



# **Install hardware**

## **E-Series Systems**

NetApp  
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# Install hardware

## EF300 and EF600

### Install and set up EF300 and EF600 storage systems

Learn how to install and set up the EF300 or EF600 storage system.

You can choose one of the following formats to guide you through installing and setting up your new storage system.

- **PDF**

This is a [PDF poster](#) of step-by-step instructions with live links to additional content.

- **Online instructions**

These are the online setup instructions described on this site. Start with [Prepare for installation](#) to get started.

### Install process

Before you install and set up your new storage system, familiarize yourself with the installation process:



Prepare for installation

Learn how to prepare for installation of your EF300 or EF600 series storage system.

Before you begin

If you are cabling your EF300 for SAS expansion, review the following information:

- [Add SAS expansion cards](#) for SAS expansion card installation.
- [Cabling overview](#) for SAS expansion cabling.

Steps

1. Create an account and register your hardware at [mysupport.netapp.com](https://mysupport.netapp.com).
2. Ensure that the following items are in the box that you received.

	Shelf with drives installed (bezel and end caps packaged separately)
	Rack-mount hardware

The following table identifies the types of cables you might receive. If you receive a cable not listed in the table, see [Hardware Universe](#) to locate the cable and identify its use.

Connector type	Cable type	Use
	RJ-45 Ethernet cables (if ordered)	Management connection

Connector type	Cable type	Use
	I/O cables (if ordered)	Cabling the data hosts
	Power cables (if ordered)	Powering up the storage system

3. Ensure that you provide the following items.

	Phillips #2 screwdriver
	Flashlight
	ESD strap

	<p>2U rack space: A standard 19 in. (48.30 cm) rack to fit 2U shelves of the following dimensions.</p> <p><b>Depth:</b> 19.0 in. (48.3 cm)</p> <p><b>Width:</b> 17.6 in. (44.7 cm)</p> <p><b>Height:</b> 3.34 in. (8.48 cm)</p> <p><b>Shelf:</b> 24-drive</p> <p><b>Max Weight:</b> 60.5 lb (27.4 kg)</p> <div data-bbox="873 562 928 625"> </div> <p>Using third-party cabinets might cause the power cables to restrict access to the controller.</p>
	<p>A supported browser for the management software:</p> <ul style="list-style-type: none"> <li>• Google Chrome (version 78 and later)</li> <li>• Microsoft Internet Explorer (version 11 and later)</li> <li>• Microsoft Edge (88 and later)</li> <li>• Mozilla Firefox (version 70 and later)</li> <li>• Safari (version 12 and later)</li> </ul>

## Install the hardware

You can install an EF300 or EF600 storage system in a two-post rack or a NetApp system cabinet.

### Before you begin

Before you install an EF300 or EF600 storage system, make sure you do the following:

- Register your hardware at [mysupport.netapp.com](https://mysupport.netapp.com).
- Prepare a flat, static-free work area.
- Take anti-static precautions.

### Steps

1. Unpack the hardware.
  - a. Unpack the contents and inventory the contained hardware against the packing slip.
  - b. Before proceeding, read through all the instructions.
2. Install the rails.



To prevent the equipment from toppling over, install the hardware from the bottom of the rack or cabinet up to the top.

If instructions were included with your rack-mounting hardware, refer to them to learn how to install the rails. For additional rack-mounting instructions, see [Rack-mount hardware](#).



3. Install the shelf.

- a. If you are installing multiple shelves, begin installing from the bottom to the top of the cabinet. Position the back of the shelf onto the rails.



When installing the shelf, use a team-lift with two people.

- b. Supporting the shelf from the bottom, slide it into the cabinet.





4. Secure the shelf.

For more information, see [Rack-mount hardware](#).



5. Install the faceplate.

a. Align the faceplate with the shelf, and snap into place.



## Power the controller shelves

Learn how to attach the power cables and power on the drive shelves.

### Before you begin

Before you power the controller shelves, make sure to do the following:

- Install your hardware.
- Take anti-static precautions.

### Steps

1. Plug in the power cables, one to each controller (EF600 pictured below).



2. Connect the two power cables, one from each controller, to two separate power distribution units (PDUs) in the cabinet or rack.



Accessing a EF300 or EF600 controller canister from the shelf can be blocked by third-party PDUs. Do not use power outlets directly behind the controller canister.

3. Allow the controller to boot for five minutes before completing the storage system set up and configuration.

## Result

The controller boots automatically. The LEDs flash on and the fans start to indicate that the controller is powering on.



Fans are very loud when they first power on.

## Complete storage system setup and configuration

Learn how to connect the controller cables to your network, and then complete the setup and configuration.

### Step 1: Cable the data hosts

Cable the storage system according to your network topology.

#### Option 1: Direct-attach topology

The following example shows cabling to the data hosts using a direct-attach topology.

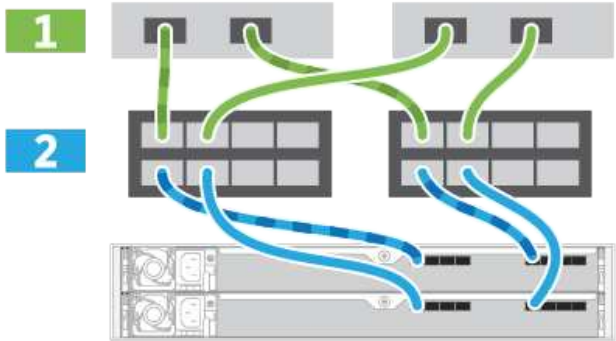
**Table 1. Example A: Direct-attach topology**

	1. Connect each host adapter directly to the host ports on the controllers.
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**Option 2: Fabric topology**

The following example shows cabling to the data hosts using a fabric topology.

**Table 2. Example B: Fabric topology**

	1. Connect each host adapter directly to the switch. 2. Connect each switch directly to the host ports on the controllers.
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**Step 2: Connect and configure the management connection**

You can configure the controller management ports using a DHCP server or a static IP address.

**Option 1: DHCP server**

Learn how to configure the management ports with a DHCP server.

**Before you begin**

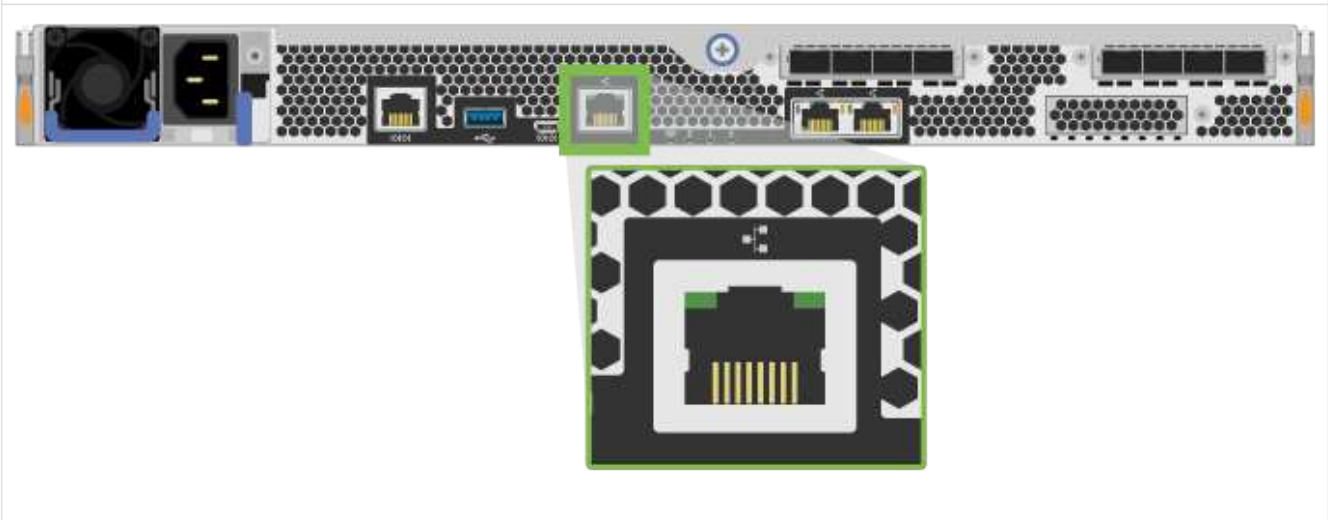
- Configure your DHCP server to associate an IP address, subnet mask, and gateway address as a permanent lease for each controller.
- Obtain the assigned IP addresses you will use to connect to the storage system from your network administrator.

**Steps**

1. Connect an Ethernet cable to each controller’s management port, and connect the other end to your network.

	RJ-45 Ethernet cables (if ordered)
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The following figure shows an example of the controller's management port location (EF600 shown):



- 2. Open a browser and connect to the storage system using one of the controller IP addresses provided to you by your network administrator.

**Option 2: Static IP address**

Learn how to configure the management ports manually by entering the IP address and the subnet mask.

**Before you begin**

- Obtain the controllers' IP address, subnet mask, gateway address, and DNS and NTP server information from your network administrator.
- Make sure that the laptop you are using is not receiving network configuration from a DHCP server.

**Steps**

- 1. Using an Ethernet cable, connect controller A's management port to the Ethernet port on a laptop.



Controller A is the upper controller canister, and controller B is the lower controller canister.

