclosure at rack position 2, as shown in Figure 14 .

   a. Connect SAS port 3 of the left node canister in the control enclosure to SAS port 1 of the left expansion canister in the second expansion enclosure.

   b. Connect SAS port 3 of the right node canister in the control enclosure to SAS port 1 of the right expansion canister in the second expansion enclosure.

3. If more expansion enclosures are installed, connect each one to the previous expansion enclosure in a chain; use two Mini SAS HD to Mini SAS HD cables, as shown in Figure 14 .

   Note: A control enclosure can support up to 19 expansion enclosures (10 above the control enclosure and 9 below the control enclosure).

4. If two control enclosures are installed, repeat this cabling procedure on the second control enclosure and its expansion enclosures.

SAS cabling guidelines

When connecting SAS cables between 2U expansion enclosures, you must follow a list of guidelines to ensure that your configuration is valid.

Orienting the connector

When inserting SAS cables, make sure the connector (Figure 15 on page 20) is oriented correctly.

- The orientation of the connector must match the orientation of the port before you push the connector into the port. The cable connector and socket are keyed, and it is important that you have proper alignment of the keys when the cable is inserted.

- The blue pull tab must be **below** the connector.

- Insert the connector **gently** until it clicks into place. If you feel resistance, the connector is probably oriented the wrong way. Do **not** force it.

- When inserted correctly, the connector can only be removed by pulling the tab.

- When both ends of a SAS cable are inserted correctly, the green link LEDs next to the connected SAS ports are lit.
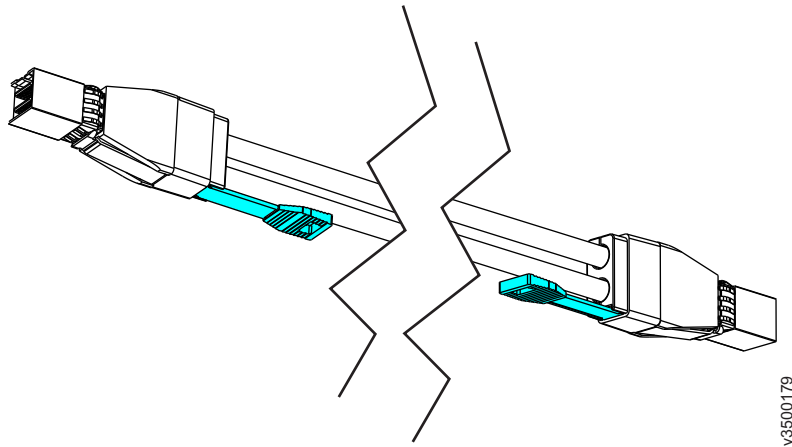
Figure 15. SAS cable connectors

Guidelines

Be aware of the following guidelines when you attach the cables to the SAS ports.
- No more than ten expansion enclosures can be chained to port 3 of a node canister. The expansion enclosures in this chain should be installed below the control enclosure (as shown in Figure 16 on page 21).
- No more than nine expansion enclosures can be chained to port 4 of a node canister. The expansion enclosures in this chain should be installed above the control enclosure (as shown in Figure 16 on page 21).
- No cable can be connected between a port on a left canister and a port on a right canister.
- A cable must not be connected between ports in the same enclosure.
- Port 3 and port 4 of a control enclosure must not be cabled to the same expansion enclosure.
- Port 3 or port 4 of a control enclosure must not be cabled to another control enclosure.
- A connected port on the node canister must connect to a single port on an expansion canister. Cables that split the connector out into separate physical connections are not supported.
- Attach cables serially between enclosures. Do not skip an enclosure.
- Each expansion enclosure is connected into the system by two SAS cables. Three different lengths of SAS cable are available for this purpose. Lengths longer than 0.6 m are typically required to connect enclosures that are not adjacent.
  - 0.6 m (feature code ACTA)
  - 1.5 m (feature code ACTB)
  - 3.0 m (feature code ACTC)
- The last enclosure in a chain must not have cables in port 2 of canister 1 and port 2 of canister 2.
- Ensure that cables are installed in an orderly way to reduce the risk of cable damage when replaceable units are removed or inserted.
- Arrange your cables to provide access to:

– USB ports. USB port access is required when you use a USB flash drive to configure the system.
– The enclosures themselves. Access is required to the hardware for servicing and for two or more people to safely remove and replace components.
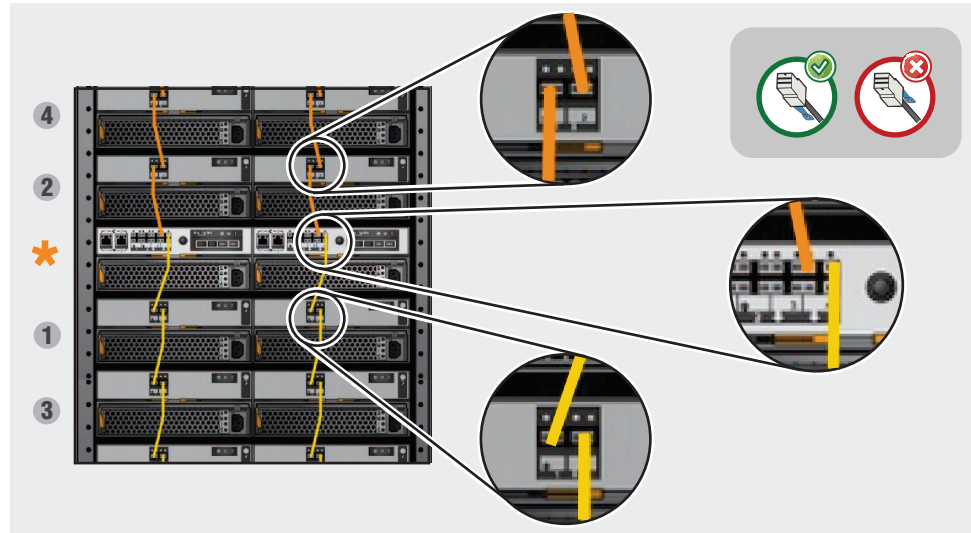
Figure 16. Connecting the SAS cables

