Quick Installation Guide

Lenovo Storage V3700 V2, V3700 V2 XP and V5030

Note

Before using this information and the product it supports, read the following information:

- The general information in Appendix C "Notices" on page 47
- The information in the "Safety and environmental notices" on page vi
- The information in the *IBM Environmental Notices and User Guide* (provided on a DVD)

Contents

Figures

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Safety and environmental notices

Review the safety notices, environmental notices, and electronic emission notices for Lenovo Storage V series 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 Lenovo Storage V series hardware.
3. Find the matching identification number in the *IBM® Systems Safety Notices*. Then, review the topics concerning the safety notices to ensure that you are in compliance.

Safety notices and labels

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

Systems Safety Notices

This publication contains the safety notices for the 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.

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.

Caution notices for the Lenovo Storage V series

Ensure that you understand the caution notices for the Lenovo Storage V series.

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:
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)**

CAUTION:

- **Rack is not intended to serve as an enclosure and does not provide any degrees of protection required of enclosures.**

- **It is intended that equipment installed within this rack will have its own enclosure. (R005).**

CAUTION:
Tighten the stabilizer brackets until they are flush against the rack. (R006)

CAUTION:
Use safe practices when lifting. (R007)

CAUTION:
Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf. (R008)

CAUTION:
If the rack is designed to be coupled to another rack only the same model rack should be coupled together with another same model rack. (R009)

Danger notices for Lenovo Storage V series

Ensure that you are familiar with the danger notices for Lenovo Storage V series.

⚠️**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 Lenovo supplied a power cord(s), connect power to this unit only with the Lenovo provided power cord. Do not use the Lenovo 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**

> **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)**

Special caution and safety notices

This information describes special safety notices that apply to the Lenovo Storage V series. 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 Lenovo Storage V series system, 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.

  Note: 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 Lenovo Storage V series system, 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 Lenovo Storage V series system 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.

About this guide

This publication provides information that helps you install and initialize Lenovo Storage V series systems.

Who should use this guide

This guide is intended for installers of Lenovo Storage V series 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.

Lenovo Storage V series information center and related publications

Product manuals, other publications, and websites contain information that relates to Lenovo Storage V series systems.

Information center for Lenovo Storage V series

The Lenovo Storage V Series information center content contains all of the information that is required to install, configure, and manage the system. The information collection is available at the following website: http://systemx.lenovofiles.com/help/topic/com.lenovo.storage.v3700.doc/lenovo_vseries.html

Table 1 "Lenovo websites for help, services, and information" on page xii lists websites where you can find help, services, and more information.

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

Website	Address
Support for Lenovo Storage V3700 V2 and Lenovo Storage V3700 V2 XP	http://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/v3700v2/6535
Support for Lenovo Storage V5030	http://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/v5030/6536

Each of the PDF publications in the Table 2 "Lenovo Storage V series library" on page xii is also available by clicking the corresponding "Link":

Table 2. **Lenovo Storage V series** *library*

Title	Description	Link
Quick Installation Guide - Lenovo Storage V3700 V2, V3700 V2 XP and V5030	The guide provides instructions for unpacking your order and installing your system. The first chapter describes how to verify your order, identify hardware components, and meet environmental requirements. The second chapter describes how to install the hardware and attach data cables and power cords. The last chapter describes how to access the management GUI to initially configure your system.	https://download.lenovo.com/pccbbs/thinkservers/v3700v2_v5030_quickinstallguide_eng.pdf
Lenovo Storage V3700 V2 *Installation Poster*	The installation poster provides an illustrated sequence of steps for installing the enclosures in a rack and beginning the setup process for a Lenovo Storage V3700 V2 system.	https://download.lenovo.com/storage/v3700v2_installation_poster_gc27-8597_en.pdf

Table 2. Lenovo Storage V series *library (continued)*

Title	Description	Link
Lenovo Storage V3700 V2 XP *Installation Poster*	The installation poster provides an illustrated sequence of steps for installing the enclosures in a rack and beginning the setup process for a Lenovo Storage V3700 V2 XP system.	https://download.lenovo.com/storage/v3700v2_xp_installation_poster_gc27-8598_en.pdf
Lenovo Storage V5030 *Installation Poster*	The installation poster provides an illustrated sequence of steps for installing the enclosures in a rack and beginning the setup process for a Lenovo Storage V5030 system.	https://download.lenovo.com/storage/v5030_installation_poster_gc27-8599_en.pdf
IBM® Systems Safety Notices	The guide contains translated caution and danger statements. Each caution and danger statement in the Lenovo Storage V series documentation has a number that you can use to locate the corresponding statement in your language in the *IBM® Systems Safety Notices* document.	http://publib.boulder.ibm.com/ infocenter/ systemx/documentation/ topic/ com.lenovo.storage.vseries.doc/ 22990548.pdf
Read First - Lenovo Storage V3700 V2, V3700 V2 XP, V5030	This document introduces the major components of the Lenovo Storage V series system and describes how to get started with the Lenovo Storage V series *Quick Installation Guide*.	https://download.lenovo.com/storage/v3700v2_v5030_read_first.pdf
Safety, Support, and Warranty Information - Lenovo Storage V3700 V2, V3700 V2 XP, V5030	This multilingual document provides information about the Lenovo warranty for machine type 6535	https://download.lenovo.com/storage/v3700v2_v5030_safety_support_warranty_info.pdf
Lenovo License Agreement for Machine Code	This multilingual guide contains the License Agreement for Machine Code for the Lenovo Storage V series products.	https://support.lenovo.com/us/en/solutions/ht101595

Lenovo documentation and related websites

Table 3 "Lenovo documentation and related websites" on page xiii lists websites that provide publications and other information about the Lenovo Storage V series or related products or technologies. The Lenovo Press publications provide positioning and value guidance, installation and implementation experiences, solution scenarios, and step-by-step procedures for various products.

Table 3. Lenovo documentation and related websites

Website	Address
Lenovo Press publications	https://lenovopress.com/storage/san/lenovo

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

Related websites

The following websites provide information about Lenovo Storage V series or related products or technologies:

Type of information	Website
Support for Lenovo Storage V3700 V2 and Lenovo Storage V3700 V2 XP	http://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/v3700v2/6535
Support for Lenovo Storage V5030	http://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/v5030/6536
Lenovo support registration	https://support.lenovo.com

How to get help and technical assistance

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

Help and service

Before calling for support, be sure to have your Lenovo Customer Number available. If you are in the US or Canada, you can call 1 (800) 426-7378 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 **hardware** option when calling for assistance. When calling IBM for service regarding the product, follow these guidelines for the **hardware**:

Software option
Identify the Lenovo Storage V series product as your product and supply your customer number as proof of purchase. The customer number is a 7-digit number (0000000 to 9999999) assigned by Lenovo when the product is purchased. Your customer number should be located 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 Lenovo Storage V3700 V2 and Lenovo Storage V3700 V2 XP, the machine type is 6535. For Lenovo Storage V5030, the machine type is 6536.

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 Lenovo website.

To find up-to-date information about products, services, and partners, visit the following Lenovo Support website:

- http://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/v3700v2/6535
- http://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/v5030/6536

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 Lenovo 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 information center contains procedures to help you diagnose problems.
- To check for technical information, hints, tips, and new device drivers or to submit a request for information, go to the following Lenovo Support website:
    - http://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/v3700v2/6535
    - http://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/v5030/6536

Using the documentation

Information about your Lenovo 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 information center. See the troubleshooting information for diagnostic instructions. The troubleshooting procedure might require you to download updated device drivers or software. Lenovo 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 the following website and follow the instructions:

- http://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/v3700v2/6535
- http://datacentersupport.lenovo.com/us/en/products/storage/lenovo-storage/v5030/6536

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" on page 1 (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 Lenovo Storage V series hardware" on page 13 involve installing the hardware and attaching the data cables and power cords.
3. Chapter 3 "Configuring the system" on page 35 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 Information Center content for Lenovo Storage V series.
- Ensure that any cables that you are supplying are available for installation.

Table 4 "Steps for different installation scenarios for Lenovo Storage V series systems" on page 1 lists the steps for each scenario.

Table 4. Steps for different installation scenarios for **Lenovo Storage V series** *systems*

Table summarizes the steps for different installation scenarios.

New system		Existing system	
Control enclosure only	**Control enclosure and one or more expansion enclosures**	**Adding expansion enclosures**	**Adding a control enclosure and expansion enclosures (Lenovo Storage V5030 only)**
"Reviewing your packing slip" on page 4	"Reviewing your packing slip" on page 4	"Reviewing your packing slip" on page 4	"Reviewing your packing slip" on page 4
"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 10	"Verify environmental requirements" on page 10	"Verify environmental requirements" on page 10	"Verify environmental requirements" on page 10
"Review enclosure location guidelines" on page 10	"Review enclosure location guidelines" on page 10	"Review enclosure location guidelines" on page 10	"Review enclosure location guidelines" on page 10
"Installing support rails for Lenovo Storage V series systems" on page 13	"Installing support rails for Lenovo Storage V series systems" on page 13	"Installing support rails for Lenovo Storage V series systems" on page 13[1]	"Installing support rails for Lenovo Storage V series systems" on page 13[2]
"Installing enclosures for Lenovo Storage V series systems" on page 18	"Installing enclosures for Lenovo Storage V series systems" on page 18	"Installing enclosures for Lenovo Storage V series systems" on page 18[1]	"Installing enclosures for Lenovo Storage V series systems" on page 18[2]

Table 4. Steps for different installation scenarios for Lenovo Storage V series *systems (continued)*

New system		Existing system	
Control enclosure only	**Control enclosure and one or more expansion enclosures**	**Adding expansion enclosures**	**Adding a control enclosure and expansion enclosures (Lenovo Storage V5030 only)**
"Connecting Ethernet cables to node canisters" on page 25	"Connecting SAS cables to expansion enclosures" on page 19	"Connecting SAS cables to expansion enclosures" on page 19[1]	"Connecting SAS cables to expansion enclosures" on page 19[1]
"Connecting Fibre Channel cables to a Fibre Channel host interface adapter" on page 29 "Connecting Fibre Channel cables to a 10 Gbps iSCSI-FCoE 4-port host interface adapter" on page 28	"Connecting Ethernet cables to node canisters" on page 25	"Powering on the system" on page 32[1]	"Connecting Ethernet cables to node canisters" on page 25[2]
"Powering on the system" on page 32	"Connecting Ethernet cables to node canisters" on page 25	"Adding a SAS expansion enclosure to an existing system" on page 40	"Connecting Fibre Channel cables to a Fibre Channel host interface adapter" on page 29
Chapter 3 "Configuring the system" on page 35	"Powering on the system" on page 32		"Powering on the system" on page 32
	Chapter 3 "Configuring the system" on page 35		"Adding a control enclosure to an existing Lenovo Storage V5030 system " on page 40
[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 Lenovo Storage V series" on page vii and "Danger notices for Lenovo Storage V series" on page viii 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. The fully populated enclosure weighs about 37 kg (82 lbs). At least three 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 Lenovo supplied a power cord(s), connect power to this unit only with the Lenovo provided power cord. Do not use the Lenovo 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.