	RJ-45 Ethernet cables (if ordered)
---	------------------------------------

The following figure shows an example of the controller's management port location (EF600 shown):



2. Open a browser and use the default IP address (169.254.128.101) to establish a connection to the controller. The controller sends back a self-signed certificate. The browser informs you that the connection is not secure.
3. Follow the browser's instructions to proceed and launch SANtricity System Manager.



If you are unable to establish a connection, verify that you are not receiving network configuration from a DHCP server.

4. Set the storage system's password to login.
5. Use the network settings provided by your network administrator in the **Configure Network Settings** wizard to configure controller A's network settings, and then select **Finish**.



Because you reset the IP address, System Manager loses connection to the controller.

6. Disconnect your laptop from the storage system, and connect the management port on controller A to your network.
7. Open a browser on a computer connected to your network, and enter controller A's newly configured IP address.



If you lose the connection to controller A, you can connect an ethernet cable to controller B to reestablish connection to controller A through controller B (169.254.128.102).

8. Log in using the password you set previously.

The Configure Network Settings wizard will appear.

9. Use the network settings provided by your network administrator in the **Configure Network Settings** wizard to configure controller B's network settings, and then select **Finish**.
10. Connect controller B to your network.
11. Validate controller B's network settings by entering controller B's configured IP address in a browser.



If you lose the connection to controller B, you can use your previously validated connection to controller A to reestablish connection to controller B through controller A.

### Step 3: Configure storage system

After you have installed the EF300 or EF600 hardware, use the SANtricity software to configure and manage your storage system.

#### Before You Begin

- Configure your management ports.
- Verify and record your password and IP addresses.

#### Steps

1. Connect your controller to a web browser.
2. Use SANtricity System Manager to manage your EF300 or EF600 series storage system. Refer to the online help included with System Manager.



If you are cabling your EF300 for SAS expansion, see [Maintaining EF600 Hardware](#) for SAS expansion card installation and the [Cabling E-Series hardware](#) for SAS expansion cabling.

## E2800 and E5700

### Install and set up E2800 and E5700 storage systems

Learn how to install and set up the E2800 or E5700 storage system.

You can choose one of the following formats to guide you through installing and setting up your new storage system.

- **PDF**

This is a printable PDF of step-by-step instructions with live links to additional content. Choose one of the following posters to get started.

- [E2860, E5760 and DE460C PDF poster](#)
- [E5724, EF570, EF280, E2812, E2824, DE212C, and DE224C PDF poster](#)

- **Online instructions**

These are the setup instructions described on this site. Start with one of the following topics to get started.

- [Prepare to install E2860, E5760 and DE460C](#)

- [Prepare to install E5724, EF570, EF280, E2812, E2824, DE212C, and DE224C](#)

## Overview

Before you install and set up your new storage system, familiarize yourself with the installation process:





# Install and set up 60-drives

## Prepare for installation

Learn how to prepare to install your E2860, E5760, or DE460 series storage system.

### Steps

- 1. Create an account and register your hardware at [mysupport.netapp.com](https://mysupport.netapp.com).
- 2. Ensure that the following items are in the box that you received.

	Shelf, bezel, and rackmount hardware
	Shelf handles x4

The following table identifies the types of cables you might receive. If you receive a cable not listed in the table, see [Hardware Universe](#) to locate the cable and identify its use.

Connector type	Cable type	Use
	Ethernet cables (if ordered)	Management connection
	I/O cables (if ordered)	Cabling the data hosts

Connector type	Cable type	Use
	Power cables  x2 per shelf  (if ordered)	Powering up the storage system
	SAS cables (Included only with the drive shelves)	Cabling the shelves

3. Ensure that you provide the following items.

	Phillips #2 screwdriver
	Flashlight
	ESD strap

	<p>4U rack space: A standard 19 in. (48.30 cm) rack to fit 4U shelves of the following dimensions.</p> <p><b>Depth:</b> 38.25 in. (97.16 cm)</p> <p><b>Width:</b> 17.66 in. (44.86 cm)</p> <p><b>Height:</b> 6.87 in. (17.46 cm)</p> <p><b>Max Weight:</b> 250 lb (113 kg)</p>
	<p>A supported browser for the management software:</p> <ul style="list-style-type: none"> <li>• Google Chrome (version 47 and later)</li> <li>• Microsoft Internet Explorer (version 11 and later)</li> <li>• Microsoft Edge (EdgeHTML 12 and later)</li> <li>• Mozilla Firefox (version 31 and later)</li> <li>• Safari (version 9 and later)</li> </ul>

## Install the hardware

Learn how to install a E2860, E5760, or DE460 storage system in a two-post rack or a NetApp system cabinet.

### Before you begin

- Register your hardware at [mysupport.netapp.com](https://mysupport.netapp.com).
- Prepare a flat, static-free work area.
- Obtain an ESD wristband and take anti-static precautions.

Read through all the instructions before proceeding with the steps below.

### Steps

1. Unpack the hardware contents, and then inventory the contained hardware against the packing slip.
2. Install the rails.

If instructions were included with your rack-mounting hardware, refer to them to learn how to install the rails. For additional rack-mounting instructions, see [Rack-mount hardware](#).



For square hole cabinets, you must first install the provided cage nuts to secure the front and rear of the shelf with screws.



3. Install the shelf.



An empty shelf weighs approximately 132 lb (60 kg). A mechanized lift or four people using lift handles are required to safely move an empty shelf.

- a. If lifting the shelf by hand, attach the four lift handles. Push up on each handle until it clicks into place.
- b. Supporting the shelf from the bottom, slide it into the cabinet. If the lift handles are used, remove them one set at a time as the shelf slides into the cabinet. To remove the handles, pull back on the release latch, push down, then pull away from the shelf.



#### 4. Secure the shelf.

- a. Insert screws into the first and third holes from the top of the shelf on both sides to secure it to the front of the cabinet.
- b. Place two back brackets on each side of the upper rear section of the shelf. Insert screws into the first and third holes of each bracket to secure the back of the cabinet.



5. Install the drives.

- a. Wrap the strap end of the ESD wristband around your wrist, and secure the clip end to a metal ground to prevent static discharges.
- b. Starting at the front left slot of the top drawer, install each drive by gently positioning into the drive slot and lowering the raised drive handle until it clicks into place.
  - If you are installing fewer than 60 drives, if you have solid-state drives (SSDs), or if your drives have different capacities:
    - Maintain a minimum of 20 drives per shelf. Install drives in the front four slots in each drawer first, for adequate airflow for cooling.
    - Distribute any remaining drives across the drawers. If possible, install an equal number of each type of drive in each drawer to allow for the creation of Drawer Loss Protected volume groups or disk pools.
    - Distribute any SSDs evenly across the drawers.
- c. Carefully slide the drawer back in by pushing the center and gently closing both latches.
  - Do not force the drawer into place.
  - Use the connector tool, disconnect the connector of the snake cable and reconnect it, make sure you hear a click to determine the reconnection is properly done.
  - Disconnection and reconnection should only be required during initial setup or if the tray is shipped to a different location.
- d. Attach the front bezel.



Risk of equipment damage — Stop pushing the drawer if you feel binding. Use the release levers at the front of the drawer to slide the drawer back out. Then, carefully reinsert the drawer into the slot.

## Cable the shelves

Learn how to attach the power cables and power on the drive shelves.

### Before you begin

- Install your hardware.
- Take anti-static precautions.

This procedure applies to IOM12 and IOM12B drive shelves.



IOM12B modules are only supported on SANtricity OS 11.70.2 onward. Ensure your controller's firmware has been updated before installing or upgrading to an IOM12B.



This procedure is for like-for-like shelf IOM hot-swaps or replacements. This means you can only replace an IOM12 module with another IOM12 module or replace an IOM12B module with another IOM12B module. (Your shelf can have two IOM12 modules or have two IOM12B modules.)

### Steps

1. Cable the shelves.

Cable the system according to your configuration. If you need more cabling options than the examples shown in this section, see [Cabling](#).

For the examples shown in this section, you need the following cables:



**SAS cables**



**Example A: An E2860 controller shelf with two DE460C disk shelves in a standard SAS configuration.**



- a. Cable controller A to IOM A of the first drive shelf.
- b. Cable IOM A of the first drive shelf to IOM A of the second drive shelf.
- c. Cable IOM B of the first drive shelf to IOM B of the second drive shelf.
- d. Cable controller B to IOM B of the second drive shelf.

**Example B: An E2860 controller shelf with one DE460C disk shelf in a standard SAS configuration.**



- a. Cable controller A to IOM A.
  - b. Cable controller B to IOM B.
2. Power the drive shelves.

You need the following cables:

	<b>Power cables</b>
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Confirm the drive shelf power switches are off.

- Connect the two power cables for each shelf to different power distribution units (PDUs) in the cabinet or rack.
- If you have drive shelves, turn on their two power switches first. Wait 2 minutes before applying power to the controller shelf.
- Turn on the two power switches on the controller shelf.
- Check the LEDs and seven-segment display on each controller.

During boot, the seven-segment display shows the repeating sequence of OS, Sd, blank to indicate the controller is performing start-of-day processing. After the controller has booted up, the shelf ID is displayed.

**Example: Power connections are on the rear of the shelf.**



## Complete storage system setup and configuration

Learn how to cable the controllers to your network and complete storage system setup and configuration.