Connecting Ethernet cables to node canisters

To provide system management connectivity for your Storwize V5000 system, you must connect Ethernet cables to Ethernet port 1 of each node canister in the control enclosure. This connection can optionally also be used for iSCSI host connection. Ethernet port 2 can optionally be connected to provide a second system management address, a second iSCSI host connection, or both.

Procedure

To install the Ethernet cables, complete the following steps.

1. Connect Ethernet port 1 of each node canister in the system to the IP network that will provide connection to the system management interfaces, as shown in Figure 17. This port can also be used for iSCSI connectivity to the system by hosts on the network. Where more than one control enclosure is present in the system, ensure port 1 of every node canister is connected to the same network to provide access if the configuration node fails.
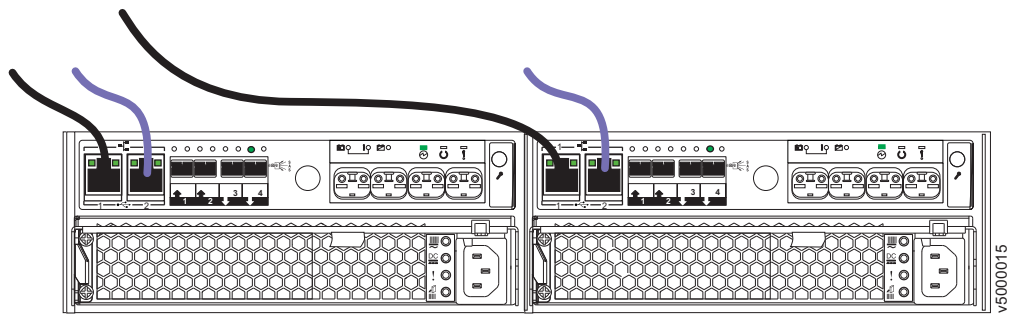
Figure 17. Connecting the Ethernet cables

2. Optionally, connect Ethernet port 2 of each node canister in the system to a second IP network that will provide redundant connection to the system management interfaces, as shown by the lighter cable connection in Figure 17. This port can also be used for iSCSI connectivity to the system by hosts on the network. If there is more than one control enclosure in the system, ensure that port 2 of every node canister is connected to the same network to provide access if the configuration node fails.

3. If a control enclosure is already installed, complete the following steps.

   a. Ensure that the port 1 Ethernet cables on all node canisters in the system are connected to the same Ethernet switch.

   b. Ensure that the port 2 Ethernet cables on all node canisters in the system are connected to the same Ethernet switch.

Connecting Fibre Channel cables to a 10 Gbps iSCSI-FCoE 2-port host interface adapter

If your Storwize V5000 system has 10 Gbps iSCSI-FCoE 2-port host interface adapters installed, you can use Fibre Channel cables to connect them to your 10 Gbps Ethernet or FCoE SAN.

About this task

The Ethernet port numbering on the host interface adapter starts at 3, because Ethernet ports one and two are built into the canister.

Note: The fibre cables are connected in pairs. Both canisters must have the same number of cables connected.

Procedure

To install the cables, complete the following steps.

1. Identify the correct pair of fibre cables for the Ethernet ports that are labeled 3 in the left canister and the right canister.
2. Connect the appropriate cable to each port.
3. For each additional pair of Ethernet ports in the right and left canisters, identify the correct pair of cables and connect them.

Results

Figure 18 shows an example configuration. The figure shows a pair of cables that are connected to port 3 in each canister. Another pair of cables is connected to port 4 in each canister.
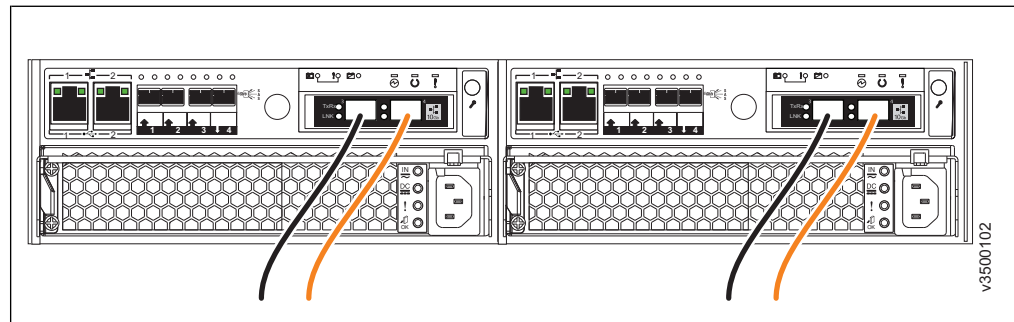
Figure 18. Example configuration with two pairs of cables connected to 10 Gbps iSCSI-FCoE 2-port host interface adapters

Connecting Fibre Channel cables to a Fibre Channel host interface adapter

If your Storwize V5000 system has 8 Gbps Fibre Channel 4-port host interface adapters installed, you can use Fibre Channel cables to connect them to your Fibre Channel SAN.

Procedure

To install the cables, complete the following steps.