• Table 5 "Lenovo Storage V series control enclosures" on page 5 summarizes the machine types and models of the Lenovo Storage V series control enclosures.

Table 5. Lenovo Storage V series control enclosures

Lenovo Storage V series Model	Machine type / model	Part Number	Warranty	Description
Lenovo Storage V3700 V2	6535-HC1	6535C1D	3 years	12-slot control enclosure for 3.5-inch drives
	6535-HC4	6535C2D	3 years	24-slot control enclosure for 2.5-inch drives
Lenovo Storage V3700 V2 XP	6535-HC2	6535C3D	3 years	12-slot control enclosure for 3.5-inch drives
	6535-HC5	6535C4D	3 years	24-slot control enclosure for 2.5-inch drives
Lenovo Storage V5030	6536-HC3	6536C12	3 years	12-slot control enclosure for 3.5-inch drives
	6536-HC6	6536C22	3 years	24-slot control enclosure for 2.5-inch drives
	6536-HC3	6536C32	5 years*	12-slot control enclosure for 3.5-inch drives
	6536-HC6	6536C42	5 years*	24-slot control enclosure for 2.5-inch drives
Lenovo Storage V5030F	6536-HC6	6536B1F	3 years	24-slot control enclosure for 2.5-inch flash drives
	6536-HC6	6536B2F	5 years*	24-slot control enclosure for 2.5-inch flash drives

Note: * means the warranty year is optional and requires extra pay.

• All Lenovo Storage V series systems support the expansion enclosures that are listed in Table 6 "Lenovo Storage V series expansion enclosures" on page 5.

Table 6. **Lenovo Storage V series** *expansion enclosures*

Lenovo Storage V series Model	Machine type / model	Part Number	Warranty	Description
Lenovo Storage V3700 V2 and Lenovo Storage V3700 V2 XP	6535-HC7	6535N1F	3 years	12-slot expansion enclosure for 3.5-inch drives
	6535-HC8	6535N2F	3 years	24-slot expansion enclosure for 2.5-inch drives

Table 6. Lenovo Storage V series expansion enclosures (continued)

Lenovo Storage V series Model	Machine type / model	Part Number	Warranty	Description
Lenovo Storage V5030	6536-HC7	6536N13	3 years	12-slot expansion enclosure for 3.5-inch drives
	6536-HC8	6536N23	3 years	24-slot expansion enclosure for 2.5-inch drives
	6536-HC7	6536N33	5 years*	12-slot expansion enclosure for 3.5-inch drives
	6536-HC8	6536N43	5 years*	24-slot expansion enclosure for 2.5-inch drives
Lenovo Storage V5030F	6536-HC8	6536B3F	3 years	24-slot expansion enclosure for 2.5-inch flash drives
	6536-HC8	6536B4F	5 years*	24-slot expansion enclosure for 2.5-inch flash drives

Note: * means the warranty year is optional and requires extra pay.

- 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 various racks.
- Two power cords for connection to rack-mounted power distribution units
- Drive bay blanking plates (installed in the enclosure)

Options applicable to control enclosures

- Cache memory upgrade (16 GB for Lenovo Storage V3700 V2 XP and 32 GB for Lenovo Storage V5030)
- Fibre Channel cables
- SAS cables
- Drives
- Power cords for connection to wall sockets
- Four-port 16 Gbps Fibre Channel HBA
- Four-port 10 Gbps Ethernet Adapter (iSCSI, FCoE)
- Four-port 12 Gbps SAS HBA
- Four-port 1 Gbps Ethernet Adapter (iSCSI)

Options applicable to expansion enclosures

- 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 Lenovo Storage V series systems.

The following figures show the rear view of the control enclosures on Lenovo Storage V series systems. The location of the power supply units and node canisters are also shown.

Figure 1 "Lenovo Storage V3700 V2 control enclosure" on page 7 shows the Lenovo Storage V3700 V2 control enclosure.

Figure 1. Lenovo Storage V3700 V2 *control enclosure*

Figure 2 "Lenovo Storage V3700 V2 XP control enclosure" on page 7 shows a rear view of the Lenovo Storage V3700 V2 XP node.

Figure 2. Lenovo Storage V3700 V2 XP *control enclosure*

Figure 3 "Lenovo Storage V5030 control enclosure" on page 7 shows a rear view of the Lenovo Storage V5030 node.

Figure 3. Lenovo Storage V5030 *control enclosure*

The following figures show the rear view of the control enclosures on Lenovo Storage V series systems. The location of the ports are shown.

- **T** Technician port
- **1** Ethernet port 1
- **2** Ethernet port 2
- **2/T** Ethernet port 2/Technician port
- **3** SAS ports

Figure 4 "Data ports on the rear of the Lenovo Storage V3700 V2 control enclosure" on page 8 shows the Lenovo Storage V3700 V2 control enclosure.
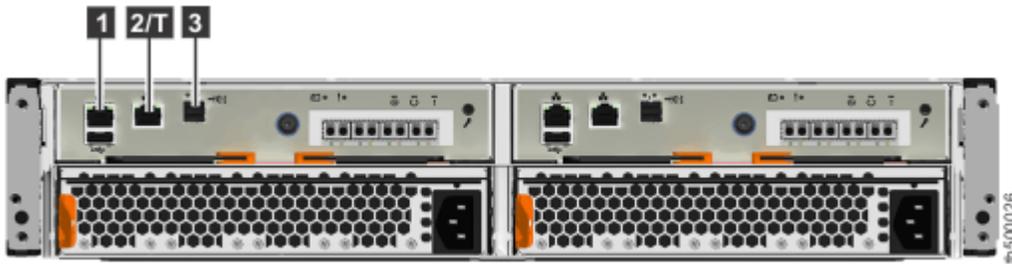
Figure 4. Data ports on the rear of the Lenovo Storage V3700 V2 *control enclosure*

Figure 5 " Data ports on the rear of the Lenovo Storage V3700 V2 XP control enclosure" on page 8 shows the data ports on the back of the Lenovo Storage V3700 V2 XP node.
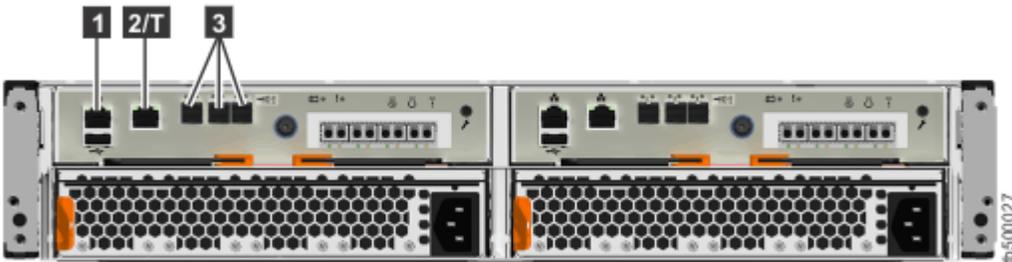
Figure 5. Data ports on the rear of the Lenovo Storage V3700 V2 XP *control enclosure*

Figure 6 " Data ports on the rear of the Lenovo Storage V5030 control enclosure" on page 8 shows the data ports on the back of a Lenovo Storage V5030 node.

Figure 6. Data ports on the rear of the Lenovo Storage V5030 *control enclosure*

Expansion enclosure components

Figure 7 "Rear view of a Lenovo Storage V series expansion enclosure" on page 9 shows the location of the power supply units and expansion canisters.

- **1** Expansion canisters
- **2** Power supply units
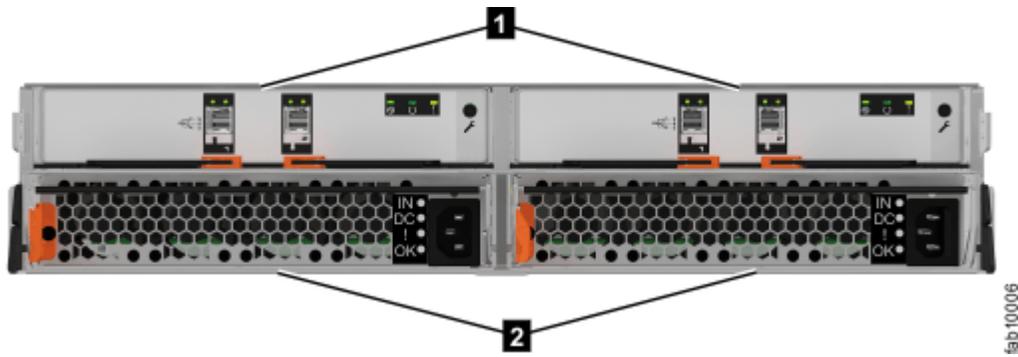
Figure 7. Rear view of a Lenovo Storage V series expansion enclosure

Figure 8 "SAS ports and LEDs in rear view of a Lenovo Storage V series expansion canister" on page 9 shows the LEDs and SAS port locations from the rear view of an expansion canister.

- **1** LEDs
- **2** SAS ports

Each canister has two SAS ports that are numbered 1 on the left and 2 on the right. Port 1 is used to connect to a SAS expansion port on a node canister or port 2 of another expansion canister.
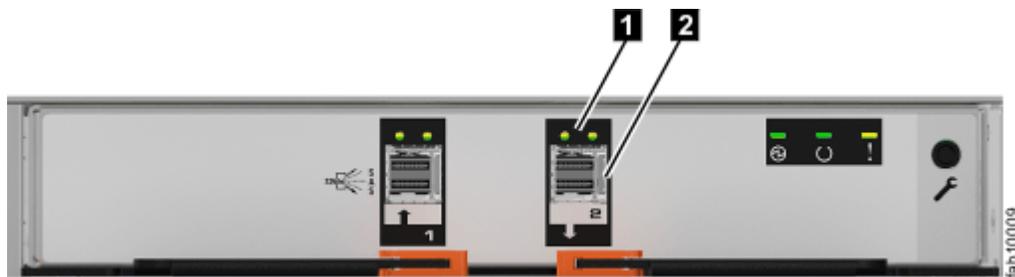
Figure 8. SAS ports and LEDs in rear view of a Lenovo Storage V series expansion canister

Support rails and enclosures

Lenovo Storage V series systems use the same rails and enclosures for both control and expansion enclosures. All Lenovo Storage V series models use the same expansion enclosure.