### Step 1: Cable the data hosts

Cable the system according to your network topology.



If you are using AIX®, you must install the E-Series multipath driver on the host before connecting it to the array.

### Option 1: Direct-attach topology

The following example shows cabling to the data hosts using a direct-attach topology.

**Table 3. Example A: Direct-attach topology**



## Option 2: Fabric topology

The following example shows cabling to the data hosts using a fabric topology.

**Table 4. Example B: Fabric topology**



## Step 2: Connect and configure the management connection

You can configure the controller management ports using a DHCP server or a static IP address.

### Option 1: DHCP server

Learn how to configure the management ports with a DHCP server.

#### Before you begin

- Configure your DHCP server to associate an IP address, subnet mask, and gateway address as a permanent lease for each controller.
- Obtain the assigned IP addresses to connect to the storage system from your network administrator.

#### Steps

1. Connect an Ethernet cable to each controller's management port, and connect the other end to your network.

	Ethernet cables (if ordered)
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The following figures show examples of the controller's management port location:

 <p>E2800 controller P1 Management Port</p>	 <p>E5700 controller P1 Management Port</p>
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2. Open a browser and connect to the storage system using one of the controller IP addresses provided to you by your network administrator.

## Option 2: Static IP address

Learn how to configure the management ports manually by entering the IP address and the subnet mask.

### Before you begin

- Obtain the controllers' IP address, subnet mask, gateway address, and DNS and NTP server information from your network administrator.
- Make sure the laptop you are using is not receiving network configuration from a DHCP server.

### Steps

1. Using an Ethernet cable, connect controller A's management port to the Ethernet port on a laptop.

	Ethernet cables (if ordered)
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The following figures show examples of the controller's management port location:



2. Open a browser and use the default IP address (169.254.128.101) to establish a connection to the controller. The controller sends back a self-signed certificate. The browser informs you that the connection is not secure.
3. Follow the browser's instructions to proceed and launch SANtricity System Manager.



If you are unable to establish a connection, verify that you are not receiving network configuration from a DHCP server.

4. Set the storage system's password to login.
5. Use the network settings provided by your network administrator in the **Configure Network Settings** wizard to configure controller A's network settings, and then select **Finish**.



Because you reset the IP address, System Manager loses connection to the controller.

6. Disconnect your laptop from the storage system, and connect the management port on controller A to your network.
7. Open a browser on a computer connected to your network, and enter controller A's newly configured IP address.



If you lose the connection to controller A, you can connect an ethernet cable to controller B to reestablish connection to controller A through controller B (169.254.128.102).

8. Log in using the password you set previously.

The Configure Network Settings wizard will appear.

9. Use the network settings provided by your network administrator in the **Configure Network Settings** wizard to configure controller B's network settings, and then select **Finish**.
10. Connect controller B to your network.

11. Validate controller B's network settings by entering controller B's newly configured IP address in a browser.



If you lose the connection to controller B, you can use your previously validated connection to controller A to reestablish connection to controller B through controller A.

### Step 3: Configure and manage your storage system

After you have installed your hardware, use the SANtricity software to configure and manage your storage system.

#### Before you begin

- Configure your management ports.
- Verify and record your password and IP addresses.

#### Steps

1. Use the SANtricity software to configure and manage your storage arrays.
2. In the simplest network configuration, connect your controller to a web browser and use SANtricity System Manager for managing a single E2800 or E5700 series storage array.



For accessing System Manager, use the same IP addresses that you used to configure your management ports.

## Install and set up 12 and 24-drives

### Prepare for installation

Learn how to prepare to install your E5724, EF570, EF280, E2812, E2824, DE212C, or DE224C series storage system.

#### Steps

1. Create an account and register your hardware at [mysupport.netapp.com](https://mysupport.netapp.com).
2. Ensure that the following items are in the box that you received.

	Shelf with drives installed (bezel packaged separately)
	Rack-mount hardware

The following table identifies the types of cables you might receive. If you receive a cable not listed in the table, see [Hardware Universe](#) to locate the cable and identify its use.

Connector type	Cable type	Use
	Ethernet cables (if ordered)	Management connection
	I/O cables (if ordered)	Cabling the data hosts
	Power cables (if ordered)	Powering up the storage system
	SAS cables included only with the drive shelves	SAS cables

3. Ensure that you provide the following items.

	<p>Phillips #2 screwdriver</p>
	<p>Flashlight</p>
	<p>ESD strap</p>
	<p>2U rack space: A standard 19 in. (48.30 cm) rack to fit 2U shelves of the following dimensions.</p> <p><b>Depth:</b> 19.0 in. (48.3 cm)</p> <p><b>Width:</b> 17.6 in. (44.7 cm)</p> <p><b>Height:</b> 3.34 in. (8.48 cm)</p> <p><b>Shelf:</b> 24-drive</p> <p><b>Max Weight:</b> 60.5 lb (27.4 kg)</p>
	<p>A supported browser for the management software:</p> <ul style="list-style-type: none"> <li>• Google Chrome (version 78 and later)</li> <li>• Microsoft Internet Explorer (version 11 and later)</li> <li>• Microsoft Edge (88 and later)</li> <li>• Mozilla Firefox (version 70 and later)</li> <li>• Safari (version 12 and later)</li> </ul>



## Install the hardware

Learn how to install a E5724, EF570, EF280, E2812, E2824, DE212C, or DE224C storage system in a two-post rack or a NetApp system cabinet.

### Before you begin

Before you install the hardware, make sure you do the following:

- Register your hardware at [mysupport.netapp.com](https://mysupport.netapp.com).
- Prepare a flat, static-free work area.
- Obtain an ESD wristband and take anti-static precautions.

Read through all the instructions before proceeding with the steps below.

### Steps

1. Unpack the hardware contents, and then inventory the contained hardware against the packing slip.
2. Install the rails.

If instructions were included with your rack-mounting hardware, refer to them for detailed information on how to install the rails. For additional rack-mounting instructions, see [Rack-mount hardware](#).



Install hardware from the bottom of the rack or cabinet up to the top to prevent the equipment from toppling over.



3. Install the shelf.



When fully loaded with drives, each shelf weighs approximately 64 lb (29 kg). Two persons or mechanical lift are required to safely move the shelf.

- a. Starting with the shelf you want at the bottom of the cabinet, place the back of the shelf (the end with the connectors) on the rails.

- b. Supporting the shelf from the bottom, slide it into the cabinet.



#### 4. Secure the shelf.

Secure the shelf to the rack as directed in [Rack-mount hardware](#).

- a. Insert screws into the first and third holes from the top of the shelf on both sides to secure it to the front of the cabinet.
- b. Place two back brackets on each side of the upper rear section of the shelf. Insert screws into the first and third holes of each bracket to secure the back of the cabinet.



5. Install the bezel or end caps.

- a. Position the front bezel in front of the controller shelf so that the holes at each end align with the fasteners on the controller shelf.
- b. Snap the bezel into place.
- c. If you have optional drive shelves, position the left end cap in front of the drive shelf so that the holes in the end cap align with the fasteners on the left side of the shelf.
- d. Snap the end cap into place.
- e. Repeat the above steps for the right end cap.



### Connect the cables

Learn how to attach the power cables and power on the drive shelves.

#### Before you begin

- Install your hardware.
- Take anti-static precautions.

This procedure applies to IOM12 and IOM12B drive shelves.



IOM12B modules are only supported on SANtricity OS 11.70.2 onward. Ensure your controller's firmware has been updated before installing or upgrading to an IOM12B.




This procedure is for like-for-like shelf IOM hot-swaps or replacements. This means you can only replace an IOM12 module with another IOM12 module or replace an IOM12B module with another IOM12B module. (Your shelf can have two IOM12 modules or have two IOM12B modules.)

## Steps

### 1. Cable the shelves.

Cable the system according to your configuration. If you need more cabling options than the examples shown, see [Cabling](#).

For the examples shown, you need the following cables:

	<b>SAS cables</b>
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**Example A: E5700 controller shelf with three DE212C/DE224 disk shelves in a standard SAS configuration.**



- Cable controller A to IOM A of the first drive shelf.
- Cable IOM A of the first drive shelf to IOM A of the second drive shelf.
- Cable IOM A of the second drive shelf to IOM A of the third drive shelf.
- Cable controller B to IOM B of the third drive shelf.
- Cable IOM B of the second drive shelf to IOM B of the third drive shelf.
- Cable IOM B of the first drive shelf to IOM B of the second drive shelf.


**Example B: An E5700 controller shelf with one DE212C/DE224 disk shelf in a standard SAS configuration.**



- a. Cable controller A to IOM A.
- b. Cable controller B to IOM B.

## 2. Power the drive shelves.

You need the following cables:

	<b>Power cables</b>
--	---------------------



Confirm the drive shelf power switches are off.

- a. Connect the two power cables for each shelf to different power distribution units (PDUs) in the cabinet or rack.
- b. If you have drive shelves, turn on their two power switches first. Wait 2 minutes before applying power to the controller shelf.
- c. Turn on the two power switches on the controller shelf.
- d. Check the LEDs and seven-segment display on each controller.

During boot, the seven-segment display shows the repeating sequence of OS, Sd, blank to indicate the controller is performing start-of-day processing. After the controller has booted up, the shelf ID is displayed.