1. Connect the required number of Fibre Channel cables. Refer to the "Planning" section of the IBM Knowledge Center for instructions on determining the number of cables required.

   Note: Both canisters must have the same number of cables connected.

   Figure 19 shows an example configuration with two Fibre Channel cables connected to each canister.
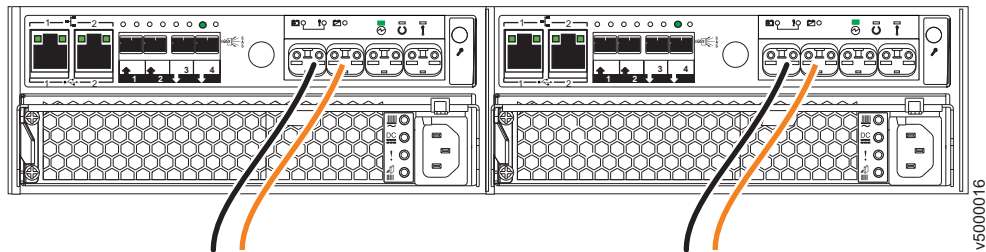
Figure 19. Example configuration with two Fibre Channel cables per canister

2. If you want to connect additional Fibre Channel cables, make sure to connect the same number of cables to each canister. Figure 20 shows an example configuration with four Fibre Channel cables connected to each canister.
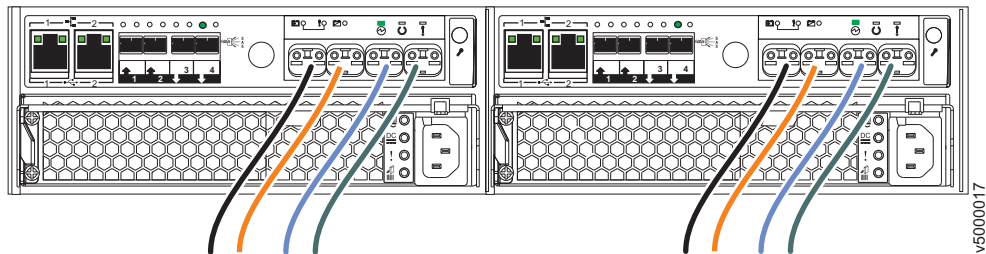
Figure 20. Example configuration with four Fibre Channel cables per canister

3. If a control enclosure is already installed, you can optionally add Fibre Channel connections between all the control enclosures.

   * This involves both the physical installation of the cables and configuring the correct zoning on the Fibre Channel switches.
   * Configure the network so that every node canister has at least two connections to every node canister in a different control enclosure.
   * You must configure the network before you attempt to add a control enclosure to an existing system.

Connecting a control enclosure to a host

When you install a control enclosure, you can connect it to a host with SAS cables. You can use onboard host SAS ports on some models or an optional SAS host interface adapter. Note that onboard SAS host ports are not available on all system models.

About this task

Two types of SAS cables are used for host attachment, depending on the requirements of the host.

- Mini SAS HD to Mini SAS HD (Figure 21)
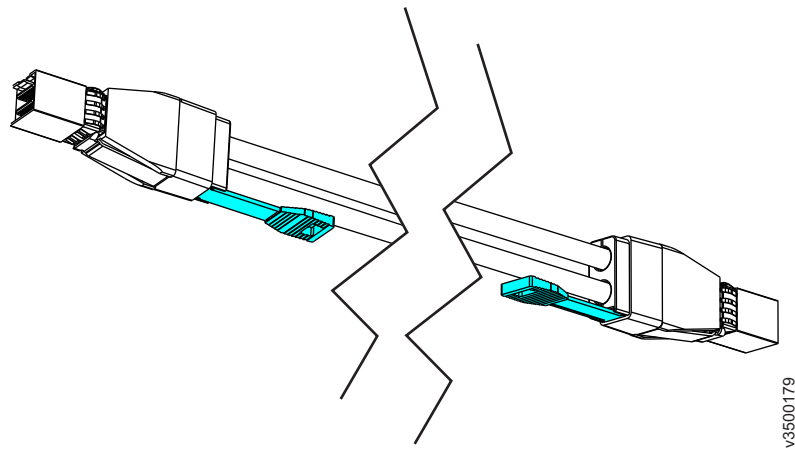
Figure 21. Mini SAS HD to Mini SAS HD cable

- Mini SAS HD to Mini SAS (Figure 22)
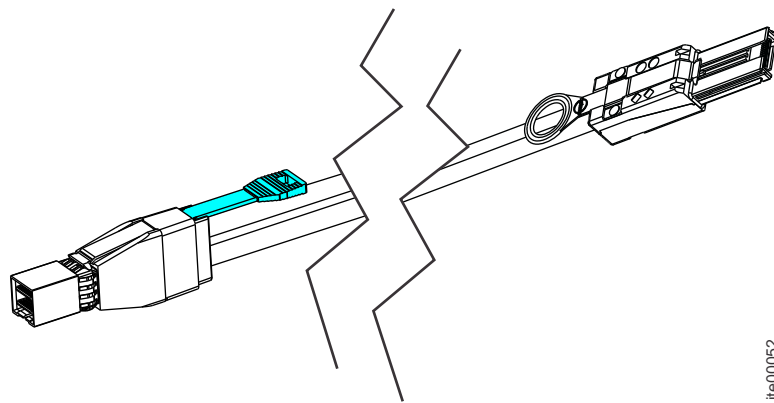
Figure 22. Mini SAS HD to Mini SAS cable

Note: When you insert a SAS cable, make sure that the connector is oriented correctly.