- The ledge on the inside of each rail supports the entire length of an enclosure.
- The enclosure support rails capture the left and right rear edges of an inserted enclosure. This prevents the installed enclosure bouncing when the rack is subjected to quake or vibration.
- The enclosure support rails adjust to fit racks from 595 mm to 755 mm deep, measured between the front and rear rack rails.
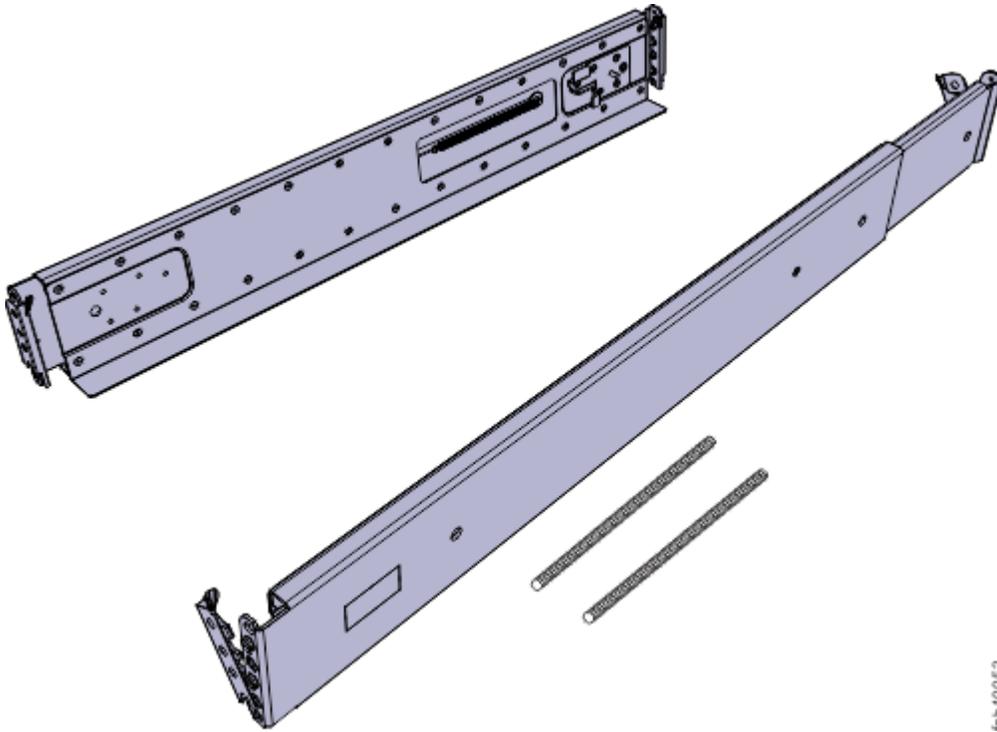
Figure 9. Enclosure support rails on Lenovo Storage V series

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 Lenovo Storage V series 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 "Lenovo Storage V series physical installation planning" topic in the Information Center for Lenovo Storage V series. The topic is available at: http://systemx.lenovofiles.com/help/topic/com.lenovo.storage.v3700.doc/svc_installplan_22qgvs.html

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 Lenovo Storage V series 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.
- Lenovo Storage V3700 V2 and Lenovo Storage V3700 V2 XP control enclosures systems can support up to 9 expansion enclosures on one chain. Lenovo Storage V5030 systems can support two chains and each chain can support up to 10 expansion enclosures.
- 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 Lenovo Storage V5030 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 Lenovo Storage V series 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.

NEBS-compliant earth connection

When you install enclosures into a Network Equipment-Building System (NEBS) compliant installation, each enclosure must have a reliable electrical earth connection that is separate to any earth connections provided by power supply cables.

On Lenovo Storage V series enclosures, this connection is made by using the front enclosure mounting screws that are part of the standard installation described in "Installing support rails for Lenovo Storage V series systems" on page 13 and "Installing enclosures for Lenovo Storage V series systems" on page 18. To provide a reliable electrical earth connection, the upright mounting rails of the racks into which enclosures are installed must meet the following requirements before installing the support rails and enclosures:

- Upright mounting rails must not be painted, oxidized or otherwise insulated from the enclosure flanges and mounting rails. If paint, oxidization or other insulation is present, it must be removed and the metal must be brought to a bright, non-corroding finish.

- Upright mounting rails must have their own NEBS-compliant connection to earth, independent of the earth connections provided by any power supply cables.

  1. If the Lenovo Storage V series system is required to be NEBS-compliant, some system configuration settings must be made. For details, see "Configuring a Lenovo Storage V series system to be NEBS-compliant" on page 39.

  2. For more information about Lenovo Storage V series configuration guidelines and restrictions, see the following website:
     https://support.lenovo.com/us/en/solutions/ht505190

  3. If a Lenovo Storage V series system is clustered with a Lenovo Storage V series system, NEBS compliance cannot be enabled. NEBS compliance is not supported on Lenovo Storage V series systems.

Installing support rails for Lenovo Storage V series systems

Lenovo Storage V series systems use the same rails for control and expansion enclosures. Before you install a control or expansion enclosure, you must first install the support rails for it.

Note: For NEBS compliant installations, more requirements are placed on the rack into which the support rails and enclosures are to be installed. Before you proceed, ensure that the rack meets the requirements that are listed in NEBS-compliant earth connection.

To install the support rails for an enclosure, complete the following steps.

Step 1. Locate the control enclosure rails (Figure 10 "Control enclosure support rails" on page 14).The rail assembly consists of two rails that must be installed in the rack cabinet.
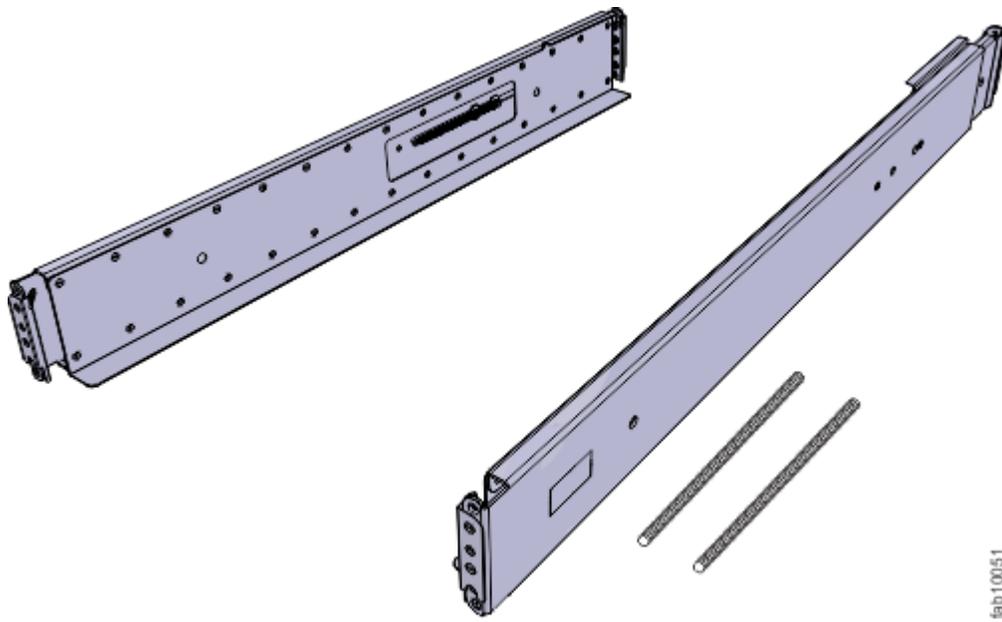
Figure 10. Control enclosure support rails

Step 2. Install a spring on each rail.

    a.   Extend the rail to its full length.

    b.   Push one looped end of a spring over one stud on the inside of the rail. (See Figure 11 "Installing the rail spring" on page 15.)

    c.   Stretch the spring slightly and push the other looped end of the spring onto the other stud on the inside of the rail.
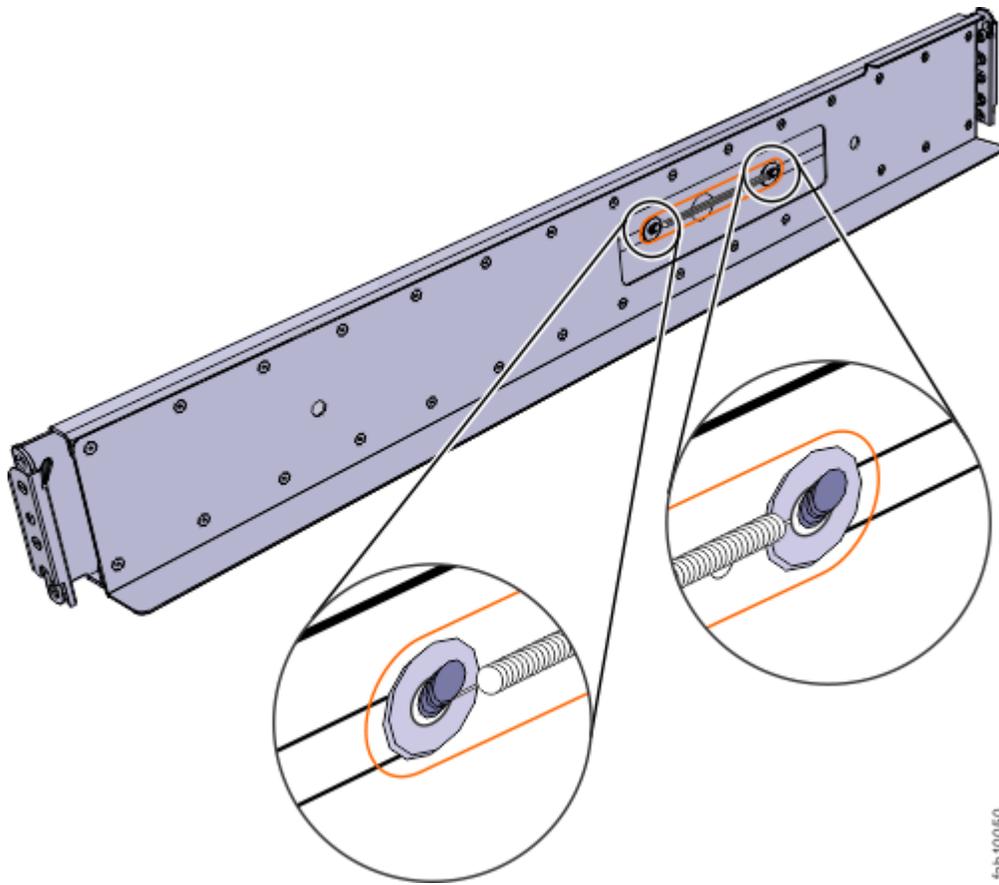
Figure 11. Installing the rail spring

Step 3.   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 12 "Hole locations in the front of the rack" on page 16 shows two rack units with the front mounting holes identified.
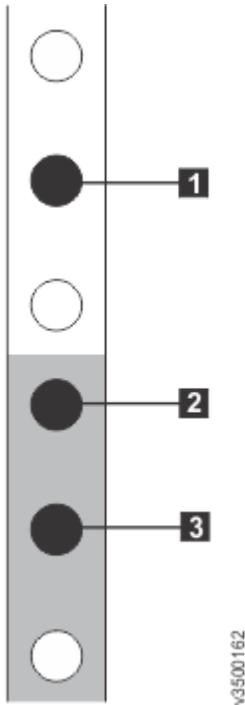
Figure 12. Hole locations in the front of the rack

- **1** Upper rail-mounting bracket pin
- **2** Lower rail-mounting bracket pin
- **3** Rack mounting screw hole

Step 4.   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 "Selecting bracket pins for your rack" on page 16).