**Example: Power connections are on the rear of the shelf.**



## Complete storage system setup and configuration

Learn how to cable the controllers to your network and complete storage system setup and configuration.

### Step 1: Cable the data hosts

Cable the system according to your network topology.

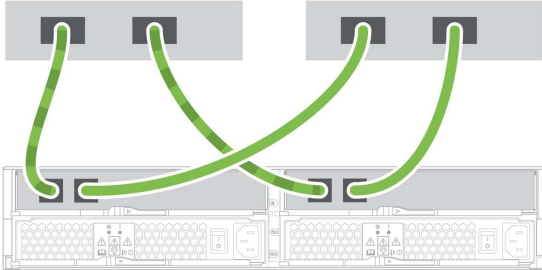


If you are using AIX®, you must install the E-Series multipath driver on the host before connecting it to the array.

### Option 1: Direct-attach topology

The following example shows cabling to the data hosts using a direct-attach topology.

**Table 5. Example A: Direct-attach topology**

<div data-bbox="142 1381 228 1430">1</div>  A diagram showing a server rack with two server units. Above the units are two sets of host adapter ports. Green lines represent cables connecting each host adapter port directly to a corresponding port on the server units below. The connections are shown as two green lines crossing each other.	<p>1. Connect each host adapter directly to the host ports on the controllers.</p>
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### Option 2: Fabric topology

The following example shows cabling to the data hosts using a fabric topology.

**Table 6. Example B: Fabric topology**



## Step 2: Connect and configure the management connection

You can configure the controller management ports using one of two options: using a DHCP server or using a static IP address.

### Option 1: DHCP server

Learn how to configure the management ports with a DHCP server.

#### Before you begin

- Configure your DHCP server to associate an IP address, subnet mask, and gateway address as a permanent lease for each controller.
- Obtain the assigned IP addresses you will use to connect to the storage system from your network administrator.

#### Steps

1. Connect an Ethernet cable to each controller's management port, and connect the other end to your network.

	Ethernet cables (if ordered)
--	------------------------------

The following figures show examples of the controller's management port location:



2. Open a browser and connect to the storage system using one of the controller IP addresses provided to you by your network administrator.

## Option 2: Static IP address

Learn how to configure the management ports manually by entering the IP address and the subnet mask.

### Before you begin

- Obtain the controllers' IP address, subnet mask, gateway address, and DNS and NTP server information from your network administrator.
- Make sure the laptop you are using is not receiving network configuration from a DHCP server.

### Steps

1. Using an Ethernet cable, connect controller A's management port to the Ethernet port on a laptop.



The following figures show examples of the controller's management port location:





2. Open a browser and use the default IP address (169.254.128.101) to establish a connection to the controller. The controller sends back a self-signed certificate. The browser informs you that the connection is not secure.
3. Follow the browser's instructions to proceed and launch SANtricity System Manager.



If you are unable to establish a connection, verify that you are not receiving network configuration from a DHCP server.

4. Set the storage system's password to login.
5. Use the network settings provided by your network administrator in the **Configure Network Settings** wizard to configure controller A's network settings, and then select **Finish**.



Because you reset the IP address, System Manager loses connection to the controller.

6. Disconnect your laptop from the storage system, and connect the management port on controller A to your network.
7. Open a browser on a computer connected to your network, and enter controller A's newly configured IP address.



If you lose the connection to controller A, you can connect an ethernet cable to controller B to reestablish connection to controller A through controller B (169.254.128.102).

8. Log in using the password you set previously.

The Configure Network Settings wizard will appear.

9. Use the network settings provided by your network administrator in the **Configure Network Settings** wizard to configure controller B's network settings, and then select **Finish**.
10. Connect controller B to your network.

11. Validate controller B's network settings by entering controller B's newly configured IP address in a browser.



If you lose the connection to controller B, you can use your previously validated connection to controller A to reestablish connection to controller B through controller A.

### Step 3: Configure storage system

After you have installed your hardware, use the SANtricity software to configure and manage your storage system.

#### Before you begin

- Configure your management ports.
- Verify and record your password and IP addresses.

#### Steps

1. Use the SANtricity software to configure and manage your storage arrays.
2. In the simplest network configuration, connect your controller to a web browser and use SANtricity System Manager for managing a single E2800 or E5700 series storage array.



For accessing System Manager, use the same IP addresses that you used to configure your management ports.

## 3040 40U cabinet

### Install trays in the 3040 40U cabinet

You can install the following controller-drive trays and expansion drive trays in the E-Series 3040 40U cabinet:

- E2612, E2624, and E2660 controller-drive trays
- E2712, E2724, and E2760 controller-drive trays
- E5412, E5424, and E5460 controller-drive trays
- E5512, E5524, and E5560 controller-drive trays
- E5612, E5624, and E5660 controller-drive trays
- EF540, EF550, and EF560 flash arrays
- DE1600, DE5600, and DE6600 drive trays

You can also install the following SAS-3 controller shelves and drive shelves in the cabinet.

- E2812, E2824, and E5724 controller shelves
- DE212C and DE224C drive shelves

However, specifications for these shelves are not listed in these procedures. Refer to [NetApp Hardware Universe](#).

## Cabinet specifications

The model 3040 40U cabinet has these standard features:

- A rear door that can be latched and locked
- Standard Electronic Industry Association (EIA) support rails that provide mounting holes for installing devices into a standard 48.3-cm (19-in.) wide cabinet
- Four roller casters and four adjustable leveling feet that are located beneath the cabinet for moving the cabinet and then leveling the cabinet in its final location
- A stability foot that stabilizes the cabinet after it is installed in its permanent location
- Access openings for interface cables
- Two AC power distribution units (PDUs) that provide integrated power connection and power handling capacity

The following figures show a front view (left) and a rear view (right) of the cabinet.



1.	Ventilation cover
2.	Interface cable access openings

3.	Rear plate
4.	EIA support rails
5.	Vertical support rails
6.	Cabinet mounting rails
7.	Stability foot
8.	Adjustable leveling feet
9.	Power distribution unit (one of two)
10.	AC power entry boxes
11.	Front of the cabinet
12.	Rear of the cabinet



**Risk of bodily injury** — If the bottom half of the cabinet is empty, do not install components in the top half of the cabinet. If the top half of the cabinet is too heavy for the bottom half, the cabinet might fall and cause bodily injury. Always install a component in the lowest available position in the cabinet.



**Risk of bodily injury** — Only move a populated cabinet with a forklift or adequate help from other persons. Always push the cabinet from the front to prevent it from falling over. A fully populated cabinet can weigh more than 2000 lb (909 kg). The cabinet is difficult to move, even on a flat surface. If you must move the cabinet along an inclined surface, remove the components from the top half of the cabinet, and make sure that you have adequate help.



You cannot install E2860 or E5760 controller shelves or a DE460C drive shelf into a 3040 40U cabinet.



If a 3040 cabinet is fully populated with DE6600 trays, it weighs more than 2756 lb (1250.1 kg).

## Power requirements and heat dissipation

The cabinet includes the following specifications for power and heat dissipation.

### Power rating

The 3040 40U cabinet is rated at 200 VAC to 240 VAC at 50 Hz to 60 Hz, and operates to  $\pm 10$  percent of that range.

### Power distribution units (PDUs)

The cabinet includes two identical AC power distribution units (PDUs), with each PDU providing up to 72A of usable power. The PDUs are mounted vertically at the back of the cabinet, and each PDU includes six 12A power banks. Each power bank contains four IEC 60320-C19 power outlets and a 15A circuit breaker. Each PDU has a total of 24 outlets and 6 circuit breakers.

Each of the two PDUs has three power entry boxes, which are located at the bottom of the cabinet. Each power entry box provides power to eight of the power outlets, as follows:

- Power entry box 1, which has power cord C1, supplies power to the bottom eight outlets
- Power entry box 2, which has power cord C2, supplies power to the middle eight outlets
- Power entry box 3, which has power cord C3, supplies power to the top eight outlets

The power entry boxes are labeled C1, C2, and C3 where the power cords connect to the modules.

### Power calculations and heat calculations for the cabinet

Component	kVA	Watts	BTU/Hr
Cabinet PDU (72A PDUs)	14.4	14400	49176
Cabinet PDU/12A bank (72A PDUs)	2.40*	2400*	8196*
E2612 controller-drive tray	0.437	433	1476
E2624 controller-drive tray	0.487	482	1644
E2660 controller-drive tray	1.128	1117	3810
E2712 controller-drive tray	0.516	511	1744
E2724 controller-drive tray	0.561	555	1894
E2760 controller-drive tray	1.205	1193	4072
E5412 controller-drive tray	0.558	552	1883
E5424 controller-drive tray and the EF540 flash array	0.607	601	2051

Component	kVA	Watts	BTU/Hr
E5460 controller-drive tray	1.254	1242	4237
E5512 controller-drive tray	0.587	581	1982
E5524 controller-drive tray and the EF550 flash array	0.637	630	2150
E5560 controller-drive tray	1.285	1272	4342
E5612 controller-drive tray	0.625	619	2111
E5624 controller-drive tray and the EF560 flash array	0.675	668	2279
E5660 controller-drive tray	1.325	1312	4477
DE1600 drive tray	0.325	322	1099
DE5600 drive tray	0.375	371	1267
DE6600 drive tray	0.1.011	1001	3415

### Maximum number of trays

The maximum number of trays that you can install in a 3040 40U cabinet depends on the height of each tray in rack units (U).