- When you connect cables to the SAS ports on the left side of the node canister, the blue pull tab must be **below** the connector.
- Insert the connector **gently** until it clicks into place. If you feel resistance, the connector is probably oriented the wrong way. Do **not** force it.
- When inserted correctly, the connector can only be removed by pulling the tab.

Procedure

To install the cables, complete the following steps.

1. Connect the required number of SAS cables. Refer to the "Planning" section of the IBM Knowledge Center for instructions on determining the number of cables required.

   Note: When you connect cables to the SAS ports on the left side of the node canister, each host must be connected to **both** canisters. Both canisters must have the **same** number of cables connected.

2. Arrange the cables to provide access to the hardware.
   - **USB ports.** USB port access is required when you use a USB flash drive to configure the system.
   - **The enclosures themselves.** Access is required to the hardware for servicing and for safely removing and replacing components by using two or more people.

Results

Figure 23 shows an example configuration with two SAS cables that are connected to each canister.
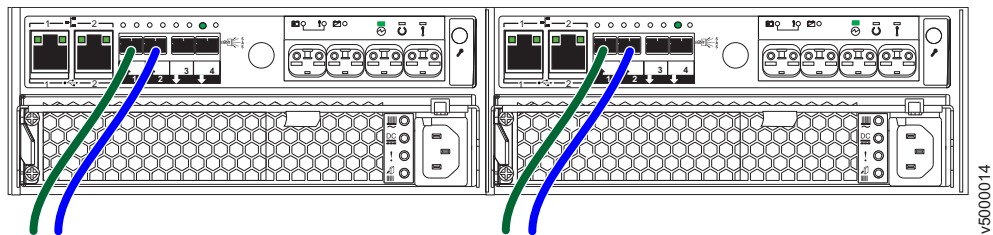
Figure 23. Example configuration with two SAS cables per canister

Powering on the system

After you install all hardware components, you must power on the system and check its status.

About this task

Attention: Do not power on the system with any open bays or slots.
- Every unused drive bay must be occupied by a filler panel.
- Filler panels must be installed in all empty host interface adapter slots.

Open bays or slots disrupt the internal air flow, causing the drives to receive insufficient cooling.

Procedure

To power on the system, complete the following steps.

1. Power on all expansion enclosures. Use the supplied power cords to connect both power supply units of the enclosure to their power sources. If the power sources have circuit breakers or switches, ensure that they are turned on. The enclosure does not have power switches. Repeat this step for each expansion enclosure in the system.

   Note: Each enclosure has two power supply units. To provide power failure redundancy, connect the two power cords to separate power circuits.

2. From the rear of the expansion enclosure, check the LEDs on each expansion canister (see Figure 24).
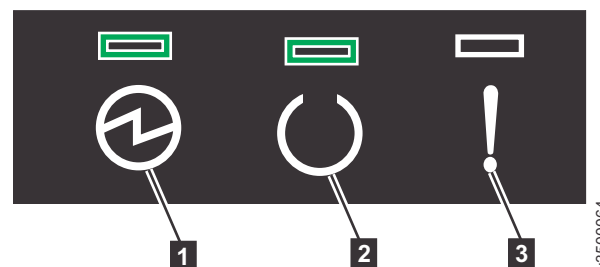
Figure 24. Expansion canister LEDs

   1 Power
   2 Status
   3 Fault

   The canister is ready with no critical errors when **Power** is illuminated, **Status** is on, and **Fault** is off. If a canister is *not* ready, refer to the "Procedure: Understanding the system status using the LEDs" topic in "Troubleshooting".

3. Wait for all expansion canisters to finish powering on.

4. Power on the control enclosure. Use the supplied power cords to connect both power supply units of the enclosure to their power sources. If the power sources have circuit breakers or switches, ensure that they are turned on. The enclosure does not have power switches.

   Note: Each enclosure has two power supply units. To provide power failure redundancy, connect the two power cords to separate power circuits.

5. From the rear of the control enclosure, check the LEDs on each node canister (see Figure 25).
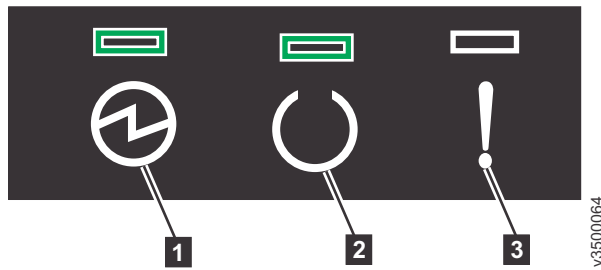
Figure 25. Node canister LEDs

1 Power
2 Status
3 Fault

The canister is ready with no critical errors when **Power** is illuminated, **Status** is flashing, and **Fault** is off. If a canister is *not* ready, refer to the "Procedure: Understanding the system status using the LEDs" topic in "Troubleshooting".

Chapter 3. Configuring the system

Configuring your system is necessary in two situations: when you power up a new system for the first time, and when you add an expansion enclosure to an existing system.

The following instructions use the supplied USB flash drive to initialize the system. If you are not authorized to use a USB flash drive in your situation, refer to the "Troubleshooting" section of the IBM Knowledge Center. This topic describes how to make an Ethernet connection to the enclosure and to initialize the system by using the service assistant GUI.

After initializing the system, you will use the Storwize management GUI to complete the configuration procedures.
- The management GUI requires a supported web browser (see "Checking your web browser settings for the management GUI").
- To configure a new system, you will log on to the management GUI with the default user name and password (see "User name and password for system initialization").