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.

Step 5.   At each end of the rail, grasp the tab and pull *firmly* to open the hinge bracket. (See Figure 13 "Opening the hinge brackets" on page 17.)
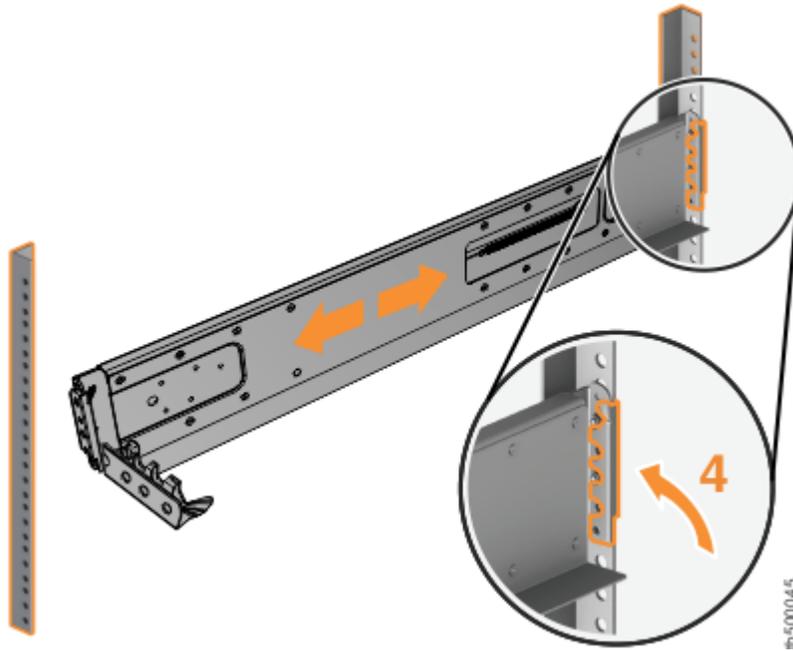
Figure 13. Opening the hinge brackets

Step 6. 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.

Step 7. On the rear of the rail, press the two bracket pins into the holes in the rack flanges.

Step 8. Close the rear hinge bracket to secure the rail to the rack cabinet flange. (See Figure 14 "Closing the hinge brackets" on page 17.)
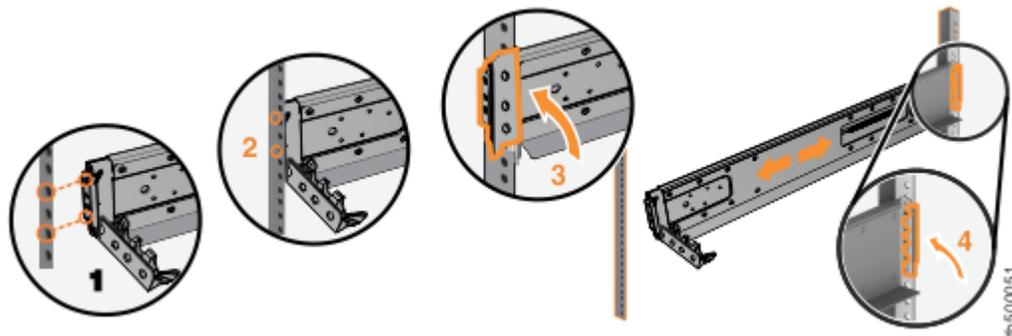
Figure 14. Closing the hinge brackets

Step 9. On the front of the rail, press the two bracket pins into the holes in the rack flanges.

Step 10. Close the front hinge bracket to secure the rail to the rack cabinet flange. Figure 14 "Closing the hinge brackets" on page 17 shows an example.

Step 11. Secure the rear of the rail to the rear rack flange with an M5 screw.

Step 12. Repeat the steps to secure the opposite rail to the rack cabinet.

Step 13. Repeat the procedure to install rails for each additional control enclosure.

Installing enclosures for Lenovo Storage V series systems

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

Note: For NEBS-compliant installations, more requirements are placed on the rack into which the support rails and enclosures are to be installed. Before you proceed, ensure that the rack meets the requirements that are listed in "NEBS-compliant earth connection" on page 13.

CAUTION:

- **To lift and install the enclosure into the rack requires at least two people.**
- **To lift a control enclosure with drives installed requires at least three people.**
- **Load the rack from the bottom up to ensure rack stability. Empty the rack from the top down.**

To install an enclosure, complete the following steps.

Step 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.(See Figure 15 "Removing enclosure end caps" on page 18.)
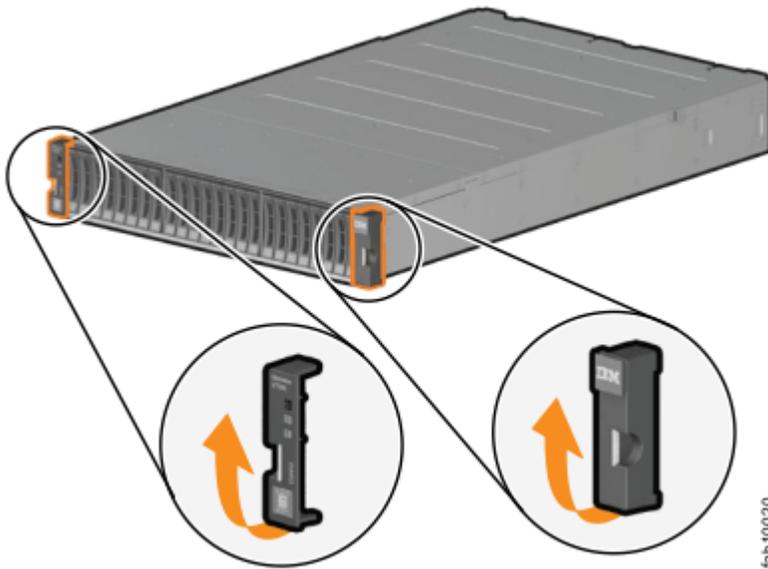
Figure 15. Removing enclosure end caps

Step 2. Align the enclosure with the front of the rack cabinet.

Step 3. Carefully slide the enclosure into the rack along the rails until the enclosure is fully inserted (see Figure 16 "Inserting the enclosure" on page 19).

   Note: The rails are not designed to hold an enclosure that is partially inserted. The enclosure must always be in a fully inserted position.
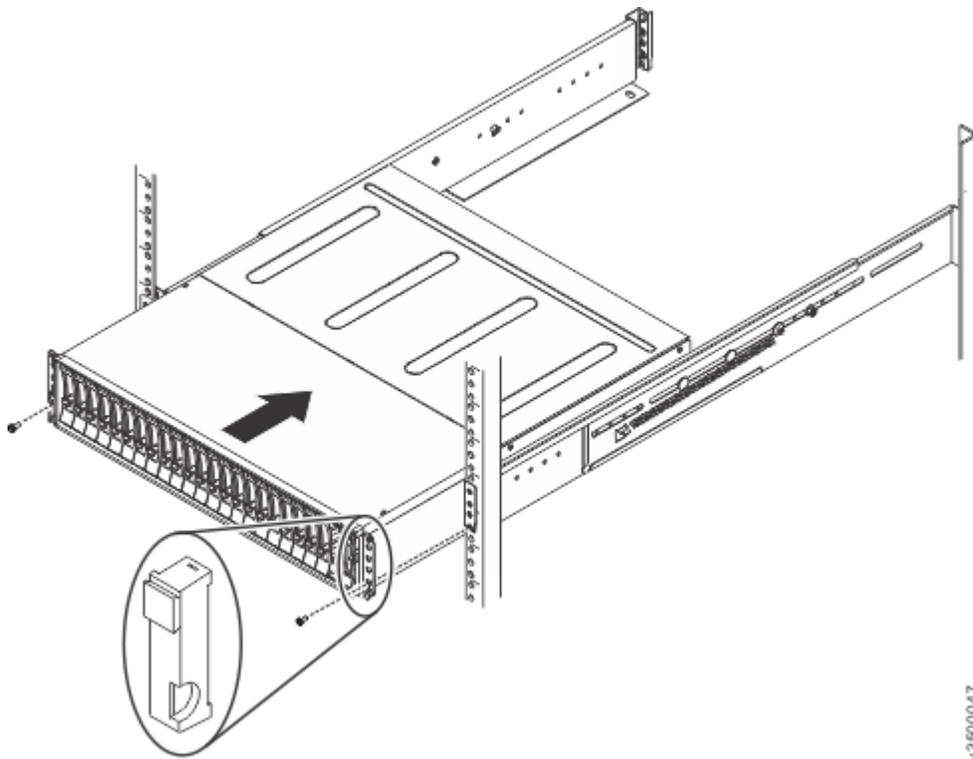
Figure 16. Inserting the enclosure

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

Step 5.   Reinstall the left and right end caps.(See Figure 16 "Inserting the enclosure" on page 19.) 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.

This task applies if you are installing one or more expansion enclosures.

The number of SAS chains and enclosures varies per each type of system, as shown in Table 8 "Summary of SAS chains and enclosures" on page 20.

Table 8. Summary of SAS chains and enclosures

System	Expansion ports	Number of SAS chains supported	Control enclosures per system	Expansion enclosures per chain	Maximum Number of Enclosures
Lenovo Storage V3700 V2 and Lenovo Storage V3700 V2 XP	Port 1 only	1	1	9	10
Lenovo Storage V5030	Port 1 and Port 2	2	1	10	21

Each set of expansion enclosures is connected together sequentially through the IN and OUT SAS ports, forming a chain with a control enclosure at the end of the chain.

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 24.

To install the cables, complete the following steps.

Step 1. Using the supplied SAS cables, connect the control enclosure to the expansion enclosure at rack position 1, as shown in the following figures.