### Tray heights in rack units (U)

Each rack unit is 1.75 inches (4.45 cm). For example, you can install up to ten 4U trays, up to twenty 2U trays, or a combination of 2U and 4U trays, up to 40U.

Tray	Rack units (U)
E2x12 or E2x24 controller-drive tray	2U
E2x60 controller-drive tray	4U
E5x12 or E5x24 controller-drive tray	2U

Tray	Rack units (U)
E5x60 controller-drive tray	4U
EF5x0 Flash Array	2U
DE1600 drive tray	2U
DE5600 drive tray	2U
DE6600 drive tray	4U

## Gather required tools and equipment

Before installing the 3040 40U cabinet, make sure you have required tools and equipment.

### Step

1. Gather all items listed in the following table.

	Item	Included with the cabinet
	<p><b>3/4-in. wrench</b> (supplied in the shipping crate) — To raise and lower the leveling feet under the cabinet.</p> <p><b>1/4-in. Allen wrench</b> — To raise and lower the stability foot in the front of the cabinet.</p>	

	Item	Included with the cabinet
<b>NEMA L6-30</b> 	<b>AC power cords</b> — To connect the cabinet to external power sources (wall plugs). <ul style="list-style-type: none"> <li>• The NEMA L6-30 connectors are for use in the USA and Canada.</li> <li>• The IEC-60309 connectors are for use worldwide, except for USA and Canada.</li> </ul>	
<b>IEC-60309</b> 	 Each PDU must be connected to an independent power source.	
	<b>SAS cables</b> (optional) – Two cables are included with each drive tray, while host side cables must be purchased separately.  <b>Communication cables</b> (optional) – To attach the tray to the host.  Refer to the appropriate controller-drive tray installation guide for additional required items.	
	<b>Mountable cable spools</b> – Installed along both sides of the vertical power distribution outlets to accommodate excess cable length and cable routing. Two cable spools are included with each controller-drive tray. Cable spools are also shipped with standalone drive trays.	
	<b>Shears</b> – To cut the metal bands on the shipping crate.	



	Item	Included with the cabinet
	<b>Forklift</b> (optional) – To remove the cabinet from the shipping pallet.	
	<b>Front panel kits</b> (optional) – To cover the empty bays at the front of the cabinet.	
	<b>Antistatic bags</b> (optional) – To protect components that are removed during the installation procedure for the cabinet.	

## Prepare to move cabinet

Prepare to move the cabinet from its location in your receiving area by estimating its total weight, acclimating the cabinet, removing the packing materials, and checking the shipping contents.

### Step 1: Estimate cabinet weight

The cabinet reliably and safely transports up to 909.1 kg (2000 lb) of capacity. You need to know the approximate weight of the cabinet so that you can safely move it.

#### Steps

1. Use the following table to calculate the approximate total weight of your cabinet.

The total weight of the cabinet depends on the number and type of trays that are installed in the cabinet.

Component	Weight	Notes
Cabinet	138.80 kg (306.0 lb)	Empty with the rear door installed
Power distribution units (PDUs [pair])	19.96 kg (44.0 lb)	
Mounting rails (pair)	1.59 kg (3.50 lb)	
E2612 controller-drive tray	27 kg (59.52 lb)	Maximum configuration
E2624 controller-drive tray	26.12 kg (57.32 lb)	Maximum configuration
E2660 controller-drive tray	105.2 kg (232 lb)	Maximum configuration
E2712 controller-drive tray	27.12 kg (59.8 lb)	Maximum configuration

Component	Weight	Notes
E2724 controller-drive tray	26 kg (57.32 lb)	Maximum configuration
E2760 controller-drive tray	105.2 kg (232 lb)	Maximum configuration
E5412 controller-drive tray	27.92 (61.52 lb)	Maximum configuration
E5424 controller-drive tray	26.92 kg (59.32 lb)	Maximum configuration
E5460 controller-drive tray	105.2 kg (232 lb)	Maximum configuration
E5512 controller-drive tray	28.89 kg (63.7 lb)	Maximum configuration
E5524 controller-drive tray	27.9 kg (61.52 lb)	Maximum configuration
E5560 controller-drive tray	107.13 kg (236.2 lb)	Maximum configuration
E5612 controller-drive tray	28.89 kg (63.7 lb)	Maximum configuration
E5624 controller-drive tray	27.9 kg (61.52 lb)	Maximum configuration
E5660 controller-drive tray	107.13 kg (236.2 lb)	Maximum configuration
EF540 flash array	23.64 kg (52.12 lb)	Maximum configuration
EF550 flash array	24.63 kg (54.32 lb)	Maximum configuration
EF560 flash array	24.63 kg (54.32 lb)	Maximum configuration
DE1600 drive tray	26.3 kg (58 lb)	Maximum configuration
DE5600 drive tray	25.31 kg (55.8 lb)	Maximum configuration
DE6600 drive tray	104.1 kg (229.6 lb)	Maximum configuration

2. Review the following notes.



Remove all drives from the DE6600 drive tray before moving the cabinet to its final position.



**Possible equipment damage** — Cabinets with DE6600 drive trays ship without drives to reduce shipping weight. Because a fully-populated cabinet with DE6600 drive trays can weigh more than 1247.3 kg (2750 lb), make sure that you move the cabinet into place before you load the drives, and make sure that the floor load capability of the cabinet's destination supports that much weight.



**Possible damage to tray components** — Do not place a DE6600 drive tray on a flat surface. Install the DE6600 drive tray in the cabinet before operating or moving drawers.

## Step 2: Acclimate cabinet

Make sure that the cabinet and the trays are acclimated to the indoor environment before removing the packing materials.

### Steps

1. If the outdoor temperature is below 0°C (32°F), leave the cabinet and trays inside of their crates indoors for at least 24 hours to prevent condensation.
2. Increase or decrease the 24-hour stabilization period depending on the outside temperature upon arrival.



**Possible damage to tray components** — If the outdoor temperature is below 0°C (32°F) when you receive your cabinet and trays, do not immediately unpack them or uncrate them. Exposing cold components to warm indoor temperatures can cause condensation, which results in component damage or failures.

## Step 3: Remove packing materials

Remove the packing materials only after the cabinet has acclimated to the indoor temperature.

### Steps

1. Refer to the unpacking instructions included on the front of the shipping crate.
2. Remove the packing materials according to the enclosed instructions.

## Step 4: Check shipping contents

Check the shipping contents to make sure that all equipment arrived at the site.

### Steps

1. Compare the packing list with the equipment that you received.
2. Make sure that all equipment arrived at the site.
3. If any items are missing, contact your sales representative.

## Step 5: Remove heavy components from cabinet

Remove some of the heavier components that are located in the top of the cabinet to ensure maximum stability.

### Before you begin

- Make sure the maximum weight does not exceed 2000 lbs before you move the cabinet.
- Note the location of each tray, component, and cable before removing it, so that you can reinstall each item in its original location.

### Steps

1. Record the cable configuration for future reassembly if any cables must be disconnected.
2. Remove the drive trays and controller-drive trays in the top half of the cabinet. Keep all of the components

from the same tray together.



You do not need to remove the power supplies or other components from the rear of each tray.

3. Place each component in a separate antistatic bag. If the original shipping boxes are available, use them to transport the components.

## Move cabinet to its permanent location

The 3040 40U cabinet has heavy-duty casters that enable you to move the cabinet to its permanent location.

### Before you begin

- Review the instructions for rolling the cabinet off the pallet without the use of a forklift.

Shipping crates provide built-in ramps and instructions. Refer to the unpacking instructions included on the front of the shipping crate.

- Evaluate all of the ramps between the loading dock and the cabinet's final destination.

You must evaluate all ramps to make sure that the cabinet's center of gravity (when the cabinet is on a ramp and sitting at an angle) does not extend beyond the cabinet's footprint.

### About this task

Many of the cabinets are populated with drive trays. This situation results in most of the weight in the front portion of the cabinet, making the center of gravity closer to the front.

### Steps

1. Remove the top-most devices in your cabinet to make sure that the cabinet is safely transported to its final location. This is especially important if any ramp has an incline or a decline greater than 10 degrees.
2. Move the cabinet to its permanent location using the correct method shown in the following figure. Make sure that you push on the front of the cabinet, not the rear.



Rear of Cabinet



Front of Cabinet

83004-01

## Complete cabinet installation

After you move the cabinet, lower the leveling feet and the stability foot, reinstall the components you removed, install other required components, and connect the cabinet to power.

### Step 1: Lower leveling feet and stability foot

You stabilize the cabinet by adjusting its feet. The leveling feet support the cabinet off the casters. The stability foot prevents the cabinet from falling over after it is placed in its permanent location.

#### Steps

1. Lower the leveling feet to support the cabinet off the casters.

The leveling feet are located near each bottom corner of the cabinet.

2. Make sure that the cabinet is as level as possible.

The following figure provides a close-up view of the stability foot and the leveling feet.



1.	Leveling feet
2.	Stability foot

## Step 2: Reinstall trays

After you move the cabinet, you can reinstall the trays in their original locations.