The steps for initializing a new system vary, depending on the operating system of the computer you use for the procedure.
- For Microsoft Windows, refer to "Initializing the system with a Microsoft Windows computer" on page 33.
- For Apple MacOS, refer to "Initializing the system with an Apple Macintosh computer" on page 35.
- For Linux, refer to "Initializing the system with a Linux computer" on page 37.

The steps for adding an expansion enclosure to an existing system are described in "Adding an expansion enclosure to an existing system" on page 38.

The steps for adding a control enclosure to an existing system are described in "Adding a control enclosure to an existing system" on page 38.

Checking your web browser settings for the management GUI

To access the management GUI, you must ensure that your web browser is supported and has the appropriate settings enabled.

Before you begin

The GUI supports the following web browsers:
- Mozilla Firefox 49
- Mozilla Firefox Extended Support Release (ESR) 45
- Microsoft Internet Explorer (IE) 11 and Microsoft Edge
- Google Chrome 54

IBM supports higher versions of the browsers if the vendors do not remove or disable function that the product relies upon. For browser levels higher than the versions that are certified with the product, customer support accepts usage-related

and defect-related service requests. If the support center cannot re-create the issue, support might request the client to re-create the problem on a certified browser version. Defects are not accepted for cosmetic differences between browsers or browser versions that do not affect the functional behavior of the product. If a problem is identified in the product, defects are accepted. If a problem is identified with the browser, IBM might investigate potential solutions or work-arounds that the client can implement until a permanent solution becomes available.

Procedure

To configure your web browser, follow these steps:

1. Enable JavaScript for your web browser.

   For Mozilla Firefox, JavaScript is enabled by default and requires no additional configuration.

   For Microsoft Internet Explorer (IE) 11 and Microsoft Edge running on Microsoft Windows 10, JavaScript is enabled by default and requires no additional configuration.

   For Microsoft Internet Explorer (IE) running on Microsoft Windows 7:

   a. In Internet Explorer, click **Tools** > **Internet Options**.

   b. Click **Security Settings**.

   c. Click **Internet** to choose the Internet zone.

   d. Click **Custom Level**.

   e. Scroll down to the **Scripting** section, and then in **Active Scripting**, click **Enable**.

   f. Click **OK** to close **Security Settings**.

   g. Click **Yes** to confirm the change for the zone.

   h. Click **OK** to close **Internet Options**.

   i. Refresh your browser.

   For Microsoft Internet Explorer (IE) running on Microsoft Windows Server 2008:

   a. In Internet Explorer, click **Tools** > **Internet Options**.

   b. Click **Security**.

   c. Click **Trusted sites**.

   d. On the **Trusted sites** dialog, verify that the web address for the management GUI is correct and click **Add**.

   e. Verify that the correct web address was added to the **Trusted sites** dialog.

   f. Click **Close** on the **Trusted sites** dialog.

   g. Click **OK**.

   h. Refresh your browser.

   For Google Chrome:

   a. On the menu bar in the Google Chrome browser window, click **Settings**.

   b. Click **Show advanced settings**.

   c. In the **Privacy** section, click **Content settings**.

   d. In the **JavaScript** section, select **Allow all sites to run JavaScript**.

   e. Click **OK**.

   f. Refresh your browser.

2. Enable cookies in your web browser.

For Microsoft Internet Explorer (IE) 11 and Microsoft Edge running on Microsoft Windows 10, cookies are enabled by default and require no additional configuration.

For Mozilla Firefox:

a. On the menu bar in the Firefox browser window, click **Tools** > **Options**.

b. On the Options window, select **Privacy**.

c. Set "Firefox will" to **Use custom settings for history**.

d. Select **Accept cookies from sites** to enable cookies.

e. Click **OK**.

f. Refresh the browser.

For Microsoft Internet Explorer:

a. In Internet Explorer, click **Tools** > **Internet Options**.

b. Click **Privacy**. Under **Settings**, move the slider to the bottom to allow all cookies.

c. Click **OK**.

d. Refresh your browser.

For Google Chrome:

a. On the menu bar in the Google Chrome browser window, click **Settings**.

b. Click **Show advanced settings**.

c. In the **Privacy** section, click **Content settings**.

d. In the **Cookies** section, select **Allow local data to be set**.

e. Click **OK**.

f. Refresh your browser.

3. Enable file download on IE 10 and 11 running on Windows 2012.

a. In Internet Explorer, click **Tools** > **Internet Options**.

b. On the Internet Options window, select the **Security** tab.

c. On the **Security** tab, click the **Internet zone**.

d. Click **Custom level** to customize the security level for this zone.

e. Scroll down to **Downloads** and select **Enable** under File download.

f. Click **OK**.

g. Click **Yes** to confirm.

h. Click **OK** to close the Internet Options.

For Microsoft Internet Explorer (IE) 11 and Microsoft Edge running on Microsoft Windows 10, file download is enabled by default and requires no additional configuration.

4. Enable scripts to disable or replace context menus. (Mozilla Firefox only).

For Mozilla Firefox:

a. On the menu bar in the Firefox browser window, click **Tools** > **Options**.

b. On the Options window, select **Content**.

c. Click **Advanced** by the **Enable JavaScript** setting.

d. Select **Disable or replace context menus**.

e. Click **OK** to close the Advanced window.

f. Click **OK** to close the Options window.

g. Refresh your browser.

5. Enable TLS 1.1/1.2 (Microsoft Internet Explorer 9 and 10 only).

For Microsoft Internet Explorer:

a. Open Internet Explorer.

b. Select **Tools** > **Internet Options**.

c. Select the **Advanced** tab.

d. Scroll to the **Security** section.

e. Check the **Use TLS 1.1** and **Use TLS 1.2** checkboxes.