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

Figure 17 "Connecting the SAS cables to a Lenovo Storage V3700 V2 system" on page 21 shows how to connect SAS cables on a Lenovo Storage V3700 V2 system.
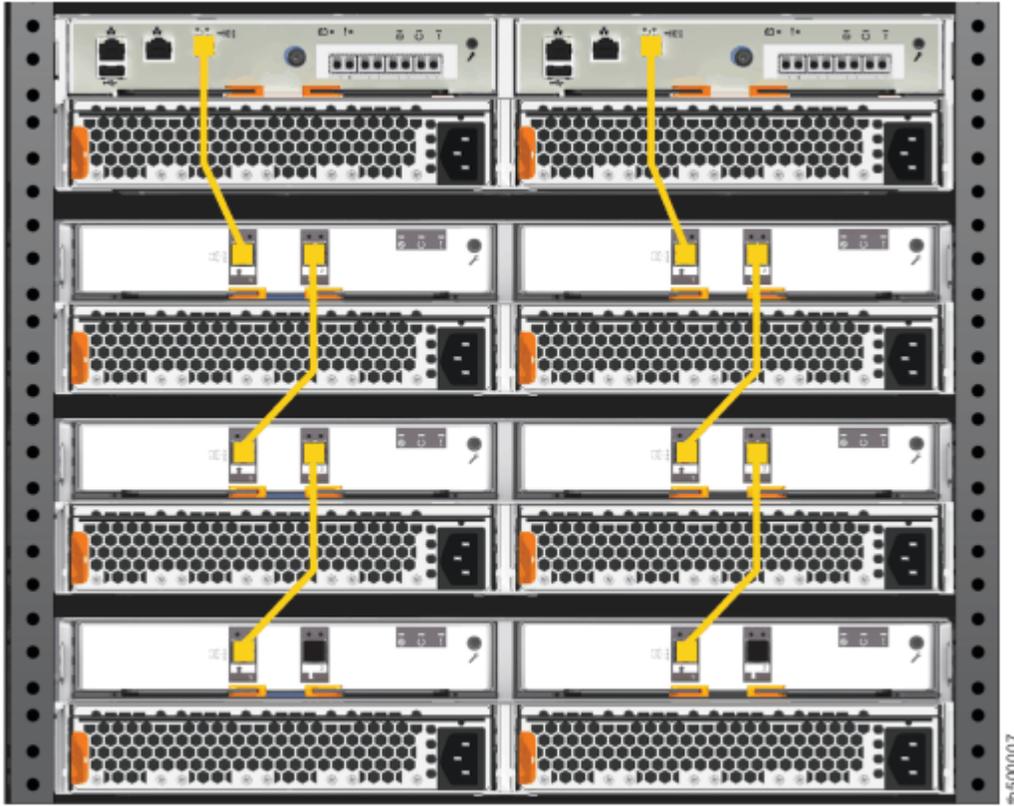
Figure 17. Connecting the SAS cables to a Lenovo Storage V3700 V2 *system*

Figure 18 "Connecting the SAS cables to a Lenovo Storage V3700 V2 XP system" on page 22 shows how to connect SAS cables on a Lenovo Storage V3700 V2 XP system.
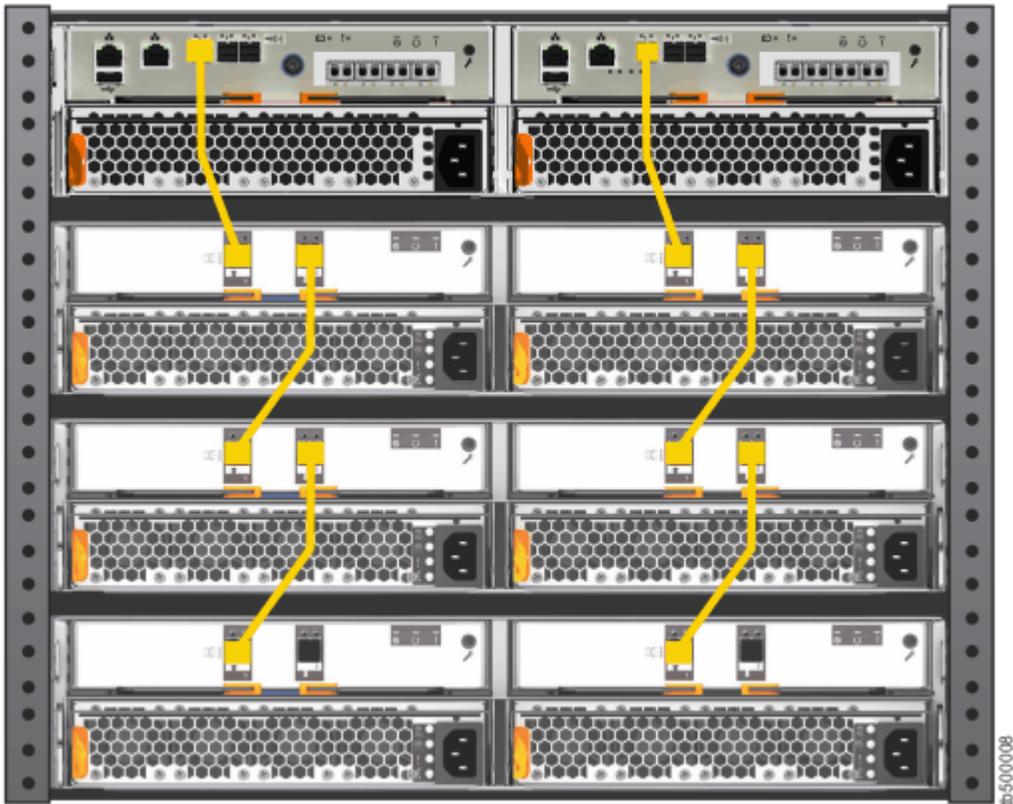
Figure 18. Connecting the SAS cables to a Lenovo Storage V3700 V2 XP *system*

Figure 19 "Connecting the SAS cables to a Lenovo Storage V5030 system" on page 23 shows how to connect SAS cables on a Lenovo Storage V5030 system. In this figure, two expansion chains are connected to the Lenovo Storage V5030 system.
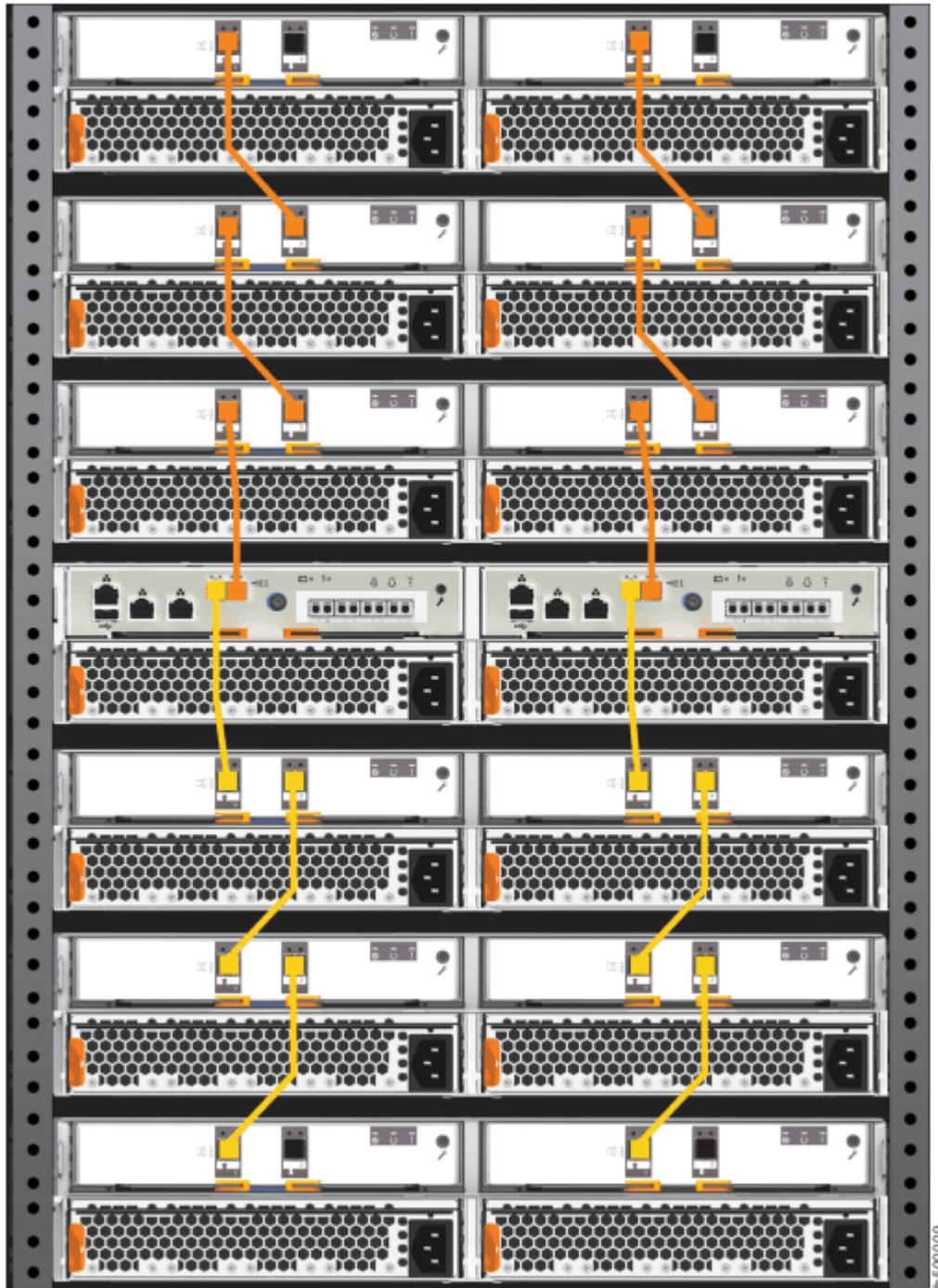
Figure 19. Connecting the SAS cables to a Lenovo Storage V5030 *system*

Step 2.   To add a second expansion chain to the Lenovo Storage V5030 control enclosure, use the supplied SAS cables to connect the control enclosure to the expansion enclosure at rack position 2, as shown in Figure 19 "Connecting the SAS cables to a Lenovo Storage V5030 system" on page 23.

Note: Lenovo Storage V3700 V2 and Lenovo Storage V3700 V2 XP systems support only one expansion chain.

a. Connect SAS port 2 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 2 of the right node canister in the control enclosure to SAS port 1 of the right expansion canister in the second expansion enclosure.

Step 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 19 "Connecting the SAS cables to a Lenovo Storage V5030 system" on page 23.

Step 4.   If two control enclosures are installed (Lenovo Storage V5030 only), 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 20 "SAS cable connectors" on page 24) 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.
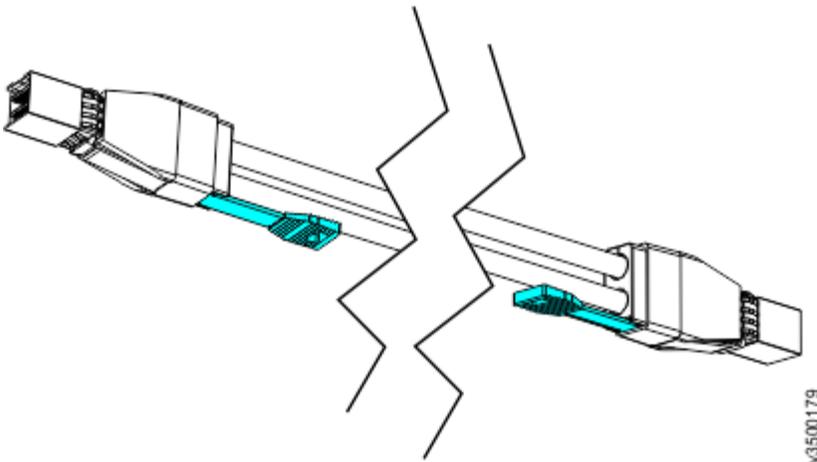
Figure 20. SAS cable connectors

Connecting SAS cables

Be aware of the following guidelines when you attach the cables to the SAS ports in 2U expansion enclosures.