*Do not* install the following trays in the top of the cabinet over your head. When fully-populated, each of these trays weighs over 100 kg (220 lb). If installed in the top of the cabinet, these trays create a top-heavy cabinet that can become easily unbalanced: E2660, E2660, E2760, E5460, E5560, and E5660 controller-drive trays, as well as the DE6600 drive tray.

### Steps

1. Reinstall all of the trays in their original locations in the cabinet.



**Risk of bodily injury** — An empty tray weighs approximately 56.7 kg (125 lb). Three persons are required to safely move an empty tray. If the tray is populated with components, a mechanized lift is required to safely move the tray.

2. Reinstall all of the components in their original locations in the trays.

To prevent address conflicts and loss of data access, replace all components in the same tray and in the same location in the tray.

3. Reinstall all cables to their original locations in the trays.
4. Route the interface cables to the cabinet.
5. Route the main power cords from the cabinet to the two external power sources. *Do not* plug in the power cords at this time.

### **Step 3: Install cable spools and tie wraps**

After you reinstall the trays, install the cable spools and tie wraps. The cable spools and tie wraps accommodate excess cable length and cable routing for the controllers and the trays.

#### **Step**

1. Install the cable spools and the tie wraps along both sides of the vertical power distribution outlets.



1.	Tie wrap location
2.	Cable spool

#### Step 4: Install additional trays

If needed, you can install additional trays. You must cover unused positions for trays to assure correct air flow.

##### Steps

1. If you have additional trays that must be installed, install the mounting hardware for these trays.
2. If the front of the cabinet is not completely filled with trays, use front panel kits to cover the empty spaces above or below the installed trays.

Covering the empty spaces is necessary so that the correct airflow through the cabinet is maintained.



3. Power on the trays.

### Step 5: Install additional mounting rails

If you are installing controller-drive trays, or drive trays that were shipped separately (not already installed in the cabinet), you might need to install additional mounting rails in the cabinet.

#### Steps

1. Determine the location for the mounting rails.
  - **Above an existing tray** — Position the mounting rails immediately above the top tray in the cabinet.
  - **Beneath an existing tray** — Position the mounting rails with enough clearance to hold the tray being installed:
    - 8.9 cm (3.5 in.) for 2U controller-drive trays or drive trays
    - 17.8 cm (7 in.) for 4U controller-drive trays or drive trays
2. Use the measurement markers on the right-front and left-front vertical supports to attach the mounting rails to the same position on each side of the cabinet.



1.	Front adjustable rail
2.	Rear adjustable rail
3.	Adjustment plate and screws
4.	Rail mounting M5×10mm screws
5.	Clip nuts
6.	Rear hold down bracket
7.	Vertical support



The clip nuts and the rear hold down bracket are not used when the rails are installed in a 3040 cabinet.

3. Place the rear adjustable rail on the vertical support.
4. On the rear adjustable rail, align the adjustable rail holes in front of the holes in the vertical support.
5. Attach two M5×10mm screws.
  - a. Attach the screws through the vertical support rail and the rear adjustable rail.
  - b. Tighten the screws.
6. Place the front adjustable rail on the vertical support.
7. On the front adjustable rail, align the adjustable rail holes in front of the holes in the vertical support.
8. Attach two M5×10mm screws.
  - a. Attach one screw through the vertical support rail and the bottom hole of the front adjustable rail.
  - b. Attach one screw through the vertical support rail and the middle of the top three holes in the front adjustable rail.
  - c. Tighten the screws.



The remaining two screw holes are used to mount the tray.

9. Repeat step 3 through step 8 to attach the second rail on the other side of the cabinet.
10. Install each tray using the applicable tray installation instructions.
11. Choose one of the following options:
  - If all positions for trays are full, power-on the trays.
  - If not all positions for trays are full, use front panel kits to cover the empty spaces above or below the installed trays.

## Step 6: Connect the cabinet to power

To complete the cabinet installation, power on the cabinet components.

### About this task

While the trays perform the power-on procedure, the LEDs on the front and the rear of the trays blink. Depending on your configuration, it can take several minutes to complete the power-on procedure.

### Steps

1. Turn off the power to all components in the cabinet.
2. Turn all 12 circuit breakers to their off (down) position.
3. Plug each of the six NEMA L6-30 connectors (USA and Canada) or the six IEC 60309 connectors (worldwide, except for USA and Canada) into an available electrical outlet.



You must connect each PDU to an independent power source outside of the cabinet.

4. Turn all 12 circuit breakers to their on (up) position.



1.	Circuit breakers
2.	Electrical outlets
3.	Power entry boxes

5. Turn on the power to all drive trays in the cabinet.



Wait 30 seconds after turning on the drive trays before you turn on the power to the controller-drive trays.

6. Wait 30 seconds after turning on the drive trays, and then turn on the power to all controller-drive trays in the cabinet.

### Result

The cabinet installation is complete. You can resume normal operations.

## Rack-mount hardware

Use the links below to access documentation that describes how to install rack-mounting hardware.

### Adjustable support rails

Access [Installing adjustable support rails](#) for installing a controller-drive tray or a drive tray that was shipped separately (not already installed in the cabinet). This procedure is applicable for the following 2U (9 cm or 3.5 inch) trays:

- DE1600 or DE5600
- E2612 or E2624
- E5412, E5424, E5512, or E5524

### Two-post rack — 2U

Access [Installing 2U equipment into a two-post rack](#).

### Four-post rack or cabinet — 2U

Access [Installing a 2U 12-drive enclosure in a four-post rack or cabinet](#).

### Four-post rack — SuperRail

Access [Install SuperRail into a four-post rack \(DE224C/DE460C shelves\)](#).

## Cabling

## Cabling overview

You can cable a host directly to a controller or use switches to connect a host to a controller.

If your storage system includes one or more drive shelves, you must cable them to your controller shelf. You can add a new drive shelf while power is still applied to other components of the storage system. In addition, you can connect your storage system to a network for out-of-band management.

The cabling information is intended for a hardware installer or system administrator who is installing or expanding a storage system. It is assumed that you have installed the storage system as described in the *Installation and Setup Instructions* for your hardware.

### Applicable hardware model

Cabling information applies to the following hardware models.

Controller Shelf	Drive Shelf
EF300, EF600	DE212C, DE224C, DE460
E5724, EF570, E2812, E2824, EF280	DE212C, DE224C
E2860, E5760	DE460C

### Additional cabling information

If you are cabling for the following configuration, see [Adding IOM Drive Shelves to an Existing E27XX, E56XX, or EF560 Controller Shelf](#).

Controller Shelf	Drive Shelf
E2712, E2724, E5612, E5624, EF560	DE212C, DE224C
E2760, E5660	DE460C

For information about other cabling options, see the [E-Series Hardware Cabling Guide](#) for older systems.

For information about cabling to support mirroring features, see the [Synchronous and Asynchronous Mirroring Feature Descriptions and Deployment Guide](#).

## Requirements

In addition to controller shelves and drive shelves, you might need some or all of the following components when cabling your storage system:

- Cables: SAS, Fibre Channel (FC), Ethernet, InfiniBand
- Small form-factor pluggable (SFP) or Quad SFP (QSFP) transceivers
- Switches

- Host bus adapters (HBAs)
- Host channel adapters (HCAs)
- Network interface cards (NICs)

## Host cabling

You can cable a host directly to a controller (direct-attached topology) or use switches (switch topology) to connect a host to a controller.

### Cabling for a direct-attached topology

A direct-attached topology connects host adapters directly to controllers in your storage system.

The following figure shows an example connection. To help ensure maximum performance, use all available host adapter ports.



**Figure 1. Two hosts and two controllers**

*(1) Connect each host adapter port directly to the host ports on the controllers.*

### Cabling for a switch topology

A switch topology uses switches to connect hosts to the controllers in your storage system. The switch must support the connection type used between the host and the controller.

The following figure shows an example connection. For switches that provide provisioning capability, you should isolate each initiator and target pair.



**Figure 2. Two hosts and two switches**

*(1) Connect each host adapter directly to the switch.*

*(2) Connect each switch directly to the host ports on the controllers. To help ensure maximum performance, use all available host adapter ports.*

## Drive shelf cabling

You must connect each controller in the controller shelf to an I/O module (IOM) in a drive shelf.

This procedure applies to IOM12 and IOM12B drive shelves.



IOM12B modules are only supported on SANtricity OS 11.70.2 onward. Ensure your controller's firmware has been updated before installing or upgrading to an IOM12B.



This procedure is for like-for-like shelf IOM hot-swaps or replacements. This means you can only replace an IOM12 module with another IOM12 module or replace an IOM12B module with another IOM12B module. (Your shelf can have two IOM12 modules or have two IOM12B modules.)

If you are cabling an older controller shelf to a DE212C, DE224C, or DE460, see [Adding IOM Drive Shelves to an Existing E27XX, E56XX, or EF560 Controller Shelf](#).

## Cabling E2800 and E5700

The following information applies to cabling an E2800, E2800B, EF280, E5700, EF5700B, or EF570 controller shelf to a DE212C, DE224C, or DE460 drive shelf.



### Cabling a 12-drive or 24-drive shelf

You can cable your controller shelf to one or more 12-drive or 24-drive shelves.

The following image shows a representation of the controller shelf and the drive shelves. To locate the ports on your model, see [Hardware Universe](#).