Note: IE 11 and later and Microsoft Edge enable TLS 1.1/1.2 by default.

User name and password for system initialization

During the initialization procedure, you need to log in to the initialization GUI for the system.

The default user name and password for the initialization GUI are listed in the following table.

Table 8. Default user name and password for the initialization GUI

User name	Password
superuser	passw0rd

Note: The 0 character in the password is the number zero, not the letter O.

Initializing the system with a Microsoft Windows computer

To initialize a new system with a Microsoft Windows computer, use the initialization tool that was shipped with your order.

Before you begin

- Begin this procedure *after* you have installed all the enclosures, drives and other options you have purchased.
- You need a Microsoft Windows computer to complete the initialization procedure. The computer must have:
  - A USB port
  - A supported browser

  For best results, the Microsoft Windows computer and the Storwize system must be connected to the same network.

About this task

This procedure is valid for Microsoft Windows 8.1 (64-bit) or Microsoft Windows 7 (64-bit).

- Use this procedure *only* when initializing a new control enclosure (with, optionally, one or more expansion enclosures).
- Do *not* use this procedure when adding an expansion enclosure to an existing system.

Procedure

To initialize the system, complete the following steps.

1. Gather the information you will use to configure the system.
   - You must have the IP network address you will use to manage the system.
     - IP address
     - Subnet mask
     - Gateway
   - Other information is optional, but useful for enabling additional capabilities.
     - The IP address of a Network Time Protocol (NTP) server for automated setting of date and time
     - The IP address of a simple mail transfer protocol (SMTP) server for sending notification of alerts
2. Locate the USB flash drive that was shipped with your order in the documentation package.
3. Insert the USB flash drive into a USB port on the Microsoft Windows computer.
4. To launch the tool, open the USB flash drive. and double-click **InitTool.bat** The initialization tool wizard starts.
5. In the wizard, click **Next** and select **Create a new system**.
6. Follow the on-screen instructions given by the initialization tool. You will be instructed to complete the following actions:
   a. Enter the details of the system management address you need to use.
   b. Connect the USB flash drive to the Storwize system and allow it to initialize.
   c. Connect the USB flash drive to the computer to check that the initialization completed.

7. If the system initialization completed successfully, click **Finish**. If you have a network connection to the Storwize system, the system management GUI is displayed. If the computer does not have a network connection to the Storwize system, go to the computer you will use to manage the system and start a supported browser. Direct the browser to the management address you specified for the system.

8. Log in with user name **superuser** and password **passw0rd**.

   Note: The **0** character in the password is a zero, not the letter O.

9. Follow the on-screen instructions to begin setting up your system.

   Note: The other options that are available in the initialization tool are used to recover the service IP address or the superuser password.

Initializing the system with an Apple Macintosh computer

To initialize a new system with an Apple Macintosh computer, use the initialization tool that was shipped with your order.

Before you begin

- Begin this procedure *after* you have installed all the enclosures, drives and other options you have purchased.
- You need an Apple Macintosh computer to complete the initialization procedure. The computer must have:
  - A USB port
  - A supported browser

  For best results, the Apple Macintosh computer and the Storwize system must be connected to the same network.

About this task

This procedure is valid for Apple MacOS X 10.7.

- Use this procedure *only* when initializing a new control enclosure (with, optionally, one or more expansion enclosures).
- Do *not* use this procedure when adding an expansion enclosure to an existing system.

Procedure

To initialize the system, complete the following steps.

1. Gather the information you will use to configure the system.
   - You must have the IP network address you will use to manage the system.
     - IP address
     - Subnet mask
     - Gateway
   - Other information is optional, but useful for enabling additional capabilities.
     - The IP address of a Network Time Protocol (NTP) server for automated setting of date and time
     - The IP address of a simple mail transfer protocol (SMTP) server for sending notificatication of alerts
2. Locate the USB flash drive that was shipped with your order in the documentation package.
3. Insert the USB flash drive into a USB port on the Apple Macintosh computer.
4. Open a terminal window.
5. Locate the root directory of the USB flash drive. The root directory is usually located in the `/Volumes/` directory.
6. Type: `sh InitTool.sh` The initialization tool wizard starts.
7. In the wizard, click **Next** and select **Create a new system**.
8. Follow the on-screen instructions given by the initialization tool. You will be instructed to complete the following actions:
   a. Enter the details of the system management address you need to use.
   b. Eject the USB flash drive and remove it from the computer.

     c. Connect the USB flash drive to the Storwize system and allow it to initialize.

     d. Connect the USB flash drive to the computer to check that the initialization completed.

9. If the system initialization completed successfully, click **Finish**. If you have a network connection to the Storwize system, the system management GUI is displayed. If the computer does not have a network connection to the Storwize system, go to the computer you will use to manage the system and start a supported browser. Direct the browser to the management address you specified for the system.

10. Log in with user name **superuser** and password **passw0rd**.

    Note: The **0** character in the password is a zero, not the letter O.

11. Follow the on-screen instructions to begin setting up your system.

    Note: The other options in the initialization tool are used to reset the service IP address or the superuser password.

Initializing the system with a Linux computer

To initialize a new system with a Linux computer, use the initialization tool that was shipped with your order.

Before you begin

- Begin this procedure *after* you have installed all the enclosures, drives and other options you have purchased.
- You need a Linux computer to complete the initialization procedure. The computer must have:
    - A USB port
    - A supported browser

    For best results, the Linux computer and the Storwize system must be connected to the same network.

About this task

This procedure is valid for Red Hat Enterprise Server 5 and 6 or Ubuntu desktop 11.04 and 13.10.