- No more than 9 expansion enclosures can be chained to SAS port 1 of a Lenovo Storage V3700 V2, Lenovo Storage V3700 V2 XP, or Lenovo Storage V5030 node canister. The expansion enclosures in this chain should be installed below the control enclosure.
- For Lenovo Storage V5030 systems only, no more than 10 expansion enclosures can be chained to SAS port 2 of a node canister. The expansion enclosures in this chain should be installed above the control enclosure.
- 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.
- 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.
- 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.

Refer to "Connecting SAS cables to expansion enclosures" on page 19 for examples of SAS cable connections on each Lenovo Storage V series system.

For information about the SAS cabling requirements for 5U expansion enclosures, see "" on page .

Connecting Ethernet cables to node canisters

The control enclosures on Lenovo Storage V series systems have several Ethernet ports on the rear of each node canister. The ports provide access to system management facilities and can also provide iSCSI connectivity. The number of ports and their initial function differ across each of the Lenovo Storage V series systems.

To install the Ethernet cables, complete the following steps.

Step 1. If you have a Lenovo Storage V3700 V2 or Lenovo Storage V3700 V2 XP system, complete the following steps.

a. Identify the location and function of the Ethernet ports on your system; refer to Figure 21 "Connecting the Ethernet cables to a Lenovo Storage V3700 V2 system" on page 26 and Figure 22 "Connecting the Ethernet cables to a Lenovo Storage V3700 V2 XP system" on page 26.

- Port 1 can be used to provide Ethernet connections; in the figures, port 1 is identified by the green cable.
- Port 2 serves as the technician port when the system is initially set up or when service is needed. In the figures, port 2 is identified by the blue cable. After the system initializes, port 2 can also be used for iSCSI connectivity or IP replication.

   Note: Do not connect port 2 to a network switch until the system initialization or service is complete. After the system initializes, the technician port is automatically disabled and port 2 can be used for Ethernet connectivity. However, when port 2 is used to perform system service, you must first enter the **satask chserviceip -techport disable** command to disable the technician port. You can then use port 2 to provide additional Ethernet connectivity.

b. Connect Ethernet port 1 of each node canister in the system to the IP network that will provide a connection to the system management interfaces.

   Figure 21 "Connecting the Ethernet cables to a Lenovo Storage V3700 V2 system" on page 26 shows the Ethernet cabling and the ports on the back of a Lenovo Storage V3700 V2 system.

Figure 21. Connecting the Ethernet cables to a Lenovo Storage V3700 V2 *system*

Figure 22 "Connecting the Ethernet cables to a Lenovo Storage V3700 V2 XP system" on page 26 shows the Ethernet cabling and the ports on the back of a Lenovo Storage V3700 V2 XP system.

Figure 22. Connecting the Ethernet cables to a Lenovo Storage V3700 V2 XP *system*

    c.   Optionally, connect Ethernet port 2 of each node canister in the system to a second IP network, as shown by the blue cable connection in Figure 21 "Connecting the Ethernet cables to a Lenovo Storage V3700 V2 system" on page 26 and Figure 22 "Connecting the Ethernet cables to a Lenovo Storage V3700 V2 XP system" on page 26. This second port can be used to provide a redundant connection to the system management interfaces; it can also be used for iSCSI connectivity to the system by hosts on the network.

        Note: On Lenovo Storage V3700 V2 and Lenovo Storage V3700 V2 XP systems, the second Ethernet port is also used as the technician port. Do not connect Ethernet port 2 to the SAN until the management GUI setup wizard completes on each system and the cluster is created. If you have to service your system, disconnect port 2 from the SAN before you enable port 2 to be the technician port again.

Step 2.   If you have a Lenovo Storage V5030 system, complete the following steps.

    a.   Identify the location and function of the Ethernet ports on your system; refer to Figure 23 "Connecting the Ethernet cables to a Lenovo Storage V5030 system" on page 27.

        • The technician port should only be used to initialize or service the system. In Figure 23 "Connecting the Ethernet cables to a Lenovo Storage V5030 system" on page 27, the technician port is identified by the green cable.

Note: Never use the technician port to provide an Ethernet connection to the system. Do not connect the Ethernet technician port to a network switch. The technician port must only be directly connected to a personal computer when initializing a system or servicing a node.

- Ethernet port 1 can be used to provide Ethernet connections. In the figure, port 1 is identified by the blue cable.

- Ethernet port 2 can optionally be used to provide additional Ethernet connections. In the figure, port 2 is identified by the red cable. Port 2 can also be used for iSCSI connectivity or IP replication.

b. Connect Ethernet port 1 of each Lenovo Storage V5030 node canister in the system to the IP network that will provide a connection to the system management interfaces. Figure 23 "Connecting the Ethernet cables to a Lenovo Storage V5030 system" on page 27 shows the port locations and Ethernet cabling on a Lenovo Storage V5030 node canister.

Figure 23. Connecting the Ethernet cables to a Lenovo Storage V5030 *system*

c. Optionally, connect Ethernet port 2 of each node canister in the system to a second IP network, as shown by the red cable connection in Figure 23 "Connecting the Ethernet cables to a Lenovo Storage V5030 system" on page 27. Port 2 can provide a redundant connection to the system management interfaces. Port 2 can also be used for iSCSI connectivity to the system by hosts on the network. If more than one control enclosure is present 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.

Connecting Ethernet cables to 1 Gbps iSCSI 4-port host interface adapters

If you installed an optional 1 Gbps iSCSI 4-port host interface adapter, you can use Ethernet cables to connect the system to your Ethernet SAN.

Each Lenovo Storage V series system has two Ethernet ports, port 1 and port 2, that are built into the canister. When a 4-port Ethernet host interface adapter is installed, the port number starts at 3.

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

To install the cables, complete the following steps.

Step 1. Identify the correct pair of Ethernet cables for the Ethernet ports labeled 3 in the left canister and the right canister.

Step 2. Connect the appropriate cable to each port.

Step 3.   For each additional pair of Ethernet ports in the right and left canisters, identify the correct pair of cables and connect them.

Figure 24 "Example of a Lenovo Storage V3700 V2 system with a 4-port Ethernet host interface adapter" on page 28 shows the Ethernet ports on a node canister, as seen from the back of a Lenovo Storage V3700 V2 system.

Figure 24. Example of a Lenovo Storage V3700 V2 system with a 4-port Ethernet host interface adapter

Connecting Fibre Channel cables to a 10 Gbps iSCSI-FCoE 4-port host interface adapter

If 10 Gbps iSCSI-FCoE 4-port host interface adapters are installed on your Lenovo Storage V series system, you can use Fibre Channel cables to connect them to your 10 Gbps Ethernet or FCoE SAN.

The Fibre Channel cables are connected in pairs. Both canisters must have the same number of cables connected.

To install the cables, complete the following steps.

Step 1.   If optional 4-port 10 Gbps Ethernet host interface adapters are installed in the node canisters, connect each port to the network that will provide connectivity to that port.To provide redundant connectivity, connect both node canisters in a control enclosure to the same networks.

Figure 25 "Example Lenovo Storage V3700 V2 configuration with 10 Gbps iSCSI-FCoE 4-port host interface adapters" on page 28 shows an example Lenovo Storage V3700 V2 configuration that uses 10 Gbps iSCSI-FCoE 4-port host interface adapters.

Figure 25. Example Lenovo Storage V3700 V2 configuration with 10 Gbps iSCSI-FCoE 4-port host interface adapters

Figure 26 "Example Lenovo Storage V3700 V2 XP configuration with 10 Gbps iSCSI-FCoE 4-port host interface adapters" on page 29 shows an example of a Lenovo Storage V3700 V2 XP configuration that uses 10 Gbps iSCSI-FCoE 4-port host interface adapters.

Figure 26. Example Lenovo Storage V3700 V2 XP *configuration with 10 Gbps iSCSI-FCoE 4-port* host interface adapters

Figure 27 "Example Lenovo Storage V5030 configuration with 10 Gbps iSCSI-FCoE 4-port host interface adapters" on page 29 shows an example of a Lenovo Storage V5030 configuration that uses 10 Gbps iSCSI-FCoE 4-port host interface adapters.

Figure 27. Example Lenovo Storage V5030 *configuration with 10 Gbps iSCSI-FCoE 4-port* host interface adapters

Connecting Fibre Channel cables to a Fibre Channel host interface adapter

If your Lenovo Storage V series system has 16 Gbps Fibre Channel 4-port host interface adapters installed, you can use Fibre Channel cables to connect them to your Fibre Channel SAN.

To install the cables, complete the following steps.

Step 1. Connect the required number of Fibre Channel cables. For the instructions on determining the number of cables required, see the "Planning network cable connections" topic in the Information Center for Lenovo Storage V series. The topic is available at:
http://systemx.lenovofiles.com/help/topic/com.lenovo.storage.v3700.doc/tbrd_cableconnection.html

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

Figure 28 "Example Lenovo Storage V series configuration with two Fibre Channel cables per canister" on page 30 shows an example Lenovo Storage V3700 V2 XP system with two Fibre Channel cables connected to each canister.
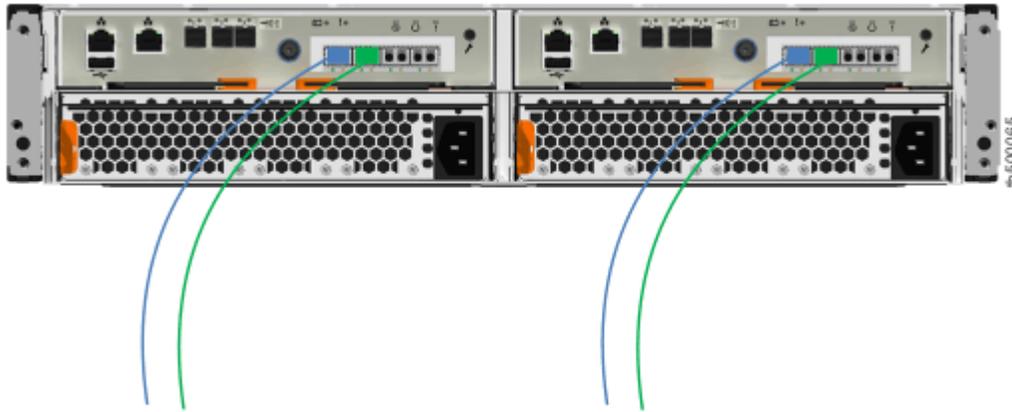
Figure 28. Example Lenovo Storage V series *configuration with two Fibre Channel cables per canister*