#### A controller shelf and 12-drive or 24-drive shelves

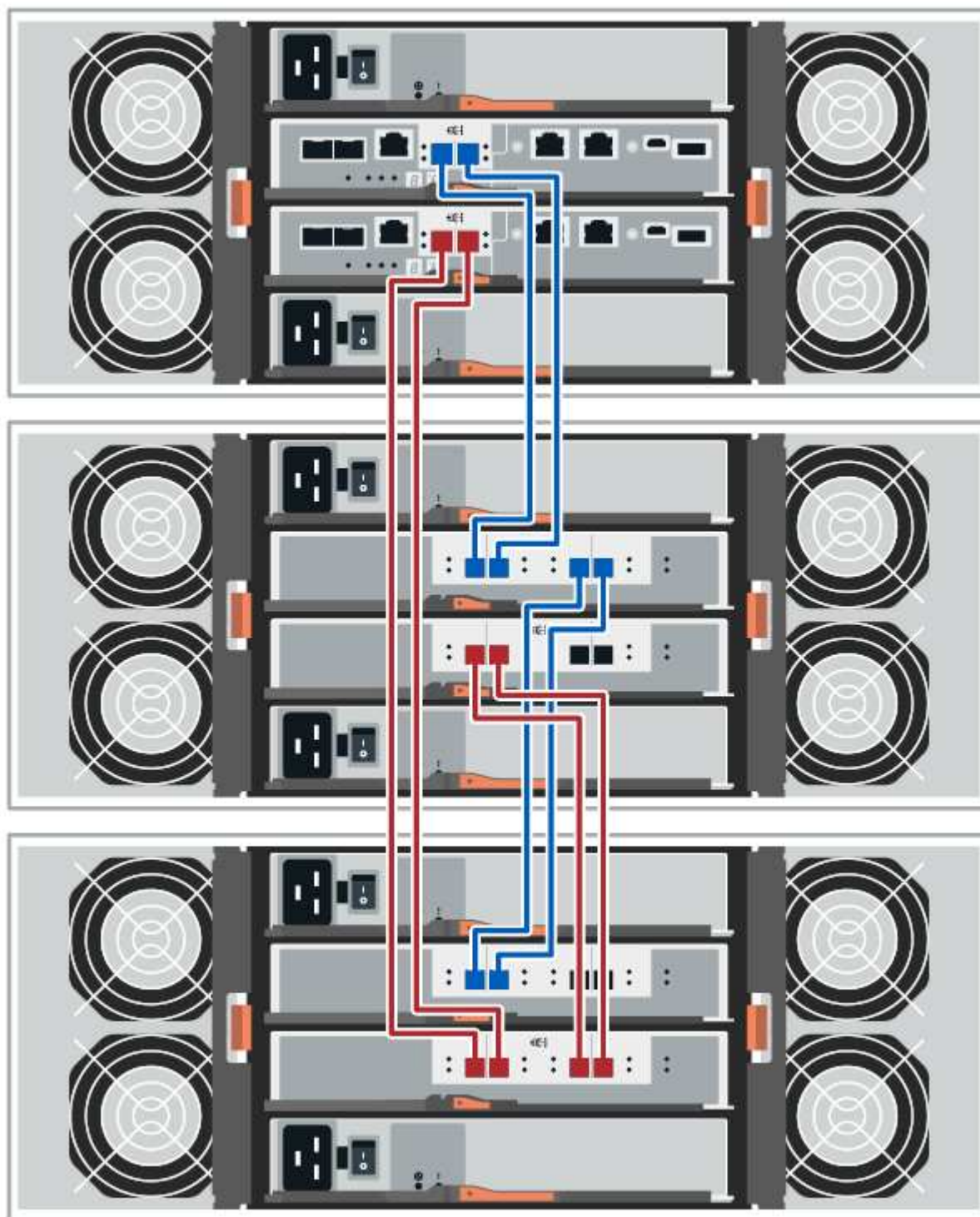


### Cabling a 60-drive shelf

You can cable your controller shelf to one or more 60-drive shelves.

The following image shows a representation of the controller shelf and the drive shelves. To locate the ports on your model, see [Hardware Universe](#).

## A controller shelf and 60-drive shelves



### Cabling EF300 and EF600

The following information applies to cabling an EF300 or EF600 controller shelf to a DE212C, DE224C, or DE460 drive shelf.

#### Before you begin

Before cabling an EF300 or EF600, make sure the firmware is updated to the latest version. To update the firmware, follow the instructions in [Upgrading SANtricity OS](#).

#### **Cabling a 12-drive or 24-drive shelf**

You can cable your controller shelf to one or more 12-drive or 24-drive shelves.

The following image shows a representation of the controller shelf and the drive shelves. To locate the ports on your model, see [Hardware Universe](#).

#### **A controller shelf and 12-drive or 24-drive shelves**



### Cabling a 60-drive shelf

You can cable your controller shelf to one or more 60-drive shelves.

The following image shows a representation of the controller shelf and the drive shelves. To locate the ports on your model, see [Hardware Universe](#).

## **A controller shelf and 60-drive shelves**





## Power cabling

You must connect each component's power supplies to separate power circuits.

### Before you begin

- You have confirmed that your location provides the necessary power.
- The two power switches on the two shelf power supplies must be turned off.

### About this task

The power source for your storage system must be able to accommodate the power requirements of the new drive shelf. For information about the power consumption for your storage system, see the [Hardware Universe](#).

### Step

1. Connect the two power cables for each shelf to different power distribution units (PDUs) in the cabinet or rack.

## Hot adding a drive shelf

You can add a new drive shelf while power is still applied to the other components of the storage system. You can configure, reconfigure, add, or relocate storage system capacity without interrupting user access to data.

### Before you begin

Due to the complexity of this procedure, the following is recommended:

- Read all steps before beginning the procedure.
- Ensure hot adding a drive shelf is the procedure you need.

### About this task

This procedure applies to hot adding a DE212C, DE224C, or DE460C drive shelf to an E2800, E2800B, EF280, E5700, E5700B, EF570, EF300, or EF600 controller shelf.

This procedure applies to IOM12 and IOM12B drive shelves.



IOM12B modules are only supported on SANtricity OS 11.70.2 onward. Ensure your controller's firmware has been updated before installing or upgrading to an IOM12B.



This procedure is for like-for-like shelf IOM hot-swaps or replacements. This means you can only replace an IOM12 module with another IOM12 module or replace an IOM12B module with another IOM12B module. (Your shelf can have two IOM12 modules or have two IOM12B modules.)

If you are cabling an older controller shelf to a DE212C, DE224C, or DE460, see [Adding IOM Drive Shelves to an Existing E27XX, E56XX, or EF560 Controller Shelf](#).



To maintain system integrity, you must follow the procedure exactly in the order presented.

## Step 1: Prepare to add the drive shelf

To prepare to hot add a drive shelf, you must check for critical events and check the status of the IOMs.

### Before you begin

- The power source for your storage system must be able to accommodate the power requirements of the new drive shelf. For the power specification for your drive shelf, see the [Hardware Universe](#).
- The cabling pattern for the existing storage system must match one of the applicable schemes shown in this procedure.

### Steps

1. In SANtricity System Manager, select **Support > Support Center > Diagnostics**.
2. Select **Collect Support Data**.

The Collect Support Data dialog box appears.

3. Click **Collect**.

The file is saved in the Downloads folder for your browser with the name support-data.7z. The data is not automatically sent to technical support.

4. Select **Support > Event Log**.

The Event Log page displays the event data.

5. Select the heading of the **Priority** column to sort critical events to the top of the list.
6. Review the system critical events for events that have occurred in the last two to three weeks, and verify that any recent critical events have been resolved or otherwise addressed.



If unresolved critical events have occurred within the previous two to three weeks, stop the procedure and contact technical support. Continue the procedure only when the issue is resolved.

7. Select **Hardware**.
8. Select the **IOMs (ESMs)** icon.



The Shelf Component Settings dialog box appears with the **IOMs (ESMs)** tab selected.

9. Make sure that the status shown for each IOM/ESM is *Optimal*.
10. Click **Show more settings**.
11. Confirm that the following conditions exist:
  - The number of ESMs/IOMs detected matches the number of ESMs/IOMs installed in the system and that for each drive shelf.
  - Both of the ESMs/IOMs show that communication is OK.
  - The data rate is 12Gb/s for DE212C, DE224C, and DE460C drive shelves or 6 Gb/s for other drive trays.



## Step 2: Install the drive shelf and apply power

You install a new drive shelf or a previously installed drive shelf, turn on the power, and check for any LEDs that require attention.

### Steps

1. If you are installing a drive shelf that has previously been installed in a storage system, remove the drives. The drives must be installed one at a time later in this procedure.

If the installation history of the drive shelf that you are installing is unknown, you should assume that it has been previously installed in a storage system.

2. Install the drive shelf in the rack that holds the storage system components.



See the installation instructions for your model for the full procedure for physical installation and power cabling. The installation instructions for your model includes notes and warnings that you must take into account to safely install a drive shelf.

3. Power on the new drive shelf, and confirm that no amber attention LEDs are illuminated on the drive shelf. If possible, resolve any fault conditions before you continue with this procedure.