- Use this procedure *only* when initializing a new control enclosure (with, optionally, one or more expansion enclosures).
- Do *not* use this procedure when adding an expansion enclosure to an existing system.

Procedure

To initialize the system, complete the following steps.

1. Gather the information you will use to configure the system.
    - You must have the IP network address you will use to manage the system.
        - IP address
        - Subnet mask
        - Gateway
    - Other information is optional, but useful for enabling additional capabilities.
        - The IP address of a Network Time Protocol (NTP) server for automated setting of date and time
        - The IP address of a simple mail transfer protocol (SMTP) server for sending notificatication of alerts
2. Locate the USB flash drive that was shipped with your order in the documentation package.
3. Insert the USB flash drive into a USB port on the Linux computer.
4. Open a terminal window.
5. Locate the root directory of the USB flash drive. It is usually located in the /media/ directory. If an automatic mount system is used, the root directory can be located by typing the **mount** command.
6. Type: **sh InitTool.sh** The initialization tool wizard starts.
7. In the wizard, click **Next** and select **Create a new system**.
8. Follow the on-screen instructions given by the initialization tool. You will be instructed to complete the following actions:
    a. Enter the details of the system management address that you need to use.

b. Connect the USB flash drive to the Storwize system and allow it to initialize.

c. Connect the USB flash drive to the computer to check that the initialization completed.

9. If the system initialization completed successfully, click **Finish**. If you have a network connection to the Storwize system, the system management GUI is displayed. If the computer does not have a network connection to the Storwize system, go to the computer that you will use to manage the system and start a supported browser. Direct the browser to the management address you specified for the system.

10. Log in with user name **superuser** and password **passw0rd**.

   Note: The **0** character in the password is a zero, not the letter O.

11. Follow the on-screen instructions to begin setting up your system.

   Note: The other options that are available in the initialization tool are used to recover the service IP address or the superuser password.

Adding an expansion enclosure to an existing system

When you add an expansion enclosure to an existing system, you must use the management GUI to update the system configuration.

About this task

The management GUI requires a supported web browser (see "Checking your web browser settings for the management GUI" on page 29).

Procedure

To add an expansion enclosure to your system, complete the following steps.

1. Install support rails for the new enclosure.
2. Install the new enclosure in the rack.
3. Connect the expansion enclosure attachment cables.
4. Connect the power cables and wait for the SAS light-emitting diodes (LEDs) to illuminate.
5. Start the management GUI.
6. Go to **Monitoring** > **System**.
7. On the System page, select **Actions** > **Add Enclosures**.
8. Continue to follow the on-screen instructions.

Adding a control enclosure to an existing system

To add a control enclosure to an existing system, you must first install it in the rack. Then, you must connect it to the system through a zone in the SAN.

About this task

The management GUI requires a supported web browser (see "Checking your web browser settings for the management GUI" on page 29).

Note: When you add a control enclosure, do not use the initialization tool or the USB flash drive.

Procedure

To add a control enclosure to an existing system, complete the following steps.

1. Install support rails for the new enclosure.
2. Install the new enclosure in the rack.
3. Connect the canisters to the storage area network. Use Fibre Channel cables to connect the SAN to a 10 Gbps iSCSI-FCoE 2-port host interface adapter (see "Connecting Fibre Channel cables to a 10 Gbps iSCSI-FCoE 2-port host interface adapter" on page 22) or an 8 Gbps Fibre Channel 4-port host interface adapter (see "Connecting Fibre Channel cables to a Fibre Channel host interface adapter" on page 24).
4. Configure the zoning on the SAN switches. The correct zoning provides a way for the Fibre Channel or FCoE ports to connect to each other. If the configuration tool for the SAN switches does not provide details of the worldwide port names (WWPNs), use the service assistant to find them. You can also use the USB flash drive to find the status of the node.
5. Start the management GUI.
6. Go to **Monitoring** > **System**.
7. On the System page, select **Actions** > **Add Enclosures**.
8. Continue to follow the on-screen instructions.

Appendix A. Accessibility features for Storwize V5000

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

Accessibility features

These are the major accessibility features for the Storwize V5000:

- You can use screen-reader software and a digital speech synthesizer to hear what is displayed on the screen. HTML documents have been tested using JAWS version 15.0.
- This product uses standard Windows navigation keys.
- Interfaces are commonly used by screen readers.
- Industry-standard devices, ports, and connectors.

The Storwize V5000 online documentation and its related publications are accessibility-enabled. The accessibility features of the online documentation are described in Viewing information in the information center .

Keyboard navigation

You can use keys or key combinations to perform operations and initiate menu actions that can also be done through mouse actions. You can navigate the Storwize V5000 online documentation from the keyboard by using the shortcut keys for your browser or screen-reader software. See your browser or screen-reader software Help for a list of shortcut keys that it supports.

IBM and accessibility

See the IBM Human Ability and Accessibility Center for more information about the commitment that IBM has to accessibility.

Appendix B. Where to find the Statement of Limited Warranty

The Statement of Limited Warranty is available in both hardcopy format and in the Storwize V5000 IBM Knowledge Center.

The *Statement of Limited Warranty* is included (in hardcopy form) with your product. It can also be ordered from IBM (see Table 2 on page xx for the part number).

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This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device might not cause harmful interference, and (2) this device must accept any interference received, including interference that might cause undesired operation.

Industry Canada compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conform à la norme NMB-003 du Canada.

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Attention: This is a Class A product. In a domestic environment this product might cause radio interference in which case the user might be required to take adequate measures.