Step 2.   If you want to connect additional Fibre Channel cables, make sure to connect the same number of cables to each canister.Figure 29 "Example Lenovo Storage V3700 V2 XP configuration with four Fibre Channel cables per canister" on page 30 shows an example Lenovo Storage V3700 V2 XP configuration with four Fibre Channel cables connected to each canister.
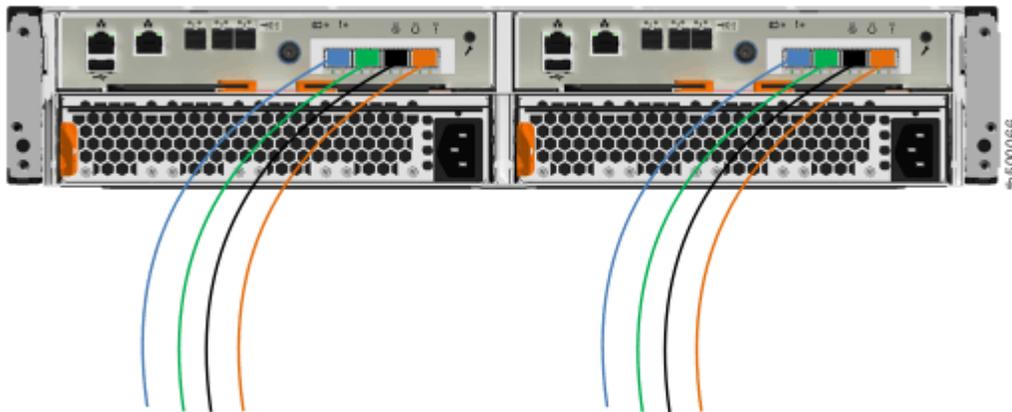
Figure 29. Example Lenovo Storage V3700 V2 XP *configuration with four Fibre Channel cables per canister*

Step 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 with onboard SAS connectors

When you install a control enclosure, you can connect it to a host with SAS cables. On Lenovo Storage V3700 V2 XP systems, you can use the 12 Gbps onboard host SAS ports or an optional 4-port 12 Gbps SAS host interface adapter. Onboard SAS host ports are not available on Lenovo Storage V3700 V2 or Lenovo Storage V5030 systems.

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 30 "Mini SAS HD to Mini SAS HD cable" on page 31)
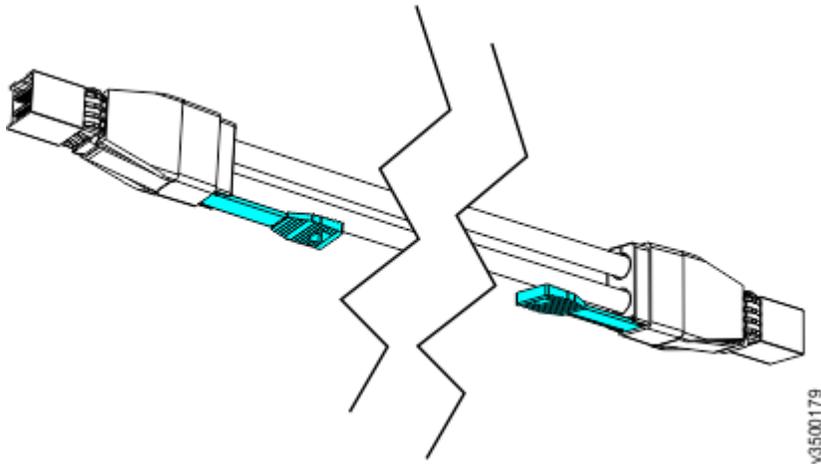
Figure 30. Mini SAS HD to Mini SAS HD cable

• Mini SAS HD to Mini SAS (Figure 31 "Mini SAS HD to Mini SAS cable" on page 31)
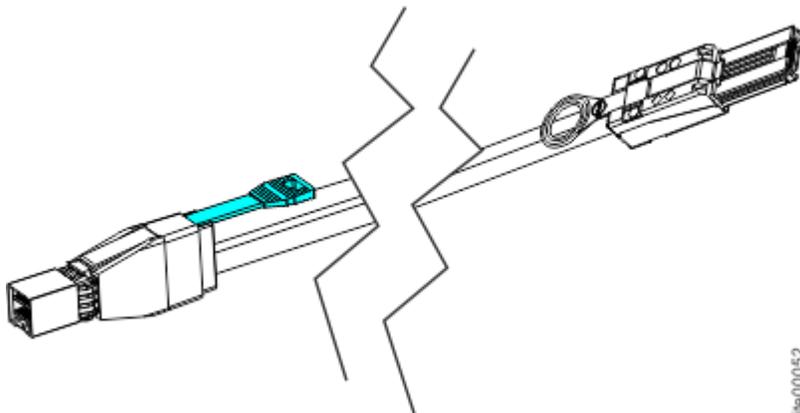
Figure 31. Mini SAS HD to Mini SAS cable

Notes: 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.

To install the cables, complete the following steps.

Step 1.   Connect the required number of SAS cables.For the instructions on determining the number of cables required, see the "Planning network cable connections" topic in the Information Center for Lenovo Storage V series. The topic is available at:
http://systemx.lenovofiles.com/help/topic/com.lenovo.storage.v3700.doc/tbrd_cableconnection.html

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.

Step 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.

Figure 32 "Location of available SAS ports on a Lenovo Storage V3700 V2 XP system" on page 32 shows the location of the onboard 12 Gbps SAS ports on a Lenovo Storage V3700 V2 XP system. In this example, the optional 4 port 12 Gbps SAS host adapter is also installed.
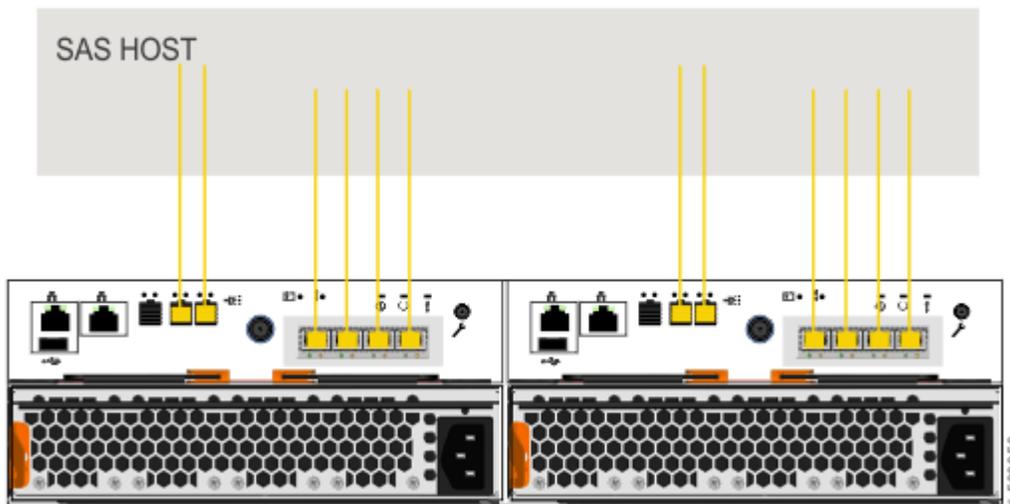
Figure 32. Location of available SAS ports on a Lenovo Storage V3700 V2 XP *system*

Powering on the system

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

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.

To power on the system, complete the following steps.

Step 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.

Step 2. From the rear of the expansion enclosure, check the LEDs on each expansion canister (see Figure 33 "Expansion canister LEDs" on page 33).
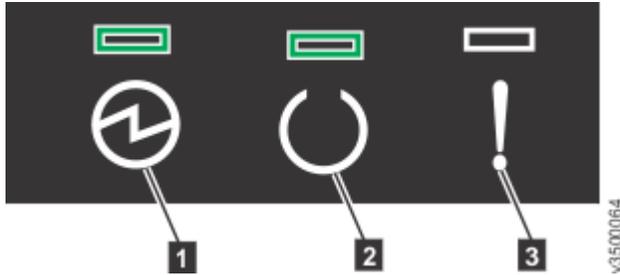
Figure 33. Expansion canister LEDs

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".

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

Step 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.

Step 5. From the rear of the control enclosure, check the LEDs on each node canister (see Figure 34 "Node canister LEDs" on page 33).
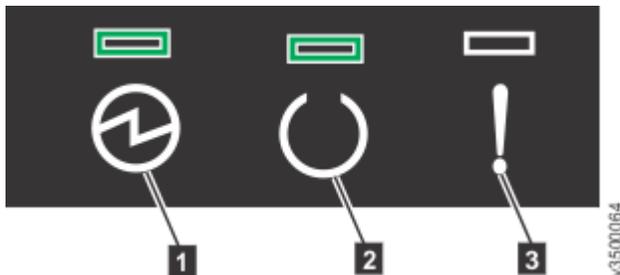
Figure 34. Node canister LEDs

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 of the "Troubleshooting" in the Information Center for Lenovo Storage V series. The topic is available at:
http://systemx.lenovofiles.com/help/topic/com.lenovo.storage.v3700.doc/v3700_system_leds.html

Chapter 3. Configuring the system

After initializing the system, you will use the Storwizemanagement 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").

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.

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

Lenovo 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, Lenovo might investigate potential solutions or work-arounds that the client can implement until a permanent solution becomes available.

To configure your web browser, follow these steps:

Step 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 MicrosoftWindows 10, JavaScript is enabled by default and requires no additional configuration.

For Microsoft Internet Explorer (IE) running on MicrosoftWindows 7:
1. In Internet Explorer, click **Tools ➜ Internet Options**.
2. Click **Security Settings**.
3. Click **Internet** to choose the Internet zone.
4. Click **Custom Level**.
5. Scroll down to the **Scripting** section, and then in **Active Scripting**, click **Enable**.
6. Click **OK** to close **Security Settings**.
7. Click **Yes** to confirm the change for the zone.
8. Click **OK** to close **Internet Options**.

9. Refresh your browser.

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

1. In Internet Explorer, click **Tools → Internet Options**.
2. Click **Security**.
3. Click **Trusted sites**.
4. On the **Trusted sites** dialog, verify that the web address for the management GUI is correct and click **Add**.
5. Verify that the correct web address was added to the **Trusted sites** dialog.
6. Click **Close** on the **Trusted sites** dialog.
7. Click **OK**.
8. Refresh your browser.

For Google Chrome:

1. On the menu bar in the Google Chrome browser window, click **Settings**.
2. Click **Show advanced settings**.
3. In the **Privacy** section, click **Content settings**.
4. In the **JavaScript** section, select **Allow all sites to run JavaScript**.
5. Click **OK**.
6. Refresh your browser.

Step 2. Enable cookies in your web browser.

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

For Mozilla Firefox:

1. On the menu bar in the Firefox browser window, click **Tools → Options**.
2. On the Options window, select **Privacy**.
3. Set "Firefox will" to **Use custom settings for history**.
4. Select **Accept cookies from sites** to enable cookies.
5. Click **OK**.
6. Refresh the browser.

For Microsoft Internet Explorer:

1. In Internet Explorer, click **Tools → Internet Options**.
2. Click **Privacy**. Under **Settings**, move the slider to the bottom to allow all cookies.
3. Click **OK**.
4. Refresh your browser.

For Google Chrome:

1. On the menu bar in the Google Chrome browser window, click **Settings**.
2. Click **Show advanced settings**.
3. In the **Privacy** section, click **Content settings**.
4. In the **Cookies** section, select **Allow local data to be set**.