## Step 3: Cable your system

Select one of the following options:

- [Option 1: Connect the drive shelf for E2800 or E5700](#)
- [Option 2: Connect the drive shelf for EF300 or EF600](#)

If you are cabling an older controller shelf to a DE212C, DE224C, or DE460, see [Adding IOM Drive Shelves to an Existing E27XX, E56XX, or EF560 Controller Shelf](#).

### Option 1: Connect the drive shelf for E2800 or E5700

You connect the drive shelf to controller A, confirm IOM status, and then connect the drive shelf to controller B.

### Steps

1. Connect the drive shelf to controller A.

The following figure shows an example connection between an additional drive shelf and controller A. To locate the ports on your model, see the [Hardware Universe](#).





2. In SANtricity System Manager, click **Hardware**.



At this point in the procedure, you have only one active path to the controller shelf.

3. Scroll down, as necessary, to see all the drive shelves in the new storage system. If the new drive shelf is not displayed, resolve the connection issue.
4. Select the **ESMs/IOMs** icon for the new drive shelf.



The **Shelf Component Settings** dialog box appears.

5. Select the **ESMs/IOMs** tab in the **Shelf Component Settings** dialog box.
6. Select **Show more options**, and verify the following:
  - IOM/ESM A is listed.
  - Current data rate is 12 Gbps for a SAS-3 drive shelf.
  - Card communications is OK.
7. Disconnect all expansion cables from controller B.
8. Connect the drive shelf to controller B.

The following figure shows an example connection between an additional drive shelf and controller B. To locate the ports on your model, see the [Hardware Universe](#).



9. If it is not already selected, select the **ESMs/IOMs** tab in the **Shelf Component Settings** dialog box, and then select **Show more options**. Verify that Card communications is **YES**.



Optimal status indicates that the loss of redundancy error associated with the new drive shelf has been resolved and the storage system is stabilized.

#### Option 2: Connect the drive shelf for EF300 or EF600

You connect the drive shelf to controller A, confirm IOM status, and then connect the drive shelf to controller B.

#### Before you begin

- You have updated your firmware to the latest version. To update your firmware, follow the instructions in the [Upgrading SANtricity OS](#).

#### Steps

1. Disconnect both of the A-side controller cables from IOM12 ports one and two from previous last shelf in the stack and then connect them to the new shelf IOM12 ports one and two.

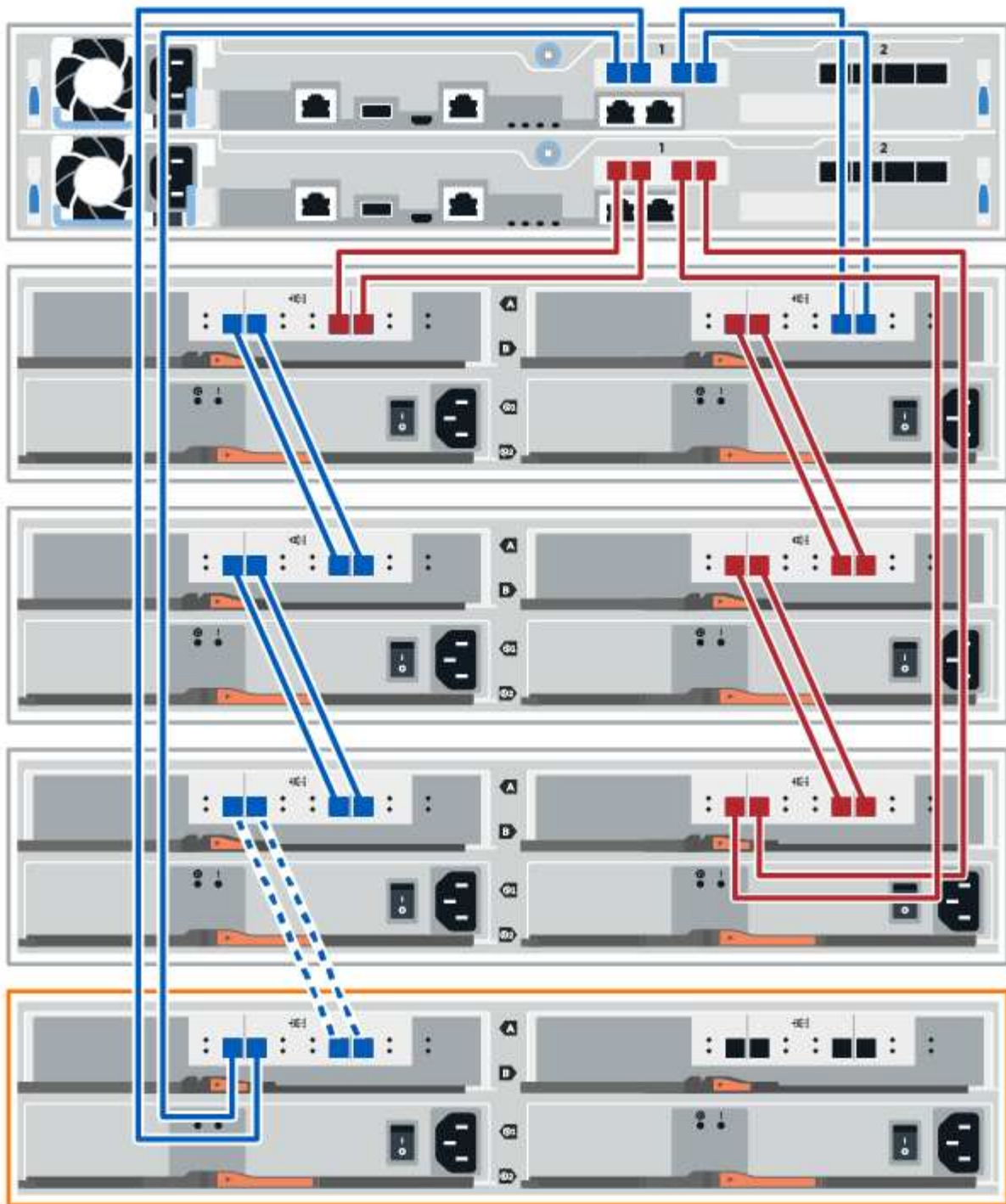


2. Connect the cables to A-side IOM12 ports three and four from the new shelf to previous last shelf IOM12 ports one and two.

The following figure shows an example connection for A side between an additional drive shelf and the previous last shelf. To locate the ports on your model, see the [Hardware Universe](#).







3. In SANtricity System Manager, click **Hardware**.



At this point in the procedure, you have only one active path to the controller shelf.

4. Scroll down, as necessary, to see all the drive shelves in the new storage system. If the new drive shelf is not displayed, resolve the connection issue.
5. Select the **ESMs/IOMs** icon for the new drive shelf.



The **Shelf Component Settings** dialog box appears.

6. Select the **ESMs/IOMs** tab in the **Shelf Component Settings** dialog box.
7. Select **Show more options**, and verify the following:
  - IOM/ESM A is listed.
  - Current data rate is 12 Gbps for a SAS-3 drive shelf.
  - Card communications is OK.
8. Disconnect both the B-side controller cables from IOM12 ports one and two from the previous last shelf in the stack then connect them to the new shelf IOM12 ports one and two.
9. Connect the cables to B-side IOM12 ports three and four from the new shelf to the previous last shelf IOM12 ports one and two.

The following figure shows an example connection for B side between an additional drive shelf and the previous last shelf. To locate the ports on your model, see the [Hardware Universe](#).





10. If it is not already selected, select the **ESMs/IOMs** tab in the **Shelf Component Settings** dialog box, and then select **Show more options**. Verify that Card communications is **YES**.



Optimal status indicates that the loss of redundancy error associated with the new drive shelf has been resolved and the storage system is stabilized.

## Step 4: Complete hot add

You complete the hot add by checking for any errors and confirming that the newly added drive shelf uses the latest firmware.

### Steps

1. In SANtricity System Manager, click **Home**.
2. If the link labeled **Recover from problems** appears at the center top of the page, click the link, and resolve any issues indicated in the Recovery Guru.
3. In SANtricity System Manager, click **Hardware**, and scroll down, as necessary, to see the newly added drive shelf.
4. For drives that were previously installed in a different storage system, add one drive at time to the newly installed drive shelf. Wait for each drive to be recognized before you insert the next drive.

When a drive is recognized by the storage system, the representation of the drive slot in the **Hardware** page displays as a blue rectangle.

5. Select **Support > Support Center > Support Resources** tab.
6. Click the **Software and Firmware Inventory** link, and check which versions of the IOM/ESM firmware and the drive firmware are installed on the new drive shelf.



You might need to scroll down the page to locate this link.

7. If necessary, upgrade the drive firmware.

IOM/ESM firmware automatically upgrades to the latest version unless you have disabled the upgrade feature.

The hot add procedure is complete. You can resume normal operations.

## Ethernet cabling for a management station

You can connect your storage system to an Ethernet network for out-of-band storage array management. You must use Ethernet cables for all storage array management connections.

### Direct topology

A direct topology connects your controller directly to an Ethernet network.

You must connect management port 1 on each controller for out-of-band management and leave port 2 available for access to the storage array by technical support.



**Figure 3. Direct storage management connections**

### Fabric topology

A fabric topology uses a switch to connect your controller to an Ethernet network.

You must connect management port 1 on each controller for out-of-band management and leave port 2 available for access to the storage array by technical support.



**Figure 4. Fabric storage management connections**

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