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This product is in conformity with the protection requirements of European Union (EU) Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

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European community contact:

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IBM-Allee 1, 71139 Ehningen, Germany
Tele: +49 (0) 800 225 5423 or +49 (0) 180 331 3233
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Germany Electromagnetic Compatibility Directive

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

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Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

People's Republic of China Class A Statement

中华人民共和国"A类"警告声明

声 明
此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

Taiwan Class A compliance statement

警告使用者：
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策。

Taiwan Contact Information

This topic contains the product service contact information for Taiwan.

```
IBM Taiwan Product Service Contact Information:
IBM Taiwan Corporation
3F, No 7, Song Ren Rd., Taipei Taiwan
Tel: 0800-016-888
```

台灣IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路7號3樓
電話：0800-016-888

Japan Voluntary Control Council for Interference Class A statement

This explains the Japan Voluntary Control Council for Interference (VCCI) statement.

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用する
と電波妨害を引き起こすことがあります。この場合には使用者が適切な対策
を講ずるよう要求されることがあります。   VCCI-A

Japan Electronics and Information Technology Industries Association Statement

This statement explains the Japan JIS C 61000-3-2 product wattage compliance.

（一社）電子情報技術産業協会　高調波電流抑制対策実施
要領に基づく定格入力電力値：Knowledge Center を参照

This statement explains the Japan Electronics and Information Technology Industries Association (JEITA) statement for products less than or equal to 20 A per phase.

高周波電流規格　JIS C 61000-3-2 適合品

This statement explains the JEITA statement for products greater than 20 A, single phase.

高周波電流規格　JIS C 61000-3-2 準用品

本装置は、「高圧又は特別高圧で受電する需要家の高調波抑制対策ガイドライン」
対象機器（高調波発生機器）です。
・回路分類　　　：6（単相、ＰＦＣ回路付）
・換算係数　　　：0

This statement explains the JEITA statement for products greater than 20 A per phase, three-phase.

高周波電流規格　JIS C 61000-3-2 準用品

本装置は、「高圧又は特別高圧で受電する需要家の高調波抑制対策ガイドライン」
対象機器（高調波発生機器）です。
・回路分類　　　：5（3相、ＰＦＣ回路付）
・換算係数　　　：0

Korean Electromagnetic Interference (EMI) Statement

This explains the Korean Electromagnetic Interference (EMI) statement.

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서
가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

Russia Electromagnetic Interference Class A Statement

This statement explains the Russia Electromagnetic Interference (EMI) statement.

ВНИМАНИЕ! Настоящее изделие относится к классу А.
В жилых помещениях оно может создавать
радиопомехи, для снижения которых необходимы
дополнительные меры

rusemi

European Contact Information

This topic contains the product service contact information for Europe.

European Community contact:
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Fax: 0049 (0)711 785 1283
Email: mailto: tjahn @ de.ibm.com

Taiwan Contact Information

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Index

Numerics

10 Gbps iSCSI-FCoE 2-port host interface card
    fibre cables   22

A

accessibility   41
    repeat rate
        up and down buttons   41
accessing
    publications   41
air flow   27

B

browsers
    See web browsers

C

Canadian electronic emission notice   48
caution   ix
caution notices   x
comments   xxi
configuration
    web browsers
        settings   29
contact information
    European   51
    Taiwan   50, 51
control enclosure
    adding to an existing system   38
    data ports   7
    installing   17
    location guidelines   11
    power cords   27
cooling   27

D

danger   ix
danger notices   xiv
Deutschsprachiger EU Hinweis   48
disk drives
    large form factor   5
    small form factor   5

E

electronic emission notices
    Deutschsprachiger EU Hinweis   48
    European Union (EU)   48
    Federal Communications Commission (FCC)   47
    Germany   48
    Industry Canada   48

electronic emission notices *(continued)*
    Japanese Voluntary Control Council for Interference (VCCI)   50
    Korean   51
    New Zealand   48
    People's Republic of China   49
    Taiwan   50
EMC statement, People's Republic of China   49
environmental notices   ix, xviii
environmental requirements   11
Ethernet
    cables
        for system management   22
    ports   7
    switch   22
European contact information   51
European Union (EU), EMC Directive conformance statement   48
expansion canister
    data ports   8
    LEDs   27
expansion enclosure
    adding to an existing system   38
    attachment cables   18, 19
    installing   17
    location guidelines   11
    power cords   27

F

FCC (Federal Communications Commission) electronic emission notice   47
Federal Communications Commission (FCC) electronic emission notice   47
feedback   xxi
fibre cables   22
Fibre Channel
    cables   24
Fibre Channel 4-port host interface card   24

G

Germany electronic emission compliance statement   48

H

hardware components
    list   5
help   xxi
homologation statement   47
host attachment cables   25
host interface card
    Fibre Channel 4-port   24

I

IEC 60950-1   ix
information help   xxi
initializing the system
    Apple Macintosh   35
    Linux   37
    Microsoft Windows   33

J

Japanese electronic emission notice   50

K

keyboards
    accessibility features   41
Knowledge Center   xix
Korean electronic emission statement   51

L

labels   ix
LEDs
    expansion canister   27
    node canister   28
location guidelines   11

M

management GUI
    adding a control enclosure   38
    adding an expansion enclosure   38

N

navigation
    accessibility   41
New Zealand electronic emission statement   48
node canister
    Ethernet cables   22
    fibre cables   22
    Fibre Channel cables   24
    LEDs   28
notices   ix
    environmental   ix, xviii
    safety   ix

P

packing slip   5
password   32
People's Republic of China, electronic emission statement   49
power cords   27
powering on the system   27
publications
    accessing   41

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