5. Click **OK**.

6. Refresh your browser.

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

1. In Internet Explorer, click **Tools ➙ Internet Options**.

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

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

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

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

6. Click **OK**.

7. Click **Yes** to confirm.

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

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

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

For Mozilla Firefox:

1. On the menu bar in the Firefox browser window, click **Tools ➙ Options**.

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

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

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

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

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

7. Refresh your browser.

Step 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 9. 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 by using the technician port

To initialize a new system, you must connect a personal computer to the technician port on the rear of a node canister and run the initialization tool.

Important: Do not use the initialization tool on a node if any other node in the system is already active. For example, a node status LED is solid on any node of the system.

You require the following items:

- A supported browser that is installed on the personal computer
- An Ethernet cable to connect the personal computer to the technician port

Attention: Do not connect the technician port to a switch. If a switch is detected, the technician port connection might shut down, causing a 746 node error.

To initialize the system, complete the following steps.

Step 1. Ensure that the system is powered on, as described in "Powering on the system" on page 32.

Step 2. Configure an Ethernet port on the personal computer to enable Dynamic Host Configuration Protocol (DHCP) configuration of its IP address and DNS settings.

If you do not have DHCP, you must manually configure the personal computer. Specify the static IPv4 address 192.168.0.2, subnet mask 255.255.255.0, gateway 192.168.0.1, and DNS 192.168.0.1.

Step 3. Locate the Ethernet port that is labeled **T** on the rear of the node canister.

On Lenovo Storage V3700 V2 and Lenovo Storage V3700 V2 XP systems, the second onboard 1 Gbps Ethernet port is initially used as the technician port.Figure 35 "Lenovo Storage V3700 V2 technician port" on page 38 and Figure 36 "Lenovo Storage V3700 V2 XP technician port" on page 38 show the location of the technician port (**T**) on each model.

Figure 35. Lenovo Storage V3700 V2 *technician port*

Figure 36. Lenovo Storage V3700 V2 XP *technician port*

Lenovo Storage V5030 systems have a dedicated technician port. Figure 37 "Lenovo Storage V5030 technician port" on page 39 shows the location of the port (T).

Figure 37. Lenovo Storage V5030 *technician port*

Step 4.   Connect an Ethernet cable between the port of the personal computer that is configured in Step 2 on page 38 and the technician port.
After the connection is made, the system will automatically configure the IP and DNS settings for the personal computer if DHCP is available. If it is not available, the system will use the values you provided in Step 2 on page 38.

Step 5.   After the Ethernet port of the personal computer is connected, open a supported browser and browse to address `http://install`. (If you do not have DCHP, open a supported browser and go to the following static IP address `192.168.0.1`.)
The browser is automatically directed to the initialization tool.

Step 6.   Follow the instructions that are presented by the initialization tool to configure the system with a name and management IP address.

Step 7.   If you experience a problem during the process due to a change in system states, wait 5 - 10 seconds. Then, either reopen the SSH connection or reload the service assistant.

Step 8.   After you complete the initialization process, disconnect the cable between the personal computer and the technician port.

The system can now be reached by opening a supported web browser and pointing it to `http://management_IP_address`.

Configuring a Lenovo Storage V series system to be NEBS-compliant

For operation in Network Equipment-Building System (NEBS) compliant installations, the Lenovo Storage V series system can be configured to extend its operational temperature range to meet NEBS operating temperature requirements.

Note: The Lenovo Storage V series system might not be able to save its cache and state data if the power fails while it is operating within the extended temperature range. This is because the battery capacity decreases as temperature rises. If the save of cache and state data cannot be completed, an extended service action is required to recover the system and data might be lost. Keep the temperature within the normal operating range if possible, and maintain a reliable power supply.

• To extend the operational temperature range of all enclosures in the system to meet NEBS operating temperature requirements, enter the following CLI command:
`chsystem -hightempmode on`
After it is set, `high_temp_mode` is applied to all enclosures in the system.

• To configure the default operating temperature ranges, enter the following CLI command:
`chsystem -hightempmode off`

- To determine which mode is configured, read the value of the `high_temp_mode` parameter in the **lssystem** output.

  1. Configuring the Lenovo Storage V series system to be NEBS-compliant only changes the way that the system responds to raised temperature. You must also ensure that the way the system is racked, and the operating environment, conforms to NEBS requirements. See "NEBS-compliant earth connection" on page 13.

  2. For more information about Lenovo Storage V series configuration guidelines and restrictions, see the following website:
     https://support.lenovo.com/us/en/solutions/ht505190

  3. If a Lenovo Storage V series system is clustered with a Lenovo Storage V series system, NEBS compliance cannot be enabled. NEBS compliance is not supported on Lenovo Storage V series systems.

Adding a SAS 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.

The management GUI requires a supported web browser (see "Checking your web browser settings for the management GUI" on page 35).

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

Step 1.   Install support rails for the new enclosure.

Step 2.   Install the new enclosure in the rack.

Step 3.   Connect the expansion enclosure attachment cables.

Step 4.   Connect the power cables and wait for the SAS light-emitting diodes (LEDs) to illuminate.

Step 5.   Start the management GUI.

Step 6.   Go to **Monitoring → System**.

Step 7.   On the System page, select **Actions → Add Enclosures**.

Step 8.   Continue to follow the on-screen instructions.

Adding a control enclosure to an existing Lenovo Storage V5030 system

A Lenovo Storage V5030 system can cluster with another Lenovo Storage V5030 system or with a Lenovo Storage V series system. To add a second control enclosure to an existing Lenovo Storage V5030 system, you must first install it in the rack. Then, you must connect it to the system through a zone in the SAN.

The management GUI requires a supported web browser (see "Checking your web browser settings for the management GUI" on page 35).

Note: You cannot cluster a second control enclosure with a Lenovo Storage V3700 V2 or Lenovo Storage V3700 V2 XP system.

To add a second control enclosure to an existing Lenovo Storage V5030 system, complete the following steps.

Step 1.   Install support rails for the new enclosure.

Step 2.   Install the new enclosure in the rack.

Step 3.   Connect the canisters to the storage area network.

Step 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.

Step 5. Start the management GUI.

Step 6. Go to **Monitoring ➙ System**.

Step 7. On the System page, select **Actions ➙ Add Enclosures**.

Step 8. Continue to follow the on-screen instructions.

Appendix A. Accessibility features for Lenovo Storage V series

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 Lenovo Storage V series:

- 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 Lenovo Storage V series online documentation and its related publications are accessibility-enabled.

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 Lenovo Storage V series 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.

Lenovo and accessibility

See the Lenovo Accessibility Features for more information about the commitment that Lenovo has to accessibility.

Appendix B. Where to find the Safety, Support, and Warranty Information

The *Safety, Support, and Warranty Information* is available in both hardcopy format and in the Lenovo Storage V series information center.

The *Safety, Support, and Warranty Information* is shipped (in hardcopy form) with your product. It can also be ordered from Lenovo (see Table 2 "Lenovo Storage V series library" on page xii for the part number).

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Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1 024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as `total bytes written` (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

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Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Recycling information

Lenovo encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. Lenovo offers a variety of programs and services to assist equipment owners in recycling their IT products. For information on recycling Lenovo products, go to: "" on page .

Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document.

Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If Lenovo determines that the levels of particulates or gases in your environment have caused damage to the device, Lenovo may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 10. Limits for particulates and gases

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2[1]. • Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. • The deliquescent relative humidity of the particulate contamination must be more than 60%[2]. • The room must be free of conductive contamination such as zinc whiskers.
Gaseous	• Copper: Class G1 as per ANSI/ISA 71.04-1985[3] • Silver: Corrosion rate of less than 300 Å in 30 days

[1] ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

[2] The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

[3] ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

Telecommunication regulatory statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Lenovo is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

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

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2014/30/EU on the approximation of the laws of the Member States relating to electromagnetic compatibility. Lenovo cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the installation of option cards from other manufacturers.

This product has been tested and found to comply with the limits for Class A equipment according to European Standards harmonized in the Directives in compliance. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Lenovo, Einsteinova 21, 851 01 Bratislava, Slovakia

CE

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

Germany Class A statement

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

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2014/30/EU zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der Klasse A der Norm gemäß Richtlinie.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der Lenovo empfohlene Kabel angeschlossen werden. Lenovo übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der Lenovo verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der Lenovo gesteckt/eingebaut werden.

Deutschland:

Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Betriebsmittein Dieses Produkt entspricht dem „Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln" EMVG (früher „Gesetz über die elektromagnetische Verträglichkeit von Geräten"). Dies ist die Umsetzung der EU-Richtlinie 2014/30/EU in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007 (früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EMV EU Richtlinie 2014/30/EU, für Geräte der Klasse A.

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraf 5 des EMVG ist die Lenovo (Deutschland) GmbH, Meitnerstr. 9, D-70563 Stuttgart.

Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4: **Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55032 Klasse A.**

Nach der EN 55032: „Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen."

Nach dem EMVG: „Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind." (Auszug aus dem EMVG, Paragraph 3, Abs. 4). Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung mit der entsprechenden Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

Anmerkung: Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den Handbüchern angegeben, zu installieren und zu betreiben.

Japan VCCI Class A 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

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

Japan Electronics and Information Technology Industries Association (JEITA) statement

高調波ガイドライン準用品 jiieta2

Japan Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guidelines with Modifications (products greater than 20 A per phase)

Korea Communications Commission (KCC) statement

이 기기는 업무용(A급)으로 전자파적합기기로 서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목 적으로 합니다.

This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.

Russia Electromagnetic Interference (EMI) Class A statement

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

rusemi

People's Republic of China Class A electronic emission statement

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

Taiwan BSMI RoHS declaration

單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛Lead (Pb)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr^{+6})	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
機架	○	○	○	○	○	○
外部蓋板	○	○	○	○	○	○
機械組合件	−	○	○	○	○	○
空氣傳動設備	−	○	○	○	○	○
冷卻組合件	−	○	○	○	○	○
內存模塊	−	○	○	○	○	○
處理器模塊	−	○	○	○	○	○
電纜組合件	−	○	○	○	○	○
電源	−	○	○	○	○	○
儲備設備	−	○	○	○	○	○
電路卡	−	○	○	○	○	○
光碟機	−	○	○	○	○	○
雷射器	−	○	○	○	○	○

備考1. 〝超出0.1 wt %〞及 〝超出0.01 wt %〞係指限用物質之百分比含量超出百分比含量基準值。

Note1 : "exceeding 0.1wt%" and "exceeding 0.01 wt%" indicate that the percentage content
of the restricted substance exceeds the reference percentage value of presence condition.

備考2. 〝○〞係指該項限用物質之百分比含量未超出百分比含量基準值。

Note2 : " ○ "indicates that the percentage content of the restricted substance does not exceed the
percentage of reference value of presence.

備考3. 〝 − 〞係指該項限用物質為排除項目。

Note3 : The "-" indicates that the restricted substance corresponds to the exemption.